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Unique and Persistent Nature of Digital Dermatoglyphic Traits: Case study on the Thumbs and Index Fingers of Departmental Cadavers, Olabisi Onabanjo University, Nigeria

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ABSTRACT

Dermatoglyphic studied epidermal configurations on the fingers and palms of the hands; the toes and the soles of the feet. Once these skin ridges are formed in the mother's womb, remain persistent until decomposition in the tomb. This study therefore, aimed at analyzing the qualitative dermatoglyphic characteristics in cadaveric specimens in the Department of Anatomy to estimate the persistent character of the finger prints in cadaveric specimen and compare them with the previously reported observations in live-ssubjects.

A descriptive, cross-sectional study was carried out on Sixty (60) Cadaveric Specimens (Ten (10) fetuses and Fifty (50) Adult Cadavers). Consents were obtained from the Heads of Department and Ethical approval was obtained from the University Ethical Committee. The cadaveric digital skin was dissected out and analyzed under a magnification of x50 using a dissecting microscope.

Arches, Ulnar Loops, Radial Loops, Whorls and Twinned Loops are among the digital patterns observed on the Two Hundred and Forty (240) Cadaveric Digits; Thumbs (n=120) and Index Fingers (n=120) and the dermatoglyphics details of each of the patterns were maintained similar to the live subjects and were fully described.

In view of the similarities between these cadaveric dermatoglyphs and those of the live subjects in previous studies; great importance must be attached to the preservation, growth and development of human resources. The observations in this study will be an eye-opener to the Governments in Nigeria to make them work harder on security of lives and the safety on the roads, since most of the Cadavers were unclaimed accident victims and armed condemned criminals.

Key Words: Dermatoglyphics, Descriptive Topography, Cadaveric Specimens, Wasted Human resources.

INTRODUCTION

The Department of Anatomy Olabisi Onabanjo University was established in 1983 as one of the Departments in the Faculty of Basic Medical Sciences of Obafemi Awolowo College of Health Sciences, to train the Pre-Clinical Medical Students.

The Department was licensed in 1986 by the Ministries of Health and Justice to practice Human Anatomy. This authorized the Department to collect Cadavers from Hospitals, Prisons and condemned Armed Robbers for the purpose of Teaching and Learning of Human Anatomy through Dissection in the University (Student Hand Book, 2018).

The thumbs had been scientifically linked with the prefrontal cerebral cortex of the human brain and it is responsible for creative thinking, spatial imagination, logical measuring and ability to manage numbers while the index fingers on the other hand had been associated with the frontal lobe of the cerebral cortex which controls human creativity, leadership skills, communications, planning, judgment, insight, hindsight and fore-sight in Man (Singh and Majumdar, 2015).

Durham et al., (2000), described the uniqueness of the fingerprints which were formed during the intrauterine period and found to remain unchanged till death. This study therefore, aimed at providing the results of a descriptive, cross-sectional topography of the dermatoglyphs of the fingers in human fetal and adult cadavers of the Department of Anatomy, Faculty of Basic Medical Sciences, Olabisi Onabanjo University.

SUBJECTS AND METHODS

Subjects

The investigation was a descriptive, cross sectional study of the cadaveric specimens of Ten (10) fetuses, at about the third trimester of pregnancy and Fifty (50) adult cadavers that had been fully dissected by both the Medical Students and Students of Bachelor of Science Programme in Human Anatomy; for the past five consecutive years (2012 to 2017).

Ethical Approval

The experimental protocol was submitted to the ethical committee for approval. Ethical approval was obtained from Departmental Health Research Ethics Committee of Olabisi Onabanjo University.

Research Procedure

The skin over the anterior surfaces of the first two Digits (Thumbs and Index Fingers) was dissected out; between the distal digital crease and the tip of the distal phalangeal segment of each of these Digits. Skin specimens were appropriately labeled and immersed in the 10% Ethanol solution in the Petri-dishes. The Fingerprint patterns were studied under the Dissecting Microscope (Model YU-JIE. XTD-3C); at a magnification of x50 (Objective lens of x10 and Eye Piece x05. The Dermatoglyphic Patterns were identified based on the Methods of Galton's Fingerprints classification (Galton 1985).



Figure 1: Arches pattern

In the Ulnar Loops, the ERs and the Sulci were observed to move from the medical side of the digits or Ulnar side with a gentle curve at the medial side of the digits forming a baselike end of a titled Goblet which opened to the Ulnar sides of the Digits (Figure. 2)



Figure 3: Radial Loop pattern

In Whorls, the ERs and the Sulci were observed to move in circular formations and at the peripheral parts of the pattern, two tri-radii were also observed. The tri-radii were made of three different groups of ERs and sulci giving them the triangular shapes; one on the radial side of the pattern and the other on its Ulnar side. This Topography was unlike the patterns observed for the Loops which had only one tri-radius near the base of each Goblet (Figure. 4).

RESULTS

The Epidermal Topography was observed to be different with respect to specific pattern types across the studied specimen.

The Arches in this study showed that the Epidermal Ridges (ERs) moved across the digits from the lateral sides to the medial sides and slightly elevated at the midways of their journey. The ERs were separated by shallow depressions or sulci (Furrows) Figure 1.



Figure 2: Ulnar Loop pattern

The ERs and the Sulci in the Radial Loops of these Cadavers had similar configurations as observed in the Ulnar Loops. The topographical difference was that the Goblets in this case opened towards the lateral or the radial sides of the digits (Figure. 3).



Figure 4: Whorl pattern

The Twinned Loops were observed to have two tri-radii. This Topography was unlike the observed arrangement in the Loops; where one tri-radius existed in each of the patterns. They however, differed from the Whorls in the patterns formed by the ERs and the Sulci. Here, the two Loops inter-twined and formed a capital letter "S" with two cores and two tri-radii (Figure. 5).



Figure 5: Twinned loop/Double loop pattern

DISCUSSION

In Nigeria, there had been no known study of the fingerprints in cadavers. Qualitatively, the in both fetal and adult cadaveric specimens: Arches, Ulnar loops, Radial loops, Whorls and Twinned loops were observed. Adenowo and Dare 2016 had reported the different basic types of fingerprints Arches, Ulnar loops, Radial loops, Whorls and Twinned (Double) loops among the medical students in Nigeria, in line with this study, the epidermal configurations of the digital skin at the anterior surfaces of the distal segments of the thumbs and the index fingers showed varying topographical Anatomy.

The topographical Anatomy observed in this study had earlier been reported in different parts of the World among the live-Subjects (Dell and Munger 1986, Moshe, 1995).

In view of the fact that similar types of digital skin topography had been earlier observed in live-Subjects, these observations supported the reliability and repeatability of the hypothesis that fingerprints (Dermatoglyphs) formed in the Womb and remain unchanged till the decomposition in the tomb.

Although the preservative fluid has helped to keep the skin of the cadavers intact for the past years; there were no gross pathological alterations of the topographical Anatomy of the epidermal carvings of these digits (Dermatoglyphs).

Limitations

In this study, there were few female Cadavers (n=10), compared to the Males (n= 40) hence, the statistical gender evaluation could not have been justified with such discrepancy in sampling size.

Although the Gross topographical descriptions of the epidermal configurations were studied perfectly well

under the Dissecting Microscope, a digital dissecting Microscope with camera accessories was not handy for the pictorial documentation.

CONCLUSION

This study served as a base line point of reference for future work on Dermatoglyphic Topography, particularly in Cadaveric specimens in Nigeria. In view of the persistence of the fingerprints in the Cadavers after about six years of chemical preservation; these skin topographical structures and their uniqueness could be used as concrete pieces of evidence in Forensic Anatomy which may be helpful in open courts to authenticate alleged criminal cases.

However, the most important component of our findings which was the presence of all the Fingerprint pattern-types found on live-Subjects; were also observed in the cadavers. This implies that all the lives wasted either as fetuses or adults would have been secured from such dangers that claimed their lives. Such cadaveric Dermatoglyphs had earlier been scientifically associated with several intelligences and learning abilities (Garden 1993 Shinleyet al., 1997, Kumari, et. al., 2014).

This study therefore serves as an eye-opener to show that Anatomy is a living subject and has great potentials to contribute to the growth and development of human resources in developing Countries of Africa.

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