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Research Article
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LIP PRINT PATTERNS AMONG THE STUDENTS OF MAHARSHI DAYANAND UNIVERSITY (MDU) ROHTAK, HARYANA

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ABSTRACT

Background: *The pattern of wrinkles on the lips has individual characteristics and the study of Lip print helps in identifying the persons based on the lips traces.* ***Aim:*** *To find the incidence of different types of lip patterns, the dominant pattern amongst the Rohtak population, to assess the differences in lip patterns among males and females in Rohtak population.* ***Materials and Methods:*** *Lip prints of 80 students studying in Maharshi Dayanand University were taken without any distortion. Red coloured lipstick and cellophane tape was used to collect the lip prints samples.* ***Results:*** *The current study has found the most predominant pattern in male was Type III in 17 (42.5%) followed by type II in 9 (22.5%), Types I in 7 (17.5%), Type I' in 3 (7.5%), Type IV in 3 (7.5%) and Type V in 1 (2.5%). In females most predominant lip pattern in female was Type II in 13 (32.5%) followed by Type I in 11 (27.5%), Type III in 8 (20%), Type I' in 5 (12.5%), Type IV in 2 (5%) and Type V in 1 (2.5%).* ***Conclusion:*** *Type III is the most predominant pattern found in Rohtak population.*

KEY WORDS

Lip pattern, lipstick, cellophane tape, lip prints.

INTRODUCTION

The Indian population structure can broadly be divided along the lines of caste and tribe status, religion and geography [1] which altogether makes them very unique compared to rest of the world. Indian caste population is composed of different endogamous groups; and their mating pattern is defined by the restricted marriages between the clans of that particular endogamous group within the fold of a particular caste [2].

Personal identification methods [3] are employed for the identification of an unknown deceased as well as for exclusion, inclusion or identification of the suspect [4]. The investigators can rely on lip prints as supportive evidence in specific investigations. Cheiloscopy is one of the most emerging methods of human identification that deals with the identification of unique lip prints. Physical and trace evidences play a significant role in forensic investigations. The legal system typically requires two different types of corroborative evidence in order to confirm placement of a suspect at a crime scene. A benefit to the collection of lip prints along with other crime scene evidence is in its use as confirmatory data. Some researcher indicates the existence of heredity in the lip prints [5].

Traces of lipstick smears could be found left on drinking cups, glasses, cigarette butts, clothing, windows and doors, parts of the body and tissue papers [6,7] and may all be significant forensic evidence in the investigation of a sexual assault or a homicide cases [8,9]. The lipstick itself can be analysed for various oils and waxes and an identification of the lipstick type may be obtained [10]. Some researcher hypothesized that through Thin Layer Chromatography analysis & UV light

analysis of the various pigments of Lipstick in different solvent system will provide characteristic data to determine for a particular lipstick [11, 12]. The use of lip prints in forensic identification is preferred because of their low utilization cost, simplicity, reliability not time consuming. It could be easily employed by a general dentist, as it does not require expertise.

MATERIALS AND METHODS

Red color lipstick, cellophane tape (transparent), white bond paper, scissor, tissue paper and magnifying lens.

Study sample:

The study was conducted on 80 students of Maharshi Dayanand University Rohtak comprised of 40 males and 40 females. All the students were briefed about the purpose of the study and written consent was taken from them before undertaking the study.

Inclusion criteria:

Students from Haryana.

Exclusion criteria:

Subjects undergoing orthodontic treatment, having congenital abnormalities, inflammation or trauma and known hypersensitivity to lipstick and **s**tudents who were not from Haryana.

Methodology:

Lips of the subject were cleaned and the lip stick was applied on the lips in a single motion. The subject was asked to rub both the lips to spread the lip stick. A strip of cellophane tape was cut out with scissors**.** Over the lip stick, the glued portion of cellophane tape strip was placed and the subject was asked to make a lip impression gently in the normal rest position of the lips. Then the tape was carefully lifted from the lip from one end of the strip to the other, and then the strip of cellophane tape cellophane strip was stuck to the white bond paper for permanent record purpose (If the print was not satisfactory, the above steps were repeated).The subject's name age, sex and serial number were written on the back of the bond paper. The subject was provided with tissue paper to clean the lips. The lip prints were then examined with the help of magnifying lens and analysis carried out.

Classification: The grooves of lip prints were classified according to Suzuki and Tsuchihashi's classification [13] (**Table 1 and Fig 1-7**) because this classification is the most commonly used for recording the pattern on

Table 1: Suzuki and Tsuchihashi (1970) classification of lip prints

TYPES OF LIP PRINTS	PATTERNS OF LIP PRINTS
Type I	Vertical grooves
Type I'	Partial length across the lip grooves of type I
Type II	Branched grooves
Type III	Intersecting grooves
Type IV	Reticular grooves
Type V	Other patterns

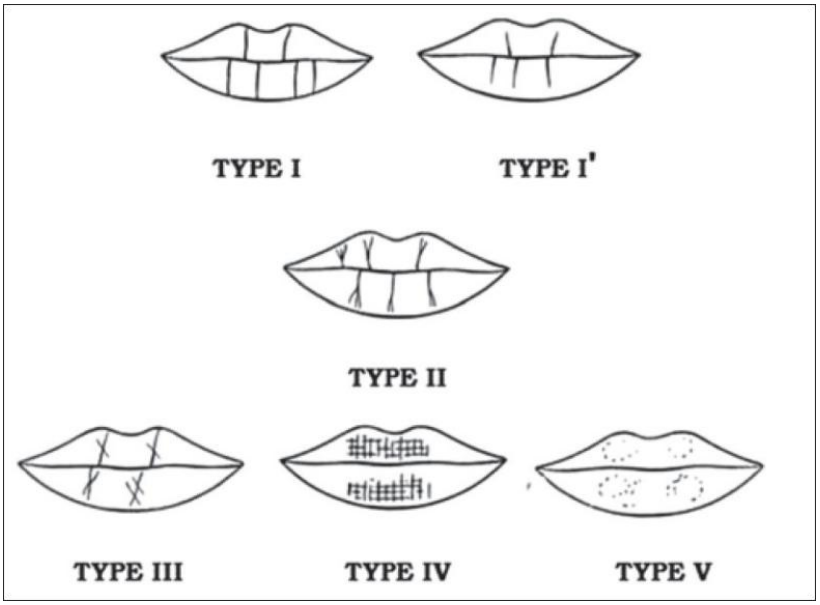


Figure 1: Suzuki and Tsuchihashi classification of lip prints

Figure 2: Type I Lip Pattern

Figure 3: Type I' Lip Pattern

Figure 4: Type II Lip Pattern

Figure 5: Type III Lip Pattern

Figure 6: Type IV Lip Pattern

Figure 7: Type V Lip Pattern

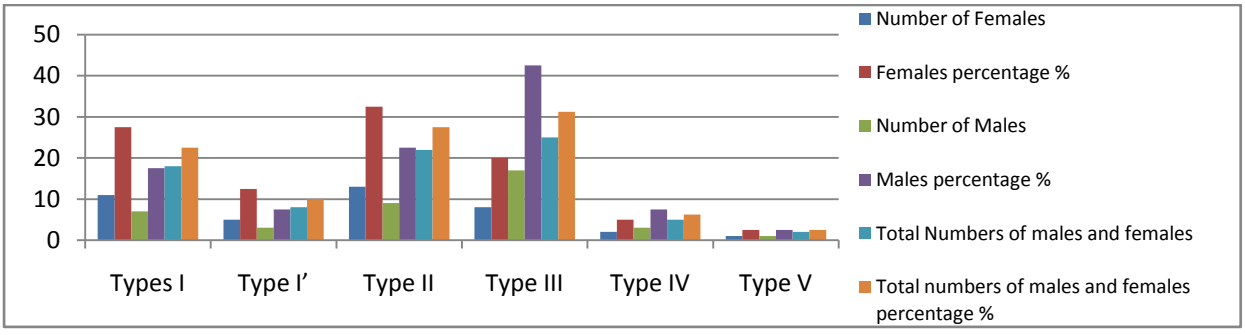
RESULT

In our study, most predominant lip pattern in male was Type III in 17 (42.5%) followed by type II in 9 (22.5%), Types I in 7 (17.5%), Type I' in 3 (7.5%), Type IV in 3 (7.5%) and Type V in 1 (2.5%). In females most predominant lip pattern in female was Type II in 13 (32.5%) followed by Type I in 11 (27.5%), Type III in 8 (20%), Type I' in 5 (12.5%), Type IV in 2 (5%) and Type V in 1 (2.5%). So according to the present study the most common lip pattern for females was found to be Type II, whereas it was Type III for males (**Table 2 and Fig 8**). In the present study, the most common pattern in the entire study population, taking both the upper and lower lips together, was Type III which constituted in 31(31.25%) of all patterns. This was followed in order by Type II in 22(27.50%), Type I in 18(22.25%), Type I' in 8(10%), Type IV in 5(6.25%) and Type V in 2(2.5%).

Table 2: Lip print patterns in males and females

Lip Patterns	Female		Male		Total	
	No.	%	No.	%	No.	%
Types I	11	27.5	7	17.5	18	22.5
Type I'	5	12.5	3	7.5	8	10
Type II	13	32.5	9	22.5	22	27.50
Type III	8	20	17	42.5	25	31.25
Type IV	2	5	3	7.5	5	6.25
Type V	1	2.5	1	2.5	2	2.5
Total	40	100	40	100	80	100

Figure 8: Graphical representations of males and females lip print patterns



DISCUSSION AND CONCLUSION

India is a vast country with large ethnic variation. Indian researchers have carried out several studies on lip prints in the last decade [14-17]. Various aspects like stability [18] and morphological patterns of lip prints have been studied in different populations. Sex determination on the basis of the lip prints too has been a much researched area. In India, various studies have shown that the patterns formed reveal a population wise dominance, that is, a particular population will show predominance of a particular lip print type. This is a potentially useful tool for identification. Comparisons of the lip print patterns between males and females have been recorded in various studies by various authors (**Table 3**).

Table 3: Study of lip print pattern by different authors in India

References	Year of study	Region	Lip pattern
Vahanwalla *et al.,* [19,20]	2000	Mumbai, Maharashtra	**Predominant Pattern:** In Males: Type III In Females: Type I
Augustine*et al.,* [21]	2008	Aurangabad, Maharashtra	**Predominant Pattern:** Males and Females: Type III
Sharma *et al.,* [22]	2009	Meerut, Uttar Pradesh	**Predominant Pattern:** In Males: Type IV In Females: Type I
Bindal *et al.,* [23]	2009	Dehradun, Uttarakhand	**Predominant Pattern:** Males and Females: Type II [60.50% / 66.83%]
Babu *et al.,* [24]	2009	Bangalore, Karnataka	**Predominant Pattern:** In Males: Type IV In Females: Type I
Saraswathi *et al.,* [25]	2009	Kanpur, Uttar Pradesh	**Predominant Pattern:** Males and Females: Type III [39.5% & 36.5%]
Patel *et al.,* [26]	2010	Udaipur	**Predominant Pattern:** In Males: Type I In Females: Type II
Narang *et al.*, [27]	2011	Amritsar, Punjab	**Predominant Pattern:** In Males: Type III In Females: Type I
Prasad *et al.,* [28]	2011	Raichur, Karnataka	**Predominant Pattern** Males and Females: Type IV
Venkatesh *et al.,* [29]	2011	Bangalore, Karnataka	**Predominant Pattern:** Males and Females: Type II
Gupta *et al.,* [30]	2011	Lucknow, Uttar Pradesh	**Predominant Pattern:** In Males: Type II In Females: Type III
Bajpai *et al.,* [31]	2011	Jaipur, Rajasthan	**Predominant Pattern:** Males and Females: Type III
Malik *et al.,* [32]	2011	Modi Nagar, Uttar Pradesh	**Predominant Pattern:** In Males: Type IV In Females: Type I

Vats *et al.,* [33]	2012	Delhi & Haryana	**Predominant Pattern:** In Males: Type III In Females: Type Y
Sandhu *et al.*, [34]	2012	Punjab	**Predominant Pattern:** Males and Females: Type I
Kumar *et al.*, [35]	2012	Pondicherry	**Predominant Pattern:** In Males: Type III In Females: Type II
Dwivedi *et al.,* [36]	2013	Lucknow, Uttar Pradesh	**Predominant Pattern:** Males and Females: Type II [36.3% / 35.5%]
Mutalik *et al.,*[37]	2013	Manipal, Karnataka	**Predominant Pattern** In Females: Type IV [33.3%]
Present Study	2013	Rohtak, Haryana	**Predominant Pattern** In Males: Type III [45%] In Females: Type II [35%]

Augustine et al.,[21]reported in their study that Type III pattern was the most common pattern among males and females. Vahanwalla et al.,[19, 20]studied lip prints in Mumbai population and found that the most common pattern was Type III in males and Type I in females. Vats et al.,[33]studied lip prints in the Delhi & Haryana population and found that the most common pattern was Type III in males and Type Y in females. Sandhu et al., [34] studied lip prints in Punjabi population and found that the most common pattern was Type I. Patel et al.,[26] studied lip prints in Udaipur population and found that the most common pattern was Type I in males and Type II in females. Bindal et al.,[23]studied the Dehradun population and found that the most common pattern among the males and females was Type II. Mutalik et al.,[37] reported that Type IV pattern was the most common among males and females of Manipal, Karnataka. Guptaet al., [30] studied lip prints in Lucknow population and found that the most common pattern was Type II in males and Type III in females. These findings were not similar with the present study. The variations in pattern between the upper and lower lip may be attributed to unique factors and might have a functional significance. Hence, this can add value to lip print in the forensic science community as a powerful tool in personal identification.

The ongoing research study is used to describe how evidential analysis of morphological features of lip print pattern was used in forensic investigations. Lipstick smears can lead to indirect proof of a relationship or contact between a victim and a suspect or a suspect and a crime scene. The lip print appearance may be affected by the pressure, direction and methodology used while taking the impressions. Lip prints bring added evidence to a crime scene that can be valuable, especially in cases lacking other evidence. In the present study we found that Type III lip predominated in males and Type II in females.

The present study represents LIP PRINTS to forensic point of view is an important step, supportive tool in forensic criminal identifications at a crime scene. In overall study, lip-prints remain as a constant anatomical structure in all times and are unique to an individual. Nevertheless, we believe that larger samples should be examined in detail to further validate the findings of this study and come to definitive conclusions. With the clear indication of the importance of lip prints authors would strongly suggest this topic be introduced during periods of law enforcement training, not only for crime scene examiners but also for first responders to crime scenes.

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