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Research Article

Comparative Study of the Lip Print Patterns Between Urhobo and Ukwuani Ethnic Groups, Delta State, Nigeria: Anthropometric Study

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Abstract

Background: Lip prints are lines, fissures or grooves in the form of wrinkles, present in the zone of transition of human lip, between the inner labial mucosa and outer skin. Comparative study of the lip print patterns in an ethnic group may be a characteristic feature of that population and therefore may contribute to forensic investigation. This study was therefore aimed at determining the lip print patterns in Urhobo and Ukwuani ethnic groups of Delta State Nigeria. Approval for this study was obtained from the Research and Ethics Committee of the Faculty of Basic Medical Sciences, Delta State University, Abraka.

Material and Methods: The study was conducted with 800 volunteer individuals comprising 400 Urhobo (200 males and 200 females) and 400 Ukwuani (200 males and 200 females). The study was done using red colour lipstick gently applied on the vermillion border of the lip which is between the mucosa and the skin. The lips of an individual were divided into three segments on the upper lip (Upper right lateral, upper right medial, upper left lateral) and the lower lip, was divided into three segments (lower left lateral, lower right medial, and lower right lateral). The various segments were visualized with the aid of a magnifying lens. The data obtained was analyzed.

Results: Results from the study showed that majority of the males of Urhobo and Ukwuani ethnic groups had similar lip print patterns while, the females of Urhobo and Ukwuani ethnic were quite different. About 1(63%) was common among males of the Urhobo and Ukwuani ethnic groups while type 2(73%) was common among Urhobo females. Type 3(72%) was found to be common among Ukwuani females.

Conclusion: The study therefore concluded that majority of the males of Urhobo and Ukwuani ethnic groups have similar lip print patterns. Also, the females of Urhobo and Ukwuani ethnic groups are quite different from one another. This study is important as it has indicated that lip print type varies between females of Urhobo and Ukwuani ethnic groups. This research, therefore contributed to knowledge by opening a new vista (avenue) in the search for alternative identification strategies and also demonstrated that no two lip prints patterns are the same, giving the fact that it is unique to individual.

Keywords: Forensic Investigation; Sexual Dimorphism; Lip Print; Urhobo; Ukwuani

Introduction

Anthropometric differentiation between human races has been a subject of interest in various fields, including forensic sciences. While lip prints, as discussed in the subsequent text, provide a unique and permanent means of individual identification. Anthropometry, the measurement of human body dimensions, plays a crucial role in these endeavors. Techniques such as cephalometric analysis, which involves measuring the dimensions of the head and face, and osteometry, the study of bone measurements, contribute valuable data for racial classification [1]. Understanding the variations in anthropometric traits among different populations is essential for accurate identification and can complement the insights gained from specialized studies like cheiloscopy, as detailed in the subsequent discussion on lip prints [1,2]. This broader perspective highlights the multifaceted approaches employed in the study of human variation and underscores the significance of integrating diverse methodologies in the pursuit of comprehensive anthropological and forensic insights.

Lip prints are lines, fissures or grooves in the form of wrinkles, present in the zone of transition of human lip, between the inner labial mucosa and outer skin, the lip print may be revealed as a surface with visible elements of lines representing the furrows [1]. The lip is covered with a specialized keratinized stratified squamous epithelium which is thin near the skin, increases in thickness slightly as the mucosa is approached, and then thickens abruptly when through mucosa is reached therefore, these characteristic pattern helps to identify the individuals because it is unique for individual and the examination of lip prints is termed, cheiloscopy [2]. Lip prints develop during the 6th week of fetal life it remain unchanged and resists minor traumas, climatic changes and inflammation [3]. The significant of the lip prints may be used in detection works, such as evident used in legal proceeding and personal identification [4]. Lip print patterns are permanent and appear to be genotypically determined [5,6]. Since lip prints are unique like the finger prints for an individual, it can also be used as a Supplementary tool to verify the presence or absence of a person at the site of crime [7].

The oily and moist secretions from sebaceous and salivary glands located at the vermillion border and subsequent moisturization from the tongue enables the formation of a latent lip print whenever there is contact [8] and is likely to be encountered and should be suspected to be present on the scene of the crime of burglary, sexual assault, house tress-pass, homicide and rape. Depending upon the scenario of the crime scene, lip prints may be found on various physical evidences at the crime scene, such as shirt, handkerchief, tissue paper/wipes, cups, photographs, letters, glass, window panes, cutlery, fruit skin/peel, cigarette butts, clothing, and even biological materials such as skin [2]. A lip print at the scene of crime can be a basis for conclusions as to the character of the event, the number of the people involved, sexes, cosmetics used, habits, occupational traits, and the pathological changes of lips themselves [9]. If a complete match or identification is not possible, proper examination of lip prints may help in establishing other relative facts like gender identification of the donor, hence reducing the burden of the forensic examiner to half.

In the present days lip prints are gaining importance in the biometric systems. Michal Choras has re-affirmed the belief in his recent studies that the lip prints can be used as a primary biometric modality for successful identification purposes [10]. He has shown that geometrical analysis of the anatomical parameters of the human lip can be monitored for successful identification. It was proposed that lip print characteristics could be used in personal identification [11], thus devised a simple system for classifying lip prints [12]. The classification is as follows; Santos divided lip prints into four types mainly: Straight line, Curved line, Angled Sine shaped line and also various classifications of the method of lip prints have been put forward by early researchers [13]. One of the most interesting emerging methods of human identification which originates from the criminal and forensic practice is human lip recognition in morphological study of lip prints [14]. Since 1950, the Japanese carried out extensive research in the matter of study of lip print patterns.

Studies on Cheiloscopy conducted in Tamil Nadu, Maharashtra and Kerala population of India have shown that there is a predominance of different lip print patterns in different populations [15-17]. Studies also reveal that lip prints show differences according to the race and ethnic origin of a person [18]. Comparison of lip prints was used to determine the uniqueness of individual's lips not the lip details themselves. Tsuchihashi expanded the database which included 1364 individuals and, as in 1970, determined that no two lip print patterns were identical and both papers of Suzuki and Tsuchihashi included the study of twins. Both concluded that there is a pattern of lip print types which were the same, further study always revealed differences in the detail. Schnuth, conducted a comparative study on 150 individuals including five pairs of identical twins and found that lip prints were not identical in the case of identical twins but similarities of lip prints between parents and children were found accounting for the heredity to play a major role and thus concluded that every individual has unique lip prints [19].

Material and Methods

The cross-sectional survey of the quantitative design carried out in communities in Urhobo and communities in Ukwuani Delta State, Nigeria. Ethical approval was granted from the Ethics and Research Committee of the Faculty of Basic Medical Sciences, College of Health Sciences, Delta State University, Abraka. Simple random technique was adopted to select the targeted populations (400

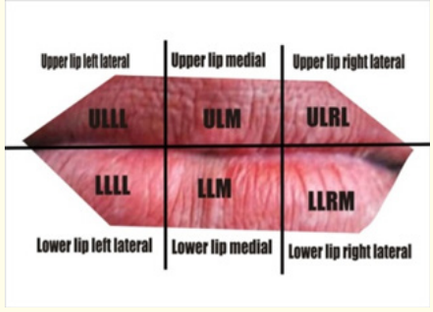

Figure 1

males and 400 females) aged 15-30 years, who were willing to participate. Informed consent of the subjects was taken after explaining the procedure to them. The subject was asked to clean the lips (using sanitary tissues) red colour lipstick was gently applied on the vermillion border of the lip which is between the mucosa and the skin. The subjects were asked to gently rub both lips to spread the applied lipstick and to slightly separate the lips. A4 paper was then placed on the lips gently for about 10 seconds to create a lip impression. This was done twice and in some cases thrice for each individual for better result. The lips of individual were divided into three segments on the upper lip. Upper right lateral, upper right medial, upper left lateral. On the lower lip, was divided into three segments, lower left lateral, lower right medial, and lower right lateral. The various segments were visualized with the aid of a magnifying lens. The lip print patterns were recorded according to study on classification proposed by Suzuki and Tsuchihashi [14].

Criteria of union

Individuals between the ages of 15 – 30years who are purely from Urhobo and Ukwuani ethnic nationality without parental affiliation to other ethnicities, without any anatomical or surgical deformity, complete lip and are willing to partake in the study was included while Subjects which are not from the Urhobo and Ukwuani ethnic groups of Delta State and are not from the age range of 15-30years and are having any anatomical or surgical deformity were excluded from the study. The following data collected were entered in data sheets showing types of the lip print patterns, sex among the males and females urhobo and ukwuani ethnic groups. Chi square test was used to show the differences between the lip prints pattern of the males and females. Statistical significance was considered at the level of P<0.05 and results were presented in tables.

Table 1: Frequency distribution and percentage of studied parameter on lip print patterns of Urhobo subjects.

Sex	Type I (%)	Type I' (%)	Type II (%)	Type III (%)	Type IV (%)	Type V (%)
Males	41.5%	3.5%	24.5%	16.0%	11.5%	3.0%
Female	21.0%		36.5%	32.0%	6.0%	4.5%

Results

The examination of lip print patterns revealed that no two lip prints are the alike with each other, thus establishing the uniqueness of the lip prints. The most predominant pattern in the entire study population in males was Type I lip print (36.5%). This was followed, in order, by Type II (21.75%), Type III (17.5%), Type IV (14.75%), Type I' (5.0%) and Type V (4.25%). While in females in the entire population was Type II (36.5%) in Urhobo female and

Table 2: Frequency Distribution and percentage of cell studies parameters on lip print.

Sex	Type I (%)	Type I' (%)	Type II (%)	Type III (%)	Type IV (%)	Type V (%)
Males	31.5%	6.5%	19.0%	19.5%	17.5%	6.0%
Female	21.0%		25.5%	36.0%	10.5%	7.0%

Table 3: Prevalent of Lip print patterns based on ethnicity.

Ethnicity	Upper lip print patterns		Lower lip print patterns	
	Male	Female	Male	Female
Urhobo	Type 1	Type 2	Type 1	Type 3
Ukwuani	Type 1	Type 2	Type 1	Type 3

type III (36.0%) in Ukwuani Ethnic group and the least for the entire female population is Type V (5.75%).

In the table the males and females has different percentage distribution which the highest percentage distribution in males are type I, II and III while in females was type III, II and I in their highest percentage distribution showing that majority of the Urhobo males had type I pattern of lip print while the female had more of type II pattern of lip print (Table 1).

In the table 2 the males and females had different percentage distribution which the highest percentage distribution in males are type I, II and III while in females was type III, II and I in their highest percentage distribution showing majority of the Ukwuani males had type 1 pattern of lip print while the female had more of type III pattern of lip print (Table 2).

In the table 3 depicts the lip patterns based on ethnicity (Ukwuani and Urhobo). The result in the above table suggests that Urhobo male has more of type 1 as recorded in the upper lip print patterns and more of type II in the upper lip print pattern was seen in Urhobo female. As regards lower lip print patterns, type I was commonly seen in Urhobo male while type III was commonly seen in Urhobo female. Type I was commonly seen in Ukwuani male as regards upper lip print patterns while type II was commonly seen in Ukwuani female. Based on lower lip print patterns, type I was commonly seen in Ukwuani male while typeIII was seen in Ukwuani female.

The statistically significant difference ($p < 0.05$) obtained in all the quadrants individually and taken together suggests the potential of usage in sex discrimination.

Discussion

This study proved that no two lip prints are the same to each other. This confirms the report that cheiloscopy is one of the importance techniques to be used for personal identification and it is also in agreement with other studies done on different populations previously which was reported that lip prints has different patterns which are unique to individual. Tsuchihashi after examining lip print of Japanese subjects came to conclusion that though the lip print consisted of combination of various types of grooves. In this study type 1' lip print patterns was not found among the female of the Urhoho and Ukwuani ethic groups and also it was observed in the present study that similarity exist between the males of the Urhobo and Ukwuani Ethnic Groups which is in relation to other study [20]. In the present study, the most predominant pattern in the entire study population, taking in the upper lips in the all quadrants in males was Type I in both Urhobo and Ukwuani ethnic groups which constituted 41.5% in Urhobo and 31.5% in Ukwuani of all the patterns and the least was Type V (3.0% in Urhobo while 6.0% in Ukwuani). This results are in concordance with Sandhu., *et al*. [21] in their study of lip print pattern in a Punjabi population found type I pattern to be predominant in males, Patel., *et al*. [22] who showed male to possess more of type I, and Karki, [23] carried out a studied among Kathmandu and found out that male have type I. while it differed from those obtained by Augustine,., *et al*. [20] who found that Type III to be the most common patterns amongs males, Mutalik., *et al*. [24] reported that Type IV pattern was the most common among males of Manipal, Karnataka and his findings were not in accordance with this present study.

In females in the entire population are quite different from one another between the two ethnic group. In Females the upper lips and lower lips in all the quadrants was Type II in Urhobo ethnic groups which constituted 36.5% of all the patterns, and the least was Type V (4.5%). %). this results are in agreement with Bindal., *et al*. [25] who carried out a studied in Dehradun population and found that the most common pattern among females was Type II, Verma,., *et al*. [26] found that Type II pattern was the most predominant pattern in females among South Indians and Karki, [23] carried out a studied among Kathmandu and found out that female have type II. While it differed from those obtained by Mutalik., *et al*. [24] reported that Type IV pattern was the most common among females of Manipal and his findings were not similar with the present study, Babu., *et al*. [26] reported that the female have more of type I.

In Females Ukwuani in the entire population in all quadrants in the upper lips and lower lips was Type III in Ukwuani ethnic groups which constituted 36.0% in all the patterns and the least was Type V (7.0%). These results are in concordance with Gupta., *et al*. [27] who carried out a studied in lip prints among Lucknow population and found that the most common pattern was Type III in females, Suzuki and Tsuchihashi, [14] found that Type III was the most predominant pattern and Type V as the least pattern among Japanese, Narang., *et al*. [28] who carried out a studied in lip prints among the Amritsa and Punjab population and found out that the most predominant pattern in female type III. While it differed from those obtained by Vats., *et al*. [29] who found that Type IV to be the most common patterns amongs females in Baniyas population, Mutalik., *et al*. [24] who reported that Type IV pattern was the most common among females of Manipal, Karnataka and his findings were not similar with the present study. In the study statistical significant was observe between the entire population of the two ethnic group which was in accordance with Xu., *et al*. [30] who observe statistical significance differences among sex. Sexual dimorphism was also observed between the Urhobo and Ukwuani males and females lip print patterns and this statement is in agreement with prior studies conducted by Vahanwahal and Parakh, [31] and Adamu., *et al.* [32] showed sexual dimorphism in lip print patterns among Nigerians consisting of males and females. Also, Augustine., *et al*. [20] con-

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