

An Investigation of Gender Variation in Lip Print Pattern Distribution of Identical and Non-Identical Twins

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Abstract

Background: The examination of the lip print is known as Cheiloscopy. This is the method of identification of a person based on characteristic arrangement of lines appearing on the red part of the lips. **Aim and Objective:** This study was aimed at investigating gender variation in lip print pattern distribution of identical and non-identical twins. **Methods:** the study comprised 80 individuals (40 pairs- 25 pairs of non-identical and 15 pairs of identical twins) of the Yoruba tribe of Nigeria (ranging between of ages of 5- 66 years) residing in Igbo-Ora community of Oyo state in Western Nigeria. The lips of the subjects were properly cleaned and a red lipstick was applied on it. After which, the lip print impression was made on a white plane sheet. Cellophane tape was then struck on it for permanent record. The obtained lip print was studied using a magnifying lens. **Results and Discussion:** The following were the results in identical twins, type I males (16.7%), females (12.5%); type I' males and females 8.3%, type II males 33.3%, females 30.5%; type III males 18.8%, females 20.8%; type IV males 16.7%, females 18.1%; type V males and females 8.3%. whereas for the non-identical twins, type I males (18.8%), females (18.4%); type I' males 7.8%, females 15.4%, type II males 31.2%, females 24.3%; type III males 21.9%, females 23.5%; type IV males 12.5%, females 14.0%; type V males 7.8% and females 4.4%. **Conclusion:** It is suggestive that certain pattern types have affinity for a particular gender probably due to hormonal interplay which ultimately results in variations in their distribution.

Keywords: Gender, Variation, Lip patterns, Identical, Non-identical, Twinning.

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INTRODUCTION

The examination of the lip print is known as Cheiloscopy. This is the method of identification of a person based on characteristic arrangement of lines appearing on the red part of the lips. It is the study of the grooves or furrows present on the zone of transition of the outer skin and inner labial mucosa of the lip [1].

[3]. The mesodermal basis of the lateral part of the lip is formed from the maxillary process, the overlying skin derived from ectoderm covering this process. The mesodermal basis of the median part of the lip (philtrum) is from the frontonasal process while the ectoderm of the maxillary process overgrows this mesoderm to meet that of the opposite maxillary process in the midline [3].

Brief Gross Anatomy of the lips

Lip prints are normal lines and fissures in form of wrinkles and groove present in the zone of transition of the labial mucosa and outer skin of the human lip. It is unique to each individual and analogous as finger print [2]. The first study on Cheiloscopy was done by a French anthropologist in 1902.

The lips are mobile, musculo-fibrous folds surrounding the mouth. It extends from the nasolabial sulci and nares laterally and superiorly to the labial mentolabial sulcus inferiorly [4]. The lips are covered by skin externally and mucous internally. They serve functionally as the valves of the oral that controls entry and exit from the mouth and upper alimentary and respiratory tracts. The upper lips is referred to as "labium superius" while the lower lip is the "labium inferioris" [4]. The juncture where the lip meet the surrounding skin of the mouth is called the vermilion boarder and the typically reddish area within the border is known as vermilion zone. The frontonasal process with the right and left maxillary processes vermilion border of the upper lip is known as the cupid bow.

Development of Lips

The lip is both ectodermal and mesodermal in origin. Its development is seen during the 6th-7th week of intrauterine development alongside the development of the face. It is possible to identify the lip pattern as early as the 6th week of the intrauterine life. The upper lip is formed by the fusion of the frontonasal process with the right and left maxillary processes

The flesh protuberance located in the center of the lip is the tubercle known by various terms including the procheilon, the "tuberculum labii superioris and the "labial tubercle". The vertical groove extending from the procheilon to the nasal septum is called the philtrum [4]. The skin of the lip is very thin with three to five layers compared to the typical skin of the face. It has fewer melanocytes and so the blood vessels appear through the skin of the lip giving it its red coloration.

Uniqueness of the Lips

A woman’s lips are visible expression of her fertility. Studies have shown that a woman facial and sexual attractiveness is linked to the make-up of her hormones during puberty and development [5]. The effects of a woman estrogen levels serve to maintain a relatively childlike and youthful facial structure during puberty and final maturity [5]. It has been shown that the higher a woman’s estrogens level, the larger her eyes and the fuller her lips. Surveys performed by psychologists also shows that men find a woman’s full lips to be sexually attractive than those that are less. A woman’s lips are attractive to men because they serve as a biological indicator of her health and fertility [5].

Lip size is linked to sexual attraction in both men and women. Women are attracted to men with masculine lips, that are middle size and not too big or too small, they are to be rugged and sexual [5]. In general, researchers found that voluptuous lips are sexually attractive in both men and women [5].

Brief History of Igbo – Ora Community

Igbo-Ora also called the ‘The Land of Twins’ is a town in the southwest Nigeria that is rated as having the highest rate of twin birth in the whole world. It is the Headquarter of Ibarapa Central Local Government Area in Oyo state. Igbo-Ora is a sleepy town located 77km from Ibadan the state’s capital and 80km north of Lagos state. It consists of six blocks made of rural community settlement and its people are of the Yoruba ethnicity. Its population as at 2017 was approximately 92,000.

There have been works on cheiloscopy by different authors in on different subjects [1, 3, 6-14].

Statement of the Problem

There is paucity of information on lip print in twinning especially in indigenous populations as compared to as compared to fingerprinting. This has created a gap in the body of knowledge.

Aim and Objective

In this study, the method of classification used was the classification scheme proposed by Suzuki and Tsuchihashi [15].

This study was aimed at investigating gender variation in lip print pattern distribution of identical and non-identical twins.

Significance of the Study

This work will find relevance in forensics and genetics.

Limitations of the Study

This study was limited to lip print examination of the subjects.

MATERIALS AND METHODS

Research Design

The study was descriptive and analytical.

Sample Size and Sampling Technique

The study comprised 80 subjects consisting of 50 (25pairs) non- identical and 30 (15 pairs) identical male and female twins between the ages of 5-66 years of age randomly selected.

Criteria for Subject Selection

All subjects used for this study were from Igbo-Ora community, Southwest Nigeria. They were healthy individuals free of congenital abnormalities, trauma, inflammation and orthodontic treatments.

Ethical Clearance

Ethical clearance was obtained from the Research Ethics Committee of the University of Port Harcourt, Nigeria.

Data Collection

The informed consent was obtained from the volunteer subjects before commencement of the study. This study was done from January 10 - November 15, 2014. The lip of the individual was properly cleaned using a cotton wool after which then the red- colored lipstick was applied evenly on the lips of the individual over the entre transition zone and vermillion border. The subject was asked to rub both lips evenly so as to spread the applied lipstick. After few minutes, a lip impression was made on the white sheet that is folded into two halves. It was made in the centre and then uniformly towards the corners of the lips. The paper was removed after the impression is made. The cellophane strip was then stroked over the lip impression serving as a permanent record. The impression was analyzed using a magnifying lens. The lip impression was divided into four quadrants – two compartments on each lip using Figures 1-4.

| | |
|-------------------------------------|-------------------------------------|
| RIGHT UPPER LIP I QUADRANT (Q1) | LEFT UPPER LIP II QUADRANT(Q2) |
| RIGHT LOWER LIP IV QUADRANT (Q4) | LEFT LOWER LIP III QUADRANT (Q3) |



Fig-1: The lip print pattern of a female non- identical twin



Fig-2: The lip print of a female identical twin



Fig-3: The lip print pattern of a male identical twin



Fig-4: The lip print of a male non- identical twin.

RESULTS

Table-1: Percentage frequency distribution of the Lip Print pattern of the male and female Identical twins and the total percentage in both sexes

| Lip print pattern | Males | Females |
|---------------------|-------|---------|
| Type I | 16.7% | 12.5% |
| Type I ¹ | 8.3% | 8.3% |
| Type II | 33.3% | 30.5% |
| Type III | 18.8% | 20.8% |
| Type IV | 16.7% | 18.1% |
| Type V | 8.3% | 8.3% |

Table-2: Percentage frequency distribution table showing the percentage distribution of the lip print pattern of the male and female Non-identical twins and the total percentage in both sexes

| Lip print pattern | Males | Females |
|---------------------|-------|---------|
| Type I | 18.8% | 18.4% |
| Type I ¹ | 7.8% | 15.4% |
| Type II | 31.2% | 24.3% |
| Type III | 21.9% | 23.5% |
| Type IV | 12.5% | 14.0% |
| Type V | 7.8% | 4.4% |

DISCUSSIONS

The distribution of lip patterns between the identical twin males and females in Table-1 is suggestive that there are some elements of gender variation in the distribution of the patterns. The pattern types I and II were seen to be more frequent in the male identical twins than the females whereas, the types III and IV were more frequent in the female identical twins. Although both categories had equal distributions of types I' and V. This further implies that this dimorphism in distribution could be a result of hormonal interplay. It appears like at formative stage, the female hormones either induces or have an affinity for genes that are responsible for the formation of types III & IV; the male hormones the types I & II while both male and female hormones exerted equal effect on the distribution of I' & V. Although there has not been any known study reporting variation in gender with respect to lip print pattern distribution, there are studies that have reported high frequency distribution of types II in males [16-18] which is consistent with the results obtained in the identical twin males.

Similarly, the distribution of the patterns in non-identical twins portrays variation with respect to gender. In the distribution of types I, II & V, the males non-identical twins had higher distribution than the females while in types I', III & IV the females had higher frequencies than the males. This result disagrees with the works of Suzuki and Tsuchihashi [19] and Saraswathi *et al.*, [2] who maintained that the Type III was more prevalent among the males. These again could be explained following the hormonal difference at the developmental stage which is believed to have exerted some affinity for particular patterns in both genders.

CONCLUSION

It is suggestive that certain pattern types have affinity for a particular gender probably due to hormonal interplay which ultimately results in variations in their distribution.

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Conflict of Interest

We write to state that there is no conflict of interest.

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Author's Contribution

We write to state that all authors have contributed significantly, and that all authors are in agreement with the contents of the manuscript. 'Author A' (Peter D. Okoh) designed the study and protocol, 'Author B' (Ezon-Ebidor Innocent Edibamode) reviewed the design, protocol and examined the intellectual content, Author C' (John Nwolim Paul) wrote the first draft of the manuscript and managed the literature search, 'Author D' (Adozue Chinasoakwu C.

Harold) managed the analyses of the study. All authors read and approved the final manuscript.

REFERENCES

1. Venkatesh, R., & David, M. P. (2011). Cheiloscopy: An aid for personal identification. *Journal of forensic dental sciences*, 3(2), 67-70.
2. Saraswathi, T. R., Mishra G., & Rangathan, K. (2009). Study of the Lip print. *Journal of Forensic and Dental Science*, 1(5): 70-74
3. Singh I., & Pal, G. P. (2007). Human Embryology, 8th Edition. Macmillan India limited, 126-128.
4. [4] Moore, K.L. and Dalley A.F. (2006). Clinical Oriented Anatomy, 5th Edition. Lippincott Williams & Wilkins. Pp. 990
5. Smith, M. J. L., Deady, D. K., Moore, F. R., Jones, B. C., Cornwell, R. E., Stirrat, M., ... & Perrett, D. I. (2012). Maternal tendencies in women are associated with estrogen levels and facial femininity. *Hormones and Behavior*, 61(1), 12-16.
6. Edibamode, E. I., Udoaka, A. I., Okoh, P. D., & Uzoaru, J. A. (2013). Lip print pattern among the student of University of Port-Harcourt, Nigeria. *Scientia Africana*, 12(2); 86-93.
7. Gilbert. & Scott, F. (2006). "Non-identical Monozygotic Twins". *DevBio: A Companion to Developmental Biology*. 8th Edition. Sinauer Associates.
8. Hirth, L., Gottsche, H., & Goedde, H. W. (1975). Lip prints-variability and genetics. *Human Genetics*, 30(1): 47-62
9. Patrick, N. P. S. (2007). The frequency of twinning in rural community in Western Nigeria. *Annals of Human Genetics*, 33(1): 41-44.
10. Patwari, P., & Lee, R. T. (2008). Mechanical control of tissue morphogenesis. *Circulation research*, 103(3), 234-243.
11. Shailesh, M., Gondvikar, A. I., Shirish, D., & Bhowate, R. (2009). Cheiloscopy for sex determination. *Journal of Forensic and Dental Science*, 1(2):56-60.
12. Williams, T. R. (1991). Lip prints - Another means of identification. *Journal of Forensic Science International*, 41(3): 190-191.
13. Santos, M. (1967). Queiloscopy: A supplementary stomatological means of identification. *International Microform J. Legal Medicine*, 2.
14. Seguí, M. A., Feucht, M. M., Ponce, A. C., & Pascual, F. A. V. (2000). Persistent lipsticks and their lip prints: new hidden evidence at the crime scene. *Forensic Science International*, 112(1), 41-47.
15. Suzuki, F., Tsuchihashi, H., & Sano, T. (1974). New conduction pathways from the left atrium to the right atrium and to the ventricle along the anterior and posterior portions of the left AV ring. *Japanese heart journal*, 15(4), 385-400.

16. Bindal, U., Jethani, S. L., Mehrotra, N., Rohatgi, R. K., Arora, M., & Sinha, P. (2009). Lip prints as a method of identification in human being. *Journal of the Anatomical Society of India*, 58(2), 152-155.
17. Vahanwala, S. P., & Parekh, B. K. (2000). Study of lip prints as an aid to forensic methodology. *Journal of Forensic Medicine and Toxicology*, 17(1): 12-18.
18. Karki, S., & Cheng, A. C. (2012). Impact of non-rinse skin cleansing with chlorhexidine gluconate on prevention of healthcare-associated infections and colonization with multi-resistant organisms: a systematic review. *Journal of Hospital Infection*, 82(2), 71-84.
19. Suzuki, K., & Tsuchihashi, Y. (1975). Two criminal cases on lip print. *Forensic Science*, 5(2), 171.