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ORIGINAL ARTICLE

Study of Predominant Lip-Print Patterns in University Students of Faridabad, Haryana

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ABSTRACT

CONTEXT: Cheiloscopy is the study of lip print patterns and can aide in identification and gender determination of the individuals.

AIM: The current study was aimed at knowing different lip groove pattern distribution, their relation with gender identification in the studied individual.

SETTINGS AND DESIGN: Lipstick used from middle line of lips and then to lateral sides. Then prints of both lower and upper lips were collected together on cellophane tape.

MATERIALS & METHOD: The samples collected randomly in this study belonged to 53 healthy selected individuals who were mainly of student population aged between18-25 of both sexes of North - West Faridabad region. Every lip print was divided into 4 Quadrants (QI, QII, QIII, QIV) according to the method given by Santos.[1] Examination of lip prints were done under direct light using magnifying hand tool. Y. Tsuchihashi and K. Suzuki[2] method was then applied for classifying the lip print samples into four different lip prints.

STATISTICAL ANALYSIS USED: The statistical package for social sciences 16 (SPSS 16) was used for the analysis of the data.

RESULTS: The dominant pattern was found to be Branched (Type II) among quadrants I, II and III while Intersecting pattern (Type III) was found highest in quadrant IV. Vertical type lip pattern was least dominant and found only on 1.9% and 5.5% in quadrant I and quadrant II respectively of study population.

CONCLUSIONS: Identification of lip print patterns can be used as tool among the subjects of this region.

KEY MESSAGE: Lip prints presence on scene of crime can confirm the presence of that specific individual on the scene, thus allowing to link crime scene with the suspect, victim and individualizing the suspect.

KEYWORDS | lip prints, identification, crime scene, quadrants, cheiloscopy

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INTRODUCTION

In cases of civil, mass disaster, criminal categories identification of unidentified deceased individual becomes very difficult. There are various techniques and methods available which are being used in Forensic science for the purpose of human identification. The most commonly used technique includes fingerprints, dental records, DNA profiling etc. However, identifying a person using their lip prints is a new and interesting field. But the research show the presence of lip prints on a scene and their utilization as an evidence for identification of criminal or personal identification is very less because the lip prints

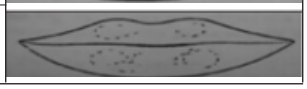
CLASSIFICATION	CHARACTERISTICS	SHAPE
Type 1	Clear vertical lines that run all over both lips	
Type 2	Partial or incomplete lines	
Type 3	Branching lines or fork shaped	
Type 4	Intersecting lines which are also branched	
Type 5	Reticulate	
Type 6	Mixed or lines which cannot be classified in the mentioned patterns	

Figure 1: The Objective of the present is to see the differences in the dominant lip characteristics for identification of the lip pattern in selected study group and to scrutinize the differences and find the prevalence of dominant pattern in the various quadrants of male and female.

cannot be found easily in every crime on the scene.

Lip prints are generally found on food article like apple, pear, bread, utensil, clothing, paper, skin etc. Lip prints can also be found on glass tumbler, butts of cigarette, and adhesive tape. Methods like photography, direct visual examination allow much accurate and fast observation of even minute details which are needed for lip prints investigation. Lip prints presence on scene of crime can confirm the presence of that specific individual on the scene, thus allowing to link crime scene with the suspect, victim and individualizing the suspect.

Lip prints found on scene of incidence are not usually well defined and clear so to establish the identity of the person becomes difficult but this point cannot curtail the fact about uniqueness characteristic of lip print as important physical evidence. Even then, the significance of studying lip prints in depth and establishing further information and data related to it will surely be helpful in establishing the role of lip prints as evidence for forensic purposes.

Suzuki and Tsuchihashi's[2] in 1970 gave a system of classification popularly known as Tsuchihashi classification of lip prints. It's the most commonly known and applied method till date.

MATERIALS AND METHOD

The present study was conducted at College of Traffic Management, Institute of Road Traffic Education (CTM-IRTE), Faridabad and Manav Rachna Dental College, Manav Rachna University, Faridabad, Haryana.

The specimens collected in this study were of 53 individuals who were selected randomly from student population aged between18-25 at Faridabad. Valid Consent of participation was taken from all the candidates. Any candidate having any disease, deformity, inflammation or previous history of any cosmetic surgery of lips was excluded.

Every Individual lips were cleaned first then application of lipstick was done properly taking into the consideration the importance of uniformity of lipstick on lips. Lipstick used was without gloss, without presence of metallic substance and dark in color and was applied from middle line of lips and then to lateral sides. Then prints of both lower and upper lips were collected together on cellophane tape. The tape was gently pressed against the lips of subject and then pasted on white sheet. The lip prints

Figure 2: Four Quadrants (QI, QII, QIII, and QIV) were made to divide every lip print sample earlier done Santos in 1967 1.Examination of samples were done by using magnifying lens under direct and focused light on them.

were also recorded by applying direct light pressure against the folded white sheet which were then stored properly with proper measure so as to avoid contamination and alteration of prints. Method given by Ahmed S.A. et.al3 was used for recording and analysis of lip prints.

Before analysing the lip print pattern in the collected samples, all the samples were divided in 4 quadrants i.e. 2 quadrants on each lip and were allotted digit Q1,Q2, Q3, Q4 in clockwise manner starting from subjects 'upper right'

Statistical Analysis:

In the study 53 individuals were studied. Lip print samples were studied from all four quadrants giving 212 samples and four pattern types were analyzed (Type I-Type IV). Irrespective of the gender the overall frequency of most repeated pattern found in the population is in the order T2>T3>T4>T1.

Out of total 53 subjects who participated in this study the dominant pattern as found is Branched (Type II) among quadrants I, II and III while Intersecting pattern (Type III) was found highest in quadrant IV. Vertical type lip pattern was least dominant and found only on 1.9% and 5.5% in quadrant I and quadrant II respectively of study population while in QIII and QIV Reticulate pattern was the least dominant pattern. Reticulate pattern was present in all quadrants with almost same frequency. Branched and Intersecting pattern were present in more than 70% of study population in QI and QII (Table 1).

Branched type pattern was more dominant in Quadrant I in both female and male subject. Vertical pattern type wasn't present in female and is found only in one male. The distribution was not found significant may be due to the due to the variation in the number of samples of male and female (Table 2).

Branched type of lip pattern was found dominant in Quadrant II in female followed by Intersecting and reticulate patterns while in male the dominant pattern was intersecting followed by branched. Vertical type pattern was not present in female and is found in three male. The distribution of pattern in both the gender was found significant (Table 3).

Branched type of lip pattern was found dominant in Quadrant III in female followed by Intersecting patterns while in male the dominant pattern was intersecting followed by branched. The distribution was not found significant may be due to the due to the variation in the number of samples of male and female (Table 4).

Vertical type pattern was found dominant in Quadrant I in female followed by Intersecting pattern while in male Intersecting pattern

PATTERN	Quadrant I		Quadrant II		Quadrant III		Quadrant IV	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Vertical (Type I)	1	1.9	3	5.6	11	20.4	14	25.9
Branched (Type II)	29	53.7	21	38.9	16	29.6	11	20.4
Intersecting (Type III)	12	22.2	18	33.3	16	29.6	20	37.0
Reticulate (Type IV)	11	20.4	11	20.4	10	18.5	8	14.8
Total	53	100.0	53	100.0	53	100.0	53	100.0

Table 1: Lip print pattern frequency in the North-West Faridabad population in various Quadrants

Table 2: Summary of the patterns of lip print in Quadrant (Q1) with regard to pattern distribution among both the gender

GENDER	Quadrant I (Q1)				
	Vertical	Branched	intersecting	Reticulate	Total
Female	0	17	8	8	33
Male	1	12	4	3	20
Total	1	29	12	11	53

Chi-Square Tests for Quadrant (Q1)			
Pearson Chi-Square	Value	df	P Value
	2.425	3	0.489

Table 3: Summary of the patterns of lip print in Quadrant (Q2) with regard to pattern distribution among both the gender

GENDER	Quadrant I (Q2)				
	Vertical	Branched	intersecting	Reticulate	Total
Female	0	15	9	9	33
Male	3	6	9	2	20
Total	3	21	18	11	53

Chi-Square Tests for Quadrant (Q1)			
Pearson Chi-Square	Value	df	P Value
	8.643	3	0.034

Table 4: Summary of the patterns of lip print in Quadrant (Q3) with regard to pattern distribution among both the gender

GENDER	Quadrant I (Q3)				
	Vertical	Branched	intersecting	Reticulate	Total
Female	0	15	9	9	33
Male	3	6	9	2	20
Total	3	21	18	11	53

Chi-Square Tests for Quadrant (Q1)			
Pearson Chi-Square	Value	df	P Value
	.510	3	0.034

Table 5: Summary of patterns of lip print in Quadrant (Q4) with regard to pattern distribution among both the gender

GENDER	Quadrant I (Q4)				
	Vertical	Branched	intersecting	Reticulate	Total
Female	0	15	9	9	33
Male	3	6	9	2	20
Total	3	21	18	11	53

Chi-Square Tests for Quadrant (Q1)			
Pearson Chi-Square	Value	df	P Value
	8.643	3	0.034

was most common followed by Branched lip pattern. Reticulate and Branched lip pattern are least found in male and female respectively. The distribution was not found significant may be due to the variation in the number of samples of male and female (Table 5).

Dominant pattern in females was found as Branched type then follows intersecting pattern and reticulate pattern. Vertical pattern was least present in all quadrants in female. In males Branched and intersecting pattern were most dominant followed by Vertical and Reticulate pattern. In pooled data Branched pattern was found in maximum number of subjects followed by Intersecting pattern. Vertical pattern was least common among the participants (Table 6).

DISCUSSION

The data and research studies used in lip print as a mode of identification is very less and this current study was done so as to give more details and reference for the lip prints use, this study showed the distribution of lip print pattern in the population of university students of Faridabad. To our knowledge, this is the first study done in North-West Faridabad for identifying the lip pattern distribution.

It was also found in the current study that Type III (37.5%) and Type II (37.5%) were found to be equally dominant in males whereas pattern Type II (36.5%) was found to be predominant in females. Ahmed S.A. *et al.,*[3] in their study found that dominant pattern in males was Type I (28.3%) and in females the dominant pattern was Type III (26.9%) which is similar to the present study. The study of Badiye *et al.,*[4] (2015) found that Pattern Type III (35.75%) and Type I (29.75) were most reoccurring in women and men respectively.

Sultana Q et.al5 found in a study that the pattern Type III (40%) is more reoccurring in males similar to present study and Type I (54%) was more predominant in females followed by other patterns which is different from our finding the difference may have come due to geographical location of he studied subjects.

In a study conducted by Karki RK6, pattern Type I and I' were most reoccurring in male (29 cases total) and very rare in females. In conjunction to present study findings, Type II pattern was more common in females as 32 cases (42.5%) cases were found with this pattern.

In the study it was also found that no lip patterns were completely identical in nature as discussed by Suzuki et al.[2] During collection of lip prints, it was noticed that lip prints may vary in appearance depending upon collection method and direction, application of pressure.

A study by Vahanwala SP et al.[7] concluded that lip prints of two different individuals are not identical in every aspect hence proving uniqueness of these print in individual by considering labial wrinkles and grooves as characteristic features.

Basheer S *et al.,*[8] (2014) also observed gender wise difference among lip print patterns with Type II as the most prevalent in males and Type IV being more dominant in females.

In a study done by Augustine J et.al9 lip print pattern comparison between both the gender showed Type III pattern as most reoccurring pattern in both females and males accounting for 47.78 % 49.15% of all the given patterns respectively which agrees with the current study in case of females and males Type II and Type III both are equally dominant.

In a study conducted by Nagrale N et.al10 Type I, I', II pattern were more reoccurring in females while type III and IV lip patterns were more prevalent in male, while Type II was found present in both the gender, which is similar with the current study, in the fact that Type II is the most reoccurring pattern. In contrast to present study Randhawak et al.[11] found Type I (32.33%) pattern as more predominant.

Thomas, BS12 Type I pattern was more reoccurring in all regions of lips in both the gender, leaving only lower middle region where pattern Type I' was more prevalent. Ishaq N et al.[13] did a study where the most reoccurring pattern in females was Type II, while Type III as more prevalent among males which is similar as in the current study.

Table 6: Summary of patterns of lip print in Quadrant (Q4) with regard to pattern distribution among both the gender

GENDER	Quadrant I (Q4)				
	Vertical	Branched	intersecting	Reticulate	Total
Female	0	15	9	9	33
Male	3	6	9	2	20
Total	3	21	18	11	53

Chi-Square Tests for Quadrant (Q1)			
Pearson Chi-Square	Value	df	P Value
	8.643	3	0.034

Kaur R *et al.,*[14] in their study findings found, Type I (35.5%) lip pattern was most reoccurring, then followed Type II (26.1%) and Type III (16.3%). Type I (37.9%) lip pattern was most prevalent in males, then followed Type II (19.2%) and Type III (18.4%). Therefore, the most prevalent pattern for both the gender in this study was Type I which also differs with the current study.

CONCLUSION

Lip prints presence on a scene of crime can confirm the presence of that specific individual on the scene, thus allowing to link crime scene with the suspect, victim and individualizing the suspect.

The dominant pattern was found to be Branched (Type II) among quadrants I, II and III while Intersecting pattern (Type III) was found highest in quadrant IV. Vertical type lip pattern was least dominant and found only on 1.9% and 5.5% in quadrant I and quadrant II respectively of study population while in QIII and QIV Reticulate pattern was the least dominant pattern.

In Female, for all quadrants the dominant pattern was Branched type which is followed by Intersecting pattern and reticulate pattern. Vertical pattern was least present in all quadrants in female. In males Branched and intersecting pattern were most dominant followed by Vertical and Reticulate pattern.

Identification lip print can be used as tool among the subjects of this region. Further analysis should be done on large population sample of different region which would be more accurate for comparing, creating a database so lip prints might serve as a significant source of information which can be used for crime solving, personal identification and population study. IJFMP

REFERENCES

1. **Santos M.** *Cheiloscopy: A supplementary stomatological means of identification. Int Microform J Leg Med 1967;1(2):66-67.*
2. **Suzuki K, Tsuchiahashi Y.** *A new Attempt of Personal Identification by Means of Lip Print. Canadian Society of Forensic Science Journal 1971;4(4):154-158.*
3. **Ahmed SA, Salem EH and Fawzy MM.** *Forensic dissection of lip print as an investigative tool in a mixed Egyptian population. Alexandria Journal of Medicine 2018;54(3):235-239.*
4. **Badiye A, Kapoor N.** *Morphologic variations of lip-print patterns in a Central Indian population: A preliminary study. Medicine, Science and the Law 2015;56(3):200-204.*
5. **Sultana Q, Shariff MH, Asif M, Avadhani R.** *"Cheiloscopy: a scientific approach for personal identification. International Journal of Anatomy and Research 2014;2(4):668-672.*
6. **Karki RK.** *Lip Prints – An Identification Aid. Kathmandu University Medical Journal 2012;10(38):55-57.*
7. **Vahanwalla SP, Parekh BK.** *Study on lip prints as an aid to forensic methodology. J Forensic Med Toxicol 2000;17(1):12–18.*
8. **Basheer Shaini, Gopinath Divya, Shameena PM, Sudha S, Lakshmi JDhana, Litha.** *Correlation of Lip Patterns, Gender, and Blood Group in North Kerala Population: A Study of Over 800 Individuals. J Forensic Dent Sci 2017;9(2):73-77.*
9. **Augustine J, Barpande SR, Tupkari JV.** *Cheiloscopy as an adjunct to forensic identification: a study of 600 individuals. J Forensic Odontostomatol 2008;26(2):44-52.*
10. **Nagrale N, Tirpude B, Murkey P and Patond S.** *Establishing Cheiloscopy as a tool for identification: an assessment on 500 subjects in central India. Al Ameen J Med Sci2014;7(3):201-206.*
11. **Randhawa K, Narang RS, Arora PC.** *Study of the effect of age changes on lip print pattern and its reliability in sex determination. J Forensic Odontostomatol 2011;29(2):45-51.*
12. **Thomas, Betsy S.** *Cheiloscopy and gender determination - an original research. World Journal of Pharmaceutical Research 2014;3(7):1165-1173.*
13. **Ishaq N, Malik AR, Ahmad Z, Ullah SE.** *Determination of Sex by Cheiloscopy as an Aid to Establish Personal Identity. Annals of King Edward Medical University 2018;24(1):581-585.*
14. **Kaul Rachna, Shilpa PS, Padmashree S, Bhat Suraksha, Sultana Nishat.** *Study of lip prints in different ethno-racial groups in India. Indian Journal of Dental Research 2017;28(5):545-548.*

