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Morphological Pattern of Lip Print among Adults of Ijesha Ethnic Group, Osun State, Nigeria

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ABSTRACT

Cheiloscopy is an investigational technique under forensic science that deals with study of uniqueness of lip prints among individuals. The aim of this work is to study the lip print patterns of Ijesa people in Osun state, Nigeria. The study group comprises of 205 males and 205 females within the age group of 18-65 years. The subjects were asked to clean their lips with the baby wipe and little quantity of lip gloss applied evenly on the sulci labiorum of the upper and lower lips. The subjects were then made to stand/sit in a relaxed position and asked to keep the lip muscles relaxed and the jaw kept closed while the prints were being taken. A clear new microscopic glass slide was placed on the relaxed lips of the subject in a single motion tilting it slightly to the right and left. The lips were divided into six compartments and classified according to Suzuki and Tsuchichashi's classification. Data were analyzed using SPSS version 20.0 software package. Chi-square Automatic Interaction Detective (CHAID) was used to analyze and compare the lip print pattern and the analyses were presented in tables and variables in categorical forms, thus it was presented as frequency, p-value was set at ≤ 0.05 to be significant. The result of this study with respect to sex shows that type I was dominant in male while type III was dominant in female. The predominant lip print pattern among Ijesa ethnic group was type III. In conclusion, there is a sexual dimorphism in the lip print pattern in Ijesa ethnic group and this can be used in personality identification in forensic anthropology.

Key words: Cheiloscopy, lip print, Ijesha ethnic group, forensic anthropology.

INTRODUCTION

The traditional methods for personal identification include anthropometry, finger prints, age estimation, sex determination, measurement of height, differentiation by blood groups, DNA and odontology.¹ Fingerprint has been the most reliable and can be seen to be used in different spheres of life. Another alternative method recently discovered is Cheiloscopy. Cheiloscopy (from the Greek word cheilos which means lips) is the forensic investigation technique that deals with identification of humans based on lip traces.²

The grooves occur at distinct pattern or types and are unique to each individual and thus can be used to identify people.³ The scheme of lip-prints invented by Suzuki and Tsuchihashi which is the most commonly used are Type I, a clear cut groove vertical across the lips, Type II, a branched groove, Type III, an intersected groove, Type IV, a reticular pattern and finally Type V, other types.⁴ Lip print became very vital due to the fact that it was unique to one person except in monozygotic twins.¹ Postmortem changes of lips prints were also analyzed to find out anthropometric measurements of

the lip region before and after fixation. All these studied concluded that cheiloscopy can be effectively used as an additional tool for personal identification.⁵

MATERIALS AND METHODS

The subjects comprised both males and females of Ijesha ethnicity traced to second generation. Ethical approval was obtained from the Department of Anatomy, University of Ilorin. Written informed consent was obtained from the participants.

Sampling Technique: The subjects were selected randomly among Ijeshas in Ilesha, Osun state, Nigeria. Sample size was calculated using Fischer's formula for large population or infinite population:

$$S = \frac{Z^2 \cdot X \cdot P \cdot Q}{D^2}$$

The sample size is composed of 410 subjects segregated into 2 groups, (205 males and 205 females) aged between 18 to 65 years, all of which were normal subjects. These subjects were randomly selected.

Lip Print: The subjects were asked to clean their lips with the baby wipe and little quantity of lip gloss applied evenly on the sulci laborium of the upper and lower lips. The subjects were then made to stand/sit in a relaxed position and asked to keep the lip muscles relaxed and the jaw kept closed while the print is being taken. A clear new microscopic glass slide was placed on the relaxed lips of the subject in a single motion tilting it slightly to the right and left. The glass slide was then removed from the surface of the lip and carbon black powder was dusted on the surface of the slide that was in contact with the lips, then the excess powder was dusted by mouth blow, resulting in the production of well-developed lip prints on the slide ready for preservation and analysis. The glass slide was placed on an area provided on the questionnaire with left and right, superior and inferior sides in consideration. Finally, a strip of transparent cellophane tape, 2-4-inch-long was cut out with a scissors and used to cover the

print then attached the slide to the questionnaire provided.

The analyses of the prints were done, by dividing the prints into three compartments each for both lower and upper lip for perfect and accurate estimation and classification.

The classification of cheiloscopy that was adopted in the study was the Suzuki and Tsuchihashi Classification (figure 1)⁴

Type I: Clear-cut grooves running vertically across the lip

Type II: Straight grooves which disappear halfway instead of covering the entire breadth of the lip

Type III: Intersecting grooves

Type IV: Reticular grooves

Type V: The groove does not fall in any of the types I-IV and cannot be differentiated morphologically

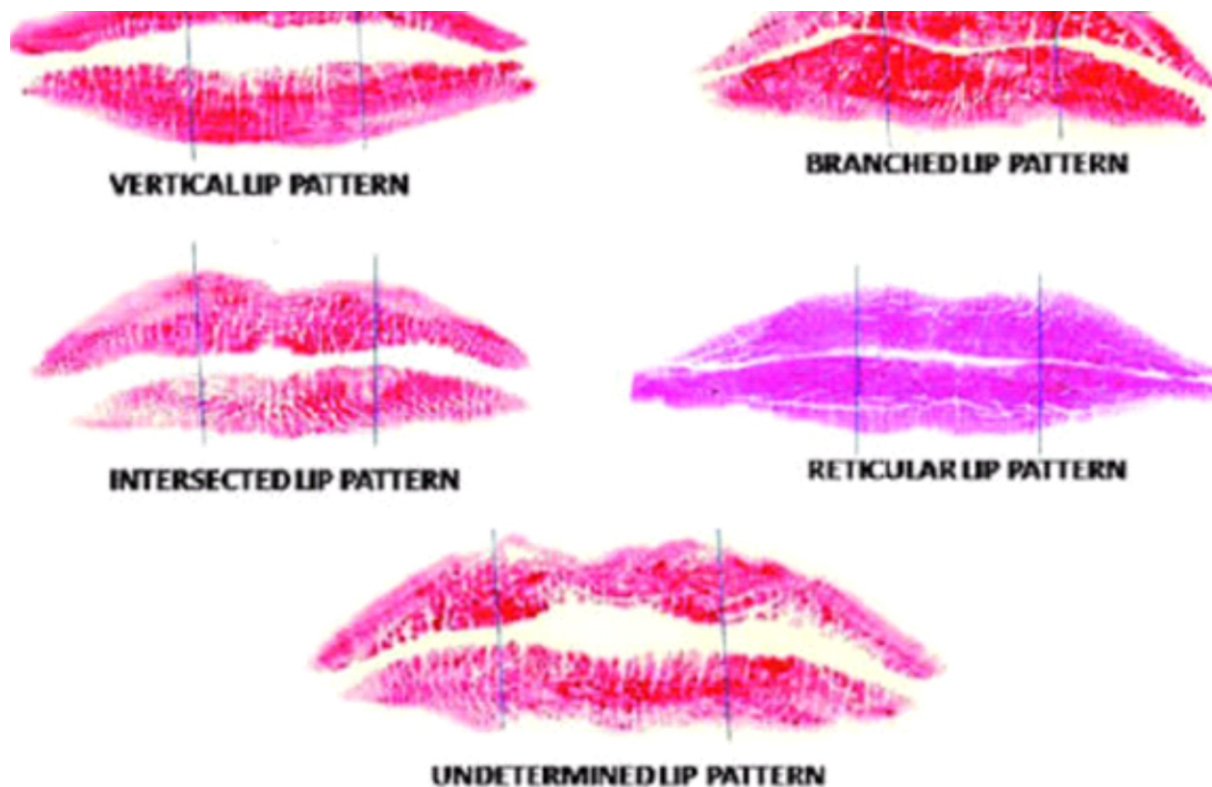


Figure 1: Pictures showing various lip print patterns⁴

Statistical Analysis: Descriptive statistics for variables were used with tables. The percentage (%) distribution of lip prints pattern was calculated using SPSS (Statistical package for the social science, version 20.0) software. Chi-square Automatic Interaction Detective

(CHAID) was used to analyze and compare the lip print pattern and the analyses were presented in tables and variables in categorical forms, thus it was presented as frequency. Statistical significance was put into consideration when ($P = 0.05$ or $P \leq 0.05$).

RESULTS

Results from the analysis are presented in tables and graph. All variables were in categorical form and, therefore, presented as frequency (percentages).

The distribution of the lip print types and test of sex-associated differences for the upper and lower

quadrants are presented in Tables 1 and 2 respectively, while Figure 1 presents Chi-square Automatic Interaction Detector (CHAID) to determine the most important chieloscopic feature that differentiates male from female.

Table 1: Distribution of lip print types on the upper quadrants and test of association

Quadrant	Sex	Lip print pattern						Chi-Square Tests		
		Type I	Type I'	Type II	Type III	Type IV	Type V	df	X ²	P-value
URQ	Male	60	8	55	59	19	4	5	11.938	0.036
		29.3%	3.9%	26.8%	28.8%	9.3%	2.0%			
	Female	45	4	43	71	32	10			
		22.0%	2.0%	21.0%	34.6%	15.6%	4.9%			
UMQ	Male	105	12	98	130	51	14	5	11.015	0.051
		25.6%	2.9%	23.9%	31.7%	12.4%	3.4%			
	Female	47	22	54	55	22	5			
		22.9%	10.7%	26.3%	26.8%	10.7%	2.4%			
ULQ	Male	39	12	43	66	33	12	5	11.404	0.044
		19.0%	5.9%	21.0%	32.2%	16.1%	5.9%			
	Female	86	34	97	121	55	17			
		21.0%	8.3%	23.7%	29.5%	13.4%	4.1%			
ULQ	Male	56	9	55	59	18	8	5	11.404	0.044
		27.3%	4.4%	26.8%	28.8%	8.8%	3.9%			
	Female	42	7	43	64	30	19			
		20.5%	3.4%	21.0%	31.2%	14.6%	9.3%			
ULQ	Total	98	16	98	123	48	27	5	11.404	0.044
		23.9%	3.9%	23.9%	30.0%	11.7%	6.6%			

Note: URQ=Upper right quadrant, UMQ=Upper middle quadrant, ULQ=Upper left quadrant;
X²=Chi square, df=degree of freedom

In table 1, for the URQ, it is distributed but type 1 (29.3%) is the most of the male lip while type 3 (34.6%) is the most dominant of the female lip. For the UMQ,

Type 3 (26.8%) is the most dominant for the male lip while type 3 (32.2%) is the most dominant of the female lip. In the ULQ, type 3 (28.8%) is the most dominant lip pattern in the male and also type 3 (31.2%) was also the most dominant in female.

Type 3 (30.0%) was also the most dominant in the lip. Type 5 (6.6%) was the least dominant in both genders. Therefore, we can say Chi square analysis showed that sex was a significant lip print pattern in the upper lip.

Table 2: Distribution of lip print types on the lower quadrants and test of association

Quadrants	Sex	Lip print pattern						Chi-Square Tests		
		Type I	Type I'	Type II	Type III	Type IV	Type V	df	X ²	P-value
LRQ	Male	61	7	48	61	16	12	5	11.807	0.038
		29.8%	3.4%	23.4%	29.8%	7.8%	5.9%			
	Female	44	5	39	64	30	23			
		21.5%	2.4%	19.0%	31.2%	14.6%	11.2%			
LMQ	Male	105	12	87	125	46	35	5	11.965	0.035
		25.6%	2.9%	21.2%	30.5%	11.2%	8.5%			
	Female	61	7	49	59	18	11			
		29.8%	3.4%	23.9%	28.8%	8.8%	5.4%			
LLQ	Male	43	5	40	64	29	24	5	10.962	0.052
		21.0%	2.4%	19.5%	31.2%	14.1%	11.7%			
	Female	104	12	89	123	47	35			
		25.4%	2.9%	21.7%	30.0%	11.5%	8.5%			
LLQ	Male	58	8	48	58	17	16	5	10.962	0.052
		28.3%	3.9%	23.4%	28.3%	8.3%	7.8%			
	Female	43	6	37	61	28	30			
		21.0%	2.9%	18.0%	29.8%	13.7%	14.6%			
Total		101	14	85	119	45	46			
		24.6%	3.4%	20.7%	29.0%	11.0%	11.2%			

Note: LRQ=Lower right quadrant, LMQ=Lower middle quadrant, LLQ=Lower left quadrant;
 X^2 =Chi square, df=degree of freedom

In the lower lip, for the LRQ type 3(30.5%) was the dominant lip pattern for both the male and female. In the LMQ region type 3(30%) was the most dominant among the lip prints. In the LLQ region type 3(29%) was also the most dominant among all the lip print. This is an indicator that sex was not a significant influence for lip print pattern. Type 1 was also very high and was the second dominant lip pattern.

Using Chi-square Automatic Interaction Detector (CHAID) to determine the most important chieloscopic feature that differentiates male from female.

In trying to examine which of the chieloscopic feature explains the male and female lip print pattern, the Chi-square Automatic Interaction Detector (CHAID) (in

figure 2) analysis was used to build a predictive classification tree model. The URQ, UMQ, ULQ, LRQ, LMQ, and LLQ were used as the predictor variables and sex as the response variables. Traditionally CHAID splits the sex into categories (nodes) with approximately equal number of observations, creating all possible distribution considering the lip prints. This process was repeated until the best outcomes were achieved, and the explaining variables are indicated in the nodes (male/female). However, where there is no relationship, the model only provides the distribution for sex, without further analysis.

It can therefore be concluded that there was a significant association of sex with lip prints among Ijesha ethnic groups.

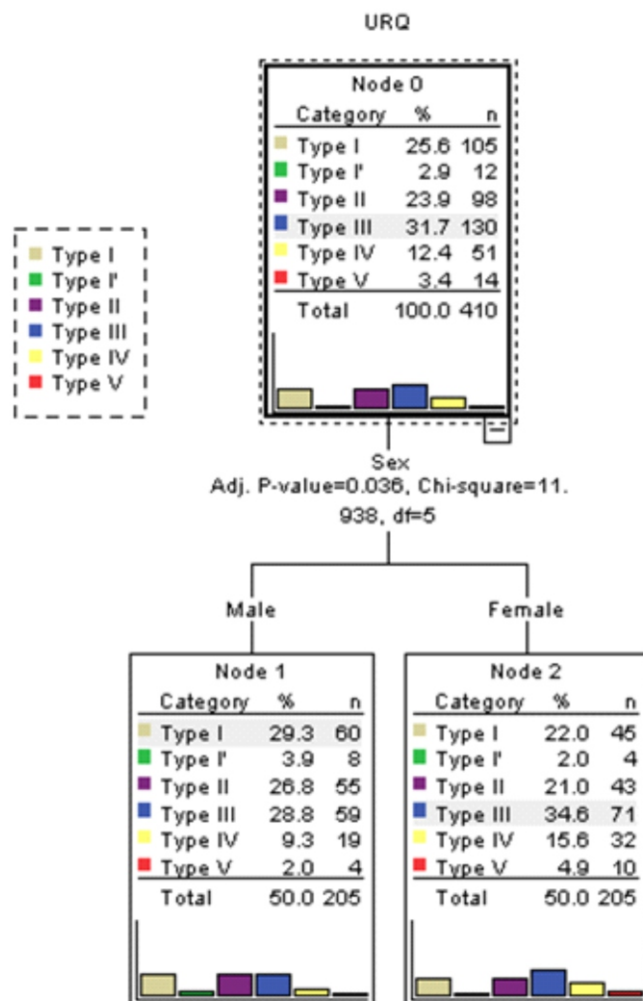


Figure 2: Decision tree for explaining how sex is explained from the lip print pattern of the URQ, UMQ, ULQ, LRQ LMQ, and LLQ

DISCUSSION

In recent times, we have gotten to realize that we can also adopt the lip print for identification, we have been very familiar with traditional methods like dermatoglyphics, DNA and odontology.⁶ Cheiloscopy can be said to be analogous to finger printing due to the distinct uniqueness. Research found out that lip pattern is unchangeable throughout a life time and even death.⁶

Environmental factors and pathology can distort the lip pattern of an individual. But the lip print gets back to its former pattern after recovery.⁷

Lip print and Sex: This study indicated that Type I is predominant for males while Type III was predominant for female. The result deviates from several other studies on cheiloscopy, a research among the Igbo people of Nigeria showed that type I was the most prevalent in both males and females respectively.⁸ Among different Yoruba dialects in Kwara State, Type I was dominant in males conversely Type II was dominant in females.⁹

In a study in Malaysian Chinese population, it was reported that Type II was the predominant lip pattern in four lip sections for both genders and Type IV was the dominant pattern for both middle part of the lips; upper, middle and lower.¹⁰

Lip Print in Ijesha Ethnic Group in Relation to Other Ethnic Group: The most predominant lip print for Ijesha ethnic group is type III (irrespective of gender). This result is similar to the findings of Hausa ethnic group which was also type III whereas type V was the most dominant in Yoruba and Igbo ethnic group.¹¹ Type I and II were found to be dominant lip print among Yorubas of Kwara state.⁹

In the Urhobo ethnic group in Delta state, type II was the most dominant while type V was the least dominant in both genders.¹²

In line with Bindal study in Indian population, type II was the most prevalent Type in both males and females.¹³ The prevalent lip pattern on the lip pattern of

Nupe people of Edu local government is type II.¹⁴

CONCLUSION

The study reveal that Type III is predominant lip pattern among the Ijesha descent. It also revealed sexual dimorphism in the patterns and frequency of distribution of lip print among the people of Ijesha. We can deduce that cheiloscopy is an excellent identification marker.

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