LIP Prints Patterns: A Study among the Aryan and Dravidian Ethnic Population in India- A Cross Sectional Study

Lubna Fathima[1], Suganya P[1], Sunayana Manipal [2], Prabu D[3], Bharathwaj[4], Raj Mohan[5]

[1]Post Graduate Student (Master of Dental Surgery), [2]Master of Dental Surgery, Reader, [3]Master of Dental Surgery, Professor and Head, [4]Master of Dental Surgery, Senior Lecturer, [5]Master of Dental Surgery, Reader, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, India

Abstract

Background: Lip prints are subjected to be unique for all the individuals except monozygotic twins; hence they can be an important indicator for human identification. Since, Aryan population are descendants of north India and Dravidian population are descendants of south India. **AIM**: The aim of the study was to assess the uniqueness of lip prints among Aryan and Dravidian ethnic population. **Materials and method**: A cross sectional study was conducted among 192 individuals of Aryan and Dravidian population. Convenient sampling was used to select the study population among the Tamilnadu and Chandigarh states in India. The lip prints were recorded with the help of lip sticks and glue portion of the cello tape. Statistical analysis was done using spss software version 20.0. **Results**: In the present study, branched lip print pattern was predominantly seen in males of Dravidian population. In contrast, least commonly predominant was partially vertical pattern which was absent in both the males and females of Aryan population. **Conclusion**: Lip prints are a unique feature for human identification. In this study, it was found that branched lip print pattern was higher in males of Dravidian population and the partially vertical type was least predominant among the males and females of Aryan and Dravidian population.

Keywords: *Lip prints, Aryan, Dravidian, ethnic population, males, females.*

Introduction

Lip prints vary from person to person and are used as a diagnostic tool in forensic odontology to augment human identification criteria. The classification of Lip prints is based on lip wrinkles and lip grooves[1]. The lip-print pattern has been used as a tool for determination of gender, geographic origin, the number of people who created a mark, forensic investigation, detection of tactical and criminalist information. Cheiloscopy is a term subject to the patterns of wrinkles and grooves present on the labial mucosa[2]. R.fischer was the first person to notice the biological phenomenon present in the red part of labial mucosa[3]. Followed by in 1932, Edmond Locard a France criminologist identified the use of lip print for identification of person[4] and in 1950 Le Moyne Snyder proved in a criminal case that lip print serves as an important identification to find out the person[5]. Tsuchihasi in Japan studied about the lip print impression which led to the classification of lip print in 1974[6]. Lip prints can be recorded in number of ways which includes the photography method, applying the lipstick on labial mucosa and recording the lip print pattern, using a finger printer, detecting the lip print using magna brush or magnetic powder[7,8]. The various pigments in the labial mucosa can be analysed by using thin layer chromatography and Ultraviolet light[9,10]. In dentistry, Lip prints can be used for comparison of homicide cases where the victims do not have teeth or readily available dental records for easy identification of the victim. According to the literature, prevalence

Corresponding Author:
Dr. Lubna Fathima
Designation: Post Graduate Student (Master of Dental Surgery), Department of Public Health Dentistry.
Address: SRM Dental College and Hospital, Bharathi Salai, Ramapuram, Chennai, Tamilnadu-600089.Email: dr.lubnafathima@gmail.com

of dental abnormalities was reported in Dravidian population was 31.5% in which 6.6% of people had microdontia[11]. The dental disease more common among the Dravidian population was malocclusion[12] and periodontitis[13]. There was no enough literature in the field of dentistry to support the same among the Aryan population. Further knowing the importance of lip prints in the field of dentistry, the common lip print pattern among two different populations existing in India was a question of concern. The gene most predominant in Aryan population was R1A1 and the gene predominant in Dravidian population is still in question. Since the north Indians are descendants of Aryan population and the south Indians are descendants of Dravidian population, the objective of the study is to analyse the uniqueness in lip prints among the Aryan and Dravidian ethnic population in India.

Materials and Method

A cross sectional study was conducted to assess the uniqueness of lip print pattern among the Aryan and Dravidian population. Decision tree methodology was designed before conducting the study. Since Aryan was predominant in Chandigarh while Dravidian population lived in large amounts in Tamilnadu, the data was collected from respective states of India. Ethical clearance was obtained from the Department of Public Health Dentistry, SRM dental college and hospital, Ramapuram. The study was conducted in the month of January 2020. Convenient sampling technique was used and data samples were obtained. Subjects without any abnormality in the lips were included in the study based on their willingness to participate. The exclusion criteria were the individual whose parents or grandparents had a history of inter-caste marriage were excluded from the study along with individuals having cleft lip, individual with any inflammation, individual allergic to the lip stick. According to Suzuki and tsuchihasi 1974 classification of lip prints was categorized as vertical, partially vertical, branched, intersected and reticular. The individual were made to sit relaxed and the lips were cleaned with cotton and a thin layer of dark red colour lip was applied in the lips and they were asked to spread uniformly. The glue portion of the cello tape was stuck into the surface of the lip under firm pressure so that the cello tape firmly sticks to the lip surface. Two duplicate prints were taken to avoid improper recording of lip print. Consecutively, the lip prints were analysed and verified by the experts for whom the Intra reliability was calculated using kappa statistics was found to be 0.89. Descriptive statistics was done to find out the overall number and percentage of study sample distribution among the Aryan and Dravidian population and gender distribution was also analysed using spss software version 20.0. Inferential statistics was performed by using Chi square to find out association of lip print pattern between the male and female and p value <0.05 was found to be statistically significant.

Results

Table 1: Comparison of lip print pattern among the males of Aryan and Dravidian population

S.No	Lip print pattern	Aryan population		Dravidian population	
		Number of males	Percentage of males	Number of males	Percentage of males
1	Branched	15	14.9%	28	27.8%
2	Intersected	3	2.9%	4	3.9%
3	Partially vertical	0	0%	3	2.9%
4	Reticular	8	9.5%	8	9.5%
5	Vertical	13	12.6%	19	18.9%

Table 1 shows the total number and total percentage of males in both ethnic population and found that higher percentage of branched lip print is found among the males of Dravidian population and no partially vertical lip print was found in males of Aryan population.

Table 2: Comparison of lip print pattern among the females of Aryan and Dravidian population

S.No	Lip print pattern	Aryan population		Dravidian population	
		Number of female	Percentage of females	Number of females	Percentage of females
1	Branched	16	17.5%	20	22.4%
2	Intersected	3	3.1%	4	4.4%
3	Partially vertical	0	0%	1	1.1%
4	Reticular	7	7.5%	8	8.5%
5	Vertical	7	7.5%	25	28%

Table 2 shows the total number and total percentage of females in both ethnic population and found a higher percentage of vertical lip print pattern among the females of Dravidian and no partially vertical lip print pattern was found among the females of Aryan population

Table 3: Comparison of lip print pattern among the males and females of Aryan population

S.No	Lip print pattern	Aryan population					
		Number of male	Percentage of male	Number of female	Percentage of female	Total number	Total percentage
1	Branched	15	20.8	16	22.2	48	40.3
2	Intersected	3	4.1	3	4.1	8	6.6
3	Partially vertical	0	0	0	0	4	3.3
4	Reticular	8	11.4	7	9.7	16	13.2
5	Vertical	13	18	7	9.7	44	36.6

Table 3 shows the lip print pattern among the males and female of Aryan population found that branched lip print was higher in percentage among the Aryan population and no partially vertical lip print pattern was found.

Table 4: Comparison of lip print pattern among the males and females of Dravidian population

S.No	Lip print pattern	Dravidian population					
		Number of male	Percentage of male	Number of female	Percentage of female	Total number	Total percentage
1	Branched	28	23.7	20	16.6	48	40.3
2	Intersected	4	3.3	4	3.3	8	6.6
3	Partially vertical	3	2.5	1	0.8	4	3.3
4	Reticular	8	6.6	8	6.6	16	13.2
5	Vertical	19	15.8	25	20.8	44	36.6

Table 4 shows the lip print pattern among the males and female of Dravidian population and found a higher percentage of branched lip print pattern was found followed by vertical lip print and least common was partially vertical lip print pattern among the Dravidian population.

Table 5: Association between the lip print pattern and gender difference between the study populations

S.No	Population	ARYAN				DRAVIDIAN				P value
		Number of male	Percentage of male	Number of female	Percentage of female	Number of male	Percentage of male	Number of female	Percentage of female	
1	Branched	15	7.7%	16	8.2%	28	14.3%	20	11.2%	0.011*
2	Intersected	3	1.5%	3	2.5%	4	2%	4	2%	
3	Reticular	8	4.1%	7	3.6%	8	4.1%	8	4.1%	
4	Vertical	13	6.6%	7	3.6%	19	9.7%	25	12.8%	

Table 5 shows that association between the lip print pattern among the males and females of Aryan and Dravidian population. P value <0.05 was considered as statistically significant.

Table 6: Association between the lip print pattern among the Aryan and Dravidian population:

S.No	Population	ARYAN POPULATION		DRAVIDIAN POPULATION		P value
		NUMBER OF POPULATION	PERCENTAGE OF POPULATION	NUMBER OF POPULATION	PERCENTAGE OF POPULATION	
1	Branched	31	15.9%	48	25.5%	0.031*
2	Intersected	6	4%	8	4%	
3	Reticular	15	7.7%	16	8.2%	
4	Vertical	20	10.2%	44	22.5%	

Table 6 shows the association between the lip print pattern among the Aryan and Dravidian population and p value was calculated to know its statistical significance.

Discussion

Lip print is found to be unique from individual to individual except the monozygotic twins. Lip print always serves as an important diagnostic tool in finding out the age, demographic details and some important aspects in forensic odontology. Lip prints always remain as a standard approach in finding out many detective crimes and forensic branch always establish accurate ways for classification of lip furrows, lip grooves and wrinkles that constitute the human lip. The study was an attempt conducted to known the prominent lip print pattern seen among the Dravidian and Aryan ethnic population and found that an overall highest lip print pattern among the males and females of Aryan population was branched lip print pattern which was found to be 7.7% and 8.2%. In Dravidian population, branched lip print pattern was found to be highest among the males and vertical lip print pattern was found to be highest among the females which are found to be 14.3% and 12.8% which coincided with the study conducted by Venkatesh et al[14] among the students of Karnataka and Bangalore. When comparative analysis was done between the Aryan and Dravidian population, it was found that highest lip print pattern was branched lip print reported among the males of Dravidian group which was 14.3% and lowest was recorded among females of Dravidian group which had partially vertical lip print pattern and one type of lip print pattern was not recorded among the males and females of Aryan group and also the males of Dravidian group which was portical lip print pattern which coincides with the study conducted by prathibha Prasad et al[15] among the Aryan-Dravidian population. Association between the gender difference and lip print among the Aryan and Dravidian population was assessed and p value was found to be statistically significant which was 0.011; the partially vertical type was not added in the analysis of p value since no record was found among the males and females of Aryan population. Association between the lip print pattern among the Aryan and Dravidian population was found to have a p value of 0.031 which was statistically significant. Sivapathasundharam et al study also concluded that branched lip print was common among the Indo-Dravidian population which coincided with our study which also gave a result that branched lip print was common among the study population. Limitation of the study was the sample size was not calculated according to confidence interval so reflection of the study cannot be applied to the generalised population.

Conclusion

Lip prints serving as a diagnostic tool to identify the human victims. The present study shows that branched lip print pattern was common and found to 15.9% among males and females of the Aryan population 22.5% in males and females among the Dravidian population. Second most common was the vertical lip pattern which was 10.2% and 13.3% among the Aryan and Dravidian population. Least common was partially vertical lip print pattern which was not found in Aryan population and 3.3% was reported among the Dravidian population.

Conflict of Interest: Nil

Source of Funding: Self

References

1. Dineshshankar J, Ganapathi N, Yoithapprabhunath TR, Maheswaran T, Kumar MS, Aravindhan R. Lip prints: Role in forensic odontology. Journal of pharmacy & bioallied sciences. 2013 Jun;5(Suppl 1):S95.
2. Sivapathasundharam B, Prakash PA, Sivakumar G. Lip prints (cheiloscopy). Indian journal of dental research: official publication of Indian Society for Dental Research. 2001;12(4):234-7.
3. Kasprzak J. Possibilities of cheiloscopy. Forensic Sci Int. 1990;46:145–151.
4. Thomas C.J., VanWyk C.W. The palatal rugae in identification. J. Forensic Odontostomatol. 1988;6:21–27.
5. Ball J. The current status of lip prints and their use for identification. The Journal of forensic odonto-stomatology. 2002 Dec;20(2):43-6.
6. Tsuchihashi Y. Studies on personal identification by means of lip prints. Forensic Science. 1974 Jan 1;3:233-48.
7. Williams TR. Lip prints: Another means of identification. J Forensic Ident. 1991;41(3):190-4.
8. Prabhu RV, Dinkar AD, Prabhu VD, Rao PK. Cheiloscopy: Revisited. J Forensic Dent Sci. 2012;4:47–52.
9. Srivastava S, Verma K, Singh J. To Identify the Concentration Level of ihjVarious Pigments & to Determine Suitable Solvent System for Different Lipstick Samples by Using TLC. J Chromat Separation Techniq. 2012;3(146):2.
10. Joshi B, Verma K, Singh J. A Comparison of Red Pigments in Different Lipsticks Using Thin Layer Chromatography (TLC). J Anal Bioanal Techniques. 2013; 4: 157-160.
11. Yamunadevi A, Selvamani M, Vinitha V, Srivandhana R, Balakrithiga M, Prabhu S, Ganapathy N. Clinical evaluation of nonsyndromic dental anomalies in Dravidian population: A cluster sample analysis. Journal of pharmacy & bioallied sciences. 2015 Aug;7(Suppl 2):S499.
12. Sardana V, Balappanavar AY, Deshpande S, Shigli A, Indushekar KR, Gogia G. Evaluation of marginal alveolar bone height for early detection of periodontal disease in pediatric population: clinical and radiographic study. The journal of contemporary dental practice. 2014;15(1):37-45.
13. Sundareswaran S, Vijayan R. Profile changes following orthodontic treatment of class I bimaxillary protrusion in adult patients of Dravidian ethnicity: A prospective study. Indian Journal of Dental Research. 2017 Sep 1;28(5):530.
14. Venkatesh R, David MP. Cheiloscopy: An aid for personal identification. Journal of forensic dental sciences. 2011 Jul;3(2):67.
15. Prasad P. A comparison of lip prints between Aryans-Dravidians and Mongols. Indian Journal of Dental Research. 2011 Sep 1;22(5):664.