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## **A Comparative Study of the Palmar Crease and Axial Triradius of Kalabari and Ikwerre Ethnic Groups of Rivers State, Nigeria**

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### **ABSTRACT**

The palmar crease is an important dermatoglyphic feature and they are lines on the palm of the hand: Simian, Suwon and Sydney crease. This study is aimed at investigating the palmar crease and axial radius of the palms of the Kalabari and Ikwerre ethnic groups. A total of 497 subjects which comprised of 375 Ikwerres (211 males and 164 females) and 122 kalabaris (67 males and 55 females) were recruited for the study using the multi stage sampling technique. The data were obtained using print scanner (Hp G3110 photo scanner) connected to Hp mini laptop and subjected to statistical analysis using fisher's exact test and Chi-Square to determine the significant difference at 95% confidence interval ( $P = 0.05$ ). The results of this study showed no Simian crease among the Ikwerre and Kalabari participants, on both, the right and left hands. The frequency of Suwon crease for both ethnic groups were not significantly different [2 (0.5%) for the Ikwerres and 2 (1.6%) for the Kalabaris ( $P > 0.05$ )]; while for the Sydney crease, only one Sydney Crease was observed among the subjects, and this was observed among a male participant in Ikwerre ethnic group which was not statistically significant ( $P > 0.05$ ). The frequencies of  $t$  and  $t'$  were not statistically significant ( $P > 0.05$ ). However, the frequency of  $t'$  for males on both hands [Ikwerre = 6 (3.1%); Kalabari = 15 (22.4%)] and that of females [Ikwerre = 40 (23.5%); Kalabari = 16 (29.1%)] were statistically significant only on both hands of the male participants ( $P < 0.05$ ). This study has established the prevalence of some of the palmar creases (Suwon and Sydney) and the position of the axial triradii ( $t$ ,  $t'$  and  $\bar{t}$ ) of the Kalabari and Ikwerre ethnic groups of Rivers State. The results of this study can be used for forensic and clinical purposes, ethnic reference and scientific data for future studies.

**Keywords:** Palmar crease, axial triradius, Ikwerre, Kalabari.

### **INTRODUCTION**

The development of dermatoglyphic features relatively begins by the end of the second trimester and remains constant throughout life<sup>1,2</sup>. The palmar crease is an important dermatoglyphic feature and they are lines on the palm of the hand<sup>3</sup>. Three of these lines; the Simian, Sydney and Suwon creases are most prominent but the Simian and Sydney creases have however been considered most important and therefore most commonly researched on.

Usually the human palm of the hand is featured with 3 strong major lines, in medical science these are often referred to as: palmar flexion creases. The lines involved are known as: Life line considered as radial longitudinal crease, Head line considered as proximal transverse crease and Heart line considered as distal transverse crease<sup>4</sup>.

An important variant is found when both lines are 'replaced' by one single line which extends the full palm, this single line is referred to as simian line or 'simian crease'. It is seen to be a merger between the 'heart line' and the 'head line'<sup>5</sup>. The Simian crease came into focus in 1877 when Pierre Paul Broca introduced

the ethnic aspect of palmar creases in anthropology. The simian line is used by anthropologist for studying variations among ethnic populations. Much later, researchers found that the occurrence of the simian line may vary from about 1% to 2% in various European populations<sup>4</sup>. The single palmar transverse crease was named as the simian line / simian crease because of the fact that the hands of 'simians' (a synonym for: 'monkeys' and 'apes') are usually characterized by the presence of various horizontal creases which transverse the full simian hand<sup>6</sup>. The simian crease is the most medically researched marker found on the hands because it is the most noticeable. A very high percentage of Down's syndrome children have this marker, but it is not a pathognomonic feature of Down's syndrome; as it is also found in 1% of the normal population<sup>7</sup>. Many exceptionally intelligent, highly evolved people have this marker<sup>8, 9</sup>. Advances in research publications have linked simian lines with several syndromes, and diseases<sup>10</sup>.

In 1967, Vrydagh-Laoureux mentioned that there is another line aside from the simian line. He called it an extended proximal palmar crease. This very line is known today as Sydney line. A line is said to be 'Sydney

line' when the proximal transverse crease extends beyond the midline axis of the fifth finger towards the ulna border of the palm. The Sydney line goes by its name because it was first discovered in Sydney<sup>10,11</sup>. The presence of Sydney line is indicative of certain health conditions such as: Alzheimer dementia (gene is on chromosome 21), Leukaemia, Congenital rubella<sup>5</sup>. There are a few observations on the distribution of simian and Sydney lines:

(I) It is stated that the Sydney line is more often found on the continent Australia, and less often in Asia; while the simian crease is more often found in Asia<sup>5</sup>.

(II) It is noted that there is a little difference in occurrence in sexes, the Sydney line can be observed more frequently in the hands of women; while the simian crease is known to be found slightly more often in the hands of men<sup>5</sup>.

(III) It was also reported in a study on Sydney line that the Sydney line is more often observed in the right while the simian crease is known to be found more frequently in the left hand<sup>5</sup>.

Suwon Crease is comprised of a long heart line that crosses the entire palm appearing to join a head line at the radial edge and a second head line is present. This line is considered by some writers as a 'cousin' of the Sydney line. It is called Suwon Crease because the researchers who found it named it after their location in Suwon, Korea. It is said that the Korean researchers found it in 0.5% of 5,196 hands. It was more commonly found in the left hand of males while zero percent (0.0%) of females were found to have it in the Korean study.

A suitable term used for description in dermatoglyphics is the triradius. A triradius is a point of convergence for three regions that separate almost parallel ridges. Loops have one triradius (on the thumb side if ulnar and towards the little finger if radial) and whorls have two. Arches do not have triradius<sup>12</sup>. An axial triradius (t) often found at the junction between the palm and the wrist. 2 % of normal people are believed to have this triradius positioned near the centre of the palm (termed t''). It is noted that a triradius found halfway in between these two positions (t') is found on 21% of the normal population. In approximation, 11% of the population will have some combination of more than one axial triradius<sup>13</sup>.

Extensive work has been carried out on several populations, racial, and ethnic groups but there is scarcity of literature for the Kalabari and Ikwerre ethnic groups of the South-South region of Nigeria. This study is therefore aimed at determining the dermatoglyphic features of the palm of Kalabari and Ikwerre ethnic groups of Rivers State.

## MATERIALS AND METHODS

The study was an analytical cross-sectional research with Digital Print Model adopted from Oghenemavwe and Osaat<sup>14</sup> and Jin Seo Park *et al.*<sup>5</sup> palmar crease

analysis model. Both manual (observation) and Print Scanner were used to obtain the samples data. The samples were drawn from the Kalabari and Ikwerre ethnic groups using multi stage sampling. A total of 497 (Ikwerre 375; 211 males and 164 females and Kalabari 122; 67 males and 55 females) subjects who were within the age range of 18 to 50 years, were recruited for the study.

The selection and collection of required parameters were based on informed consent of volunteer subjects. Participant's hands were thoroughly washed with water and detergent and dried with towel before taking prints. This was done to remove dirt from the hands. A little pressure was applied to press the palm on the scanner for adequate contact between the palm and the scanner. Sharp prints of the palms were captured. The prints were magnified using the zooming tool on Hp mini laptop connected to the scanner via USB cords. The prints were observed using Jin Seo<sup>5</sup> palmar crease analysis model to see if Simian, Suwon and Sydney crease were present on the palm. The palmar prints were again examined for the various positions of axial triradii.

Data were analyzed using version 20.0 of the Statistical Package for Social Sciences (SPSS). Fisher's exact test and Chi-Square were done to determine the significant difference at 95 % confidence interval (P=0.05).

## RESULTS

The data obtained were presented in tables based on the method with which it was collected and analyzed. The frequencies of the palmar creases and axial triradii were presented in percentage for males and females of both ethnic groups and P - values were obtained using the Fisher's exact and Chi-square test.

No simian crease was observed in this study.

The results of the frequency of Suwon crease of the Ikwerre and Kalabari ethnic groups of South - South Nigeria were presented in table 1.

The results of the frequency of Sydney crease of the Ikwerre and Kalabari ethnic groups of South - South Nigeria were presented in table 2.

The results of the frequency of axial triradii (t, t', t'') of the Ikwerre and Kalabari ethnic groups of South - South Nigeria were presented in table 3 to 5.

There was no simian crease seen among the Ikwerre and Kalabari participants in this study, on both the right and left hand.

In table 1, it was observed that 4 (0.8%) Suwon Crease on each hand of the study participants, 1 (0.4%) of the Suwon creases were observed among the males and 3 (1.3%) among the females. 1 (0.5%) Suwon Crease was observed among the Ikwerre males but none was observed among the Kalabari males. Also, 1 (0.6%) Suwon crease was observed among the Ikwerre females and 2 (3.6%) among the Kalabari females. In both, 2 (0.5%) Suwon creases were observed among the Ikwerre ethnic group and 2 (1.6%) among the Kalabari

ethnic group and this was not significantly different ( $P > 0.05$ ).

In table 2, only one Sydney Crease was observed among the study participants, and this was observed among a male participant in Ikwerre ethnic group. This was not statistically significant ( $P > 0.05$ ).

In table 3, the percentage frequencies of Axial Triradius (t) were shown as follows: The axial triradius (t) was found in 183 (50.0%) of the Ikwerre group and 51 (41.8%) of the Kalabari group ( $P > 0.05$ ) which was not significant. It was 112 (57.1%) among the Ikwerre male and 33 (49.3%) among the Kalabari males (0.262), but 71 (41.8%) among the Ikwerre females and 18 (32.7%) among the Kalabari females ( $P > 0.05$ ). This was also not significant.

In table 4, the Axial triradius (t), it was found in 135

(36.9%) of the Ikwerre group and in 40 (32.2%) of the Kalabari group ( $P > 0.05$ ). For gender differences, it was 76 (38.8%) in Ikwerre male and 19 (28.4%) in Kalabari males ( $P > 0.05$ ), but 59 (34.7%) in Ikwerre females and 21 (38.2%) in Kalabari females ( $P > 0.05$ ). These were not significant

In table 5, a statistically significant difference was observed in the axial triradius (t) of the Ikwerre group as compared against that of Kalabari group (12.6% and 25.4% respectively,  $P < 0.05$ ). A statistically significant difference was also observed when the Ikwerre males were compared against the Kalabari males (3.1% Vs 22.4% respectively,  $P < 0.05$ ), but there was no statistically significant difference observed when the Ikwerre females were compared against the Kalabari females (23.5% Vs 29.1% respectively,  $P > 0.05$ ).

**Table 1:** Frequency of Suwon Crease of the Ikwerre and Kalabari ethnic groups of South-South Nigeria

Hand side	Gender	Ikwerre	Kalabari	P-value
		Frequency (%)	Frequency (%)	
Right	Male	1 (0.5)	0 (0.0)	1.000
	Female	1 (0.6)	2 (3.6)	0.149
	Both	2 (0.5)	2 (1.6)	0.261
Left	Male	1 (0.5)	0 (0.0)	1.000
	Female	1 (0.6)	2 (3.6)	0.149
	Both	2 (0.5)	2 (1.6)	0.261

**Key:** The figures in parenthesis are in percentages

**Table 2:** Frequency of Sydney Crease of the Ikwerre and Kalabari ethnic groups of South-South Nigeria

Hand side	Gender	Ikwerre	Kalabari	P-value
		Frequency (%)	Frequency (%)	
Right	Male	1 (0.5)	0 (0.0)	1.000
	Female	0 (0.0)	0 (0.0)	-
	Both	1 (0.3)	0 (0.0)	1.000
Left	Male	1 (0.5)	0 (0.0)	1.000
	Female	0 (0.0)	0 (0.0)	-
	Both	1 (0.3)	0 (0.0)	1.000

**Key:** The figures in parenthesis are in percentages

**Table 3:** Frequency of Axial Triradius (t) of the Ikwerre and Kalabari ethnic groups of South-South Nigeria

Hand side	Gender	Ikwerre	Kalabari	$\chi^2$	p-value
		Frequency (%)	Frequency (%)		
Right	Male	112 (57.1)	33 (49.3)	1.256	0.262
	Female	71 (41.8)	18 (32.7)	1.420	0.233
	Both	183 (50.0)	51 (41.8)	2.463	0.117
Left	Male	112 (57.1)	33 (49.3)	1.256	0.262
	Female	71 (41.8)	18 (32.7)	1.420	0.233
	Both	183 (50.0)	51 (41.8)	2.463	0.117

**Key:** The figures in parenthesis are in percentages

**Table 4:** Frequency of Axial Triradius (t) of the Ikwerre and Kalabari ethnic groups of South-South Nigeria

Hand side	Gender	Ikwerre	Kalabari	$\chi^2$	p-value
		Frequency (%)	Frequency (%)		
Right	Male	76 (38.8)	19 (28.4)	2.345	0.125
	Female	59 (34.7)	21 (38.2)	0.219	0.640
	Both	135 (36.9)	40 (32.8)	0.668	0.414
Left	Male	76 (38.8)	19 (28.4)	2.345	0.125
	Female	59 (34.7)	21 (38.2)	0.219	0.640
	Both	135 (36.9)	40 (32.8)	0.668	0.414

**Key:** The figures in parenthesis are in percentages

**Table 5:** Frequency of Axial Triradius (t) of the Ikwerre and Kalabari ethnic groups of South-South Nigeria

Hand side	Gender	Ikwerre	Kalabari	$\chi^2$	p-value
		Frequency (%)	Frequency (%)		
Right	Male	6 (3.1)	15 (22.4)	25.385	<0.001*
	Female	40 (23.5)	16 (29.1)	0.688	0.407
	Both	46 (12.6)	31 (25.4)	11.354	0.001*
Left	Male	6 (3.1)	15 (22.4)	25.385	<0.001*
	Female	40 (23.5)	16 (29.1)	0.688	0.407
	Both	46 (25.4)	31 (12.6)	11.354	0.001*

**Key:** The figures in parenthesis are in percentages

## DISCUSSION

In this study, no Simian crease was found in both the Ikwerre and Kalabari ethnic groups of Rivers state. However, Sydney crease were observed in both hands to be 0.5% and 1.6% of the Ikwerre and Kalabari ethnic groups respectively, and Suwon crease was observed in both hands to be 0.3% of the Ikwerre group, but none in any of the Kalabari group. The subjects examined in this study were healthy subjects with no form of deformity on any of their hands. Findings of this study compares favourably with findings of a Nigerian study which reported that no Simian crease was found among undergraduate students from the Anatomy Department of the University of Lagos<sup>15</sup>. In another Nigerian study conducted among the Ijaws of South-South Nigeria, a population similar to this present studied population, the prevalence of Simian crease in males was 1.77% in the entire population and 3.98% in the male population, and that of females was 2.37% in the entire population and 4.27% in the female population<sup>11</sup>. The same study also observed that Sydney crease was uncommonly distributed among the population (0.19%). This finding was in contrary to finding of this present study. The prevalence of palmar creases varies from countries to countries. This was evident in a study conducted in Pokara where a prevalence higher than the prevalence of this present study was observed among normal children; children with no form of chromosomal anomaly<sup>16</sup>. In the Pokaran study, a Simian crease prevalence of as high as 14.6% was observed among normal children. In an Indian study, the prevalence of

Simian, Sydney and Suwon creases were 14.4%, 3.6% and 2.4% respectively<sup>6</sup>.

This present study did not observe any gender difference or lateral predominance in the palmar creases. However, in the Indian study it was maintained that the Simian crease had right unilateral predominance which was associated with handedness and was more common in males; the Sydney crease had no lateral predominance nor association with handedness, but was more prevalent in females, while the Suwon crease had no lateral predominance nor association with handedness, but was more prevalent in males<sup>6</sup>.

The result of this study showed that for (t) and (t) the Ikwerre males and females had a higher prevalence than the Kalabari males and females, while the (t) was more prevalent in Kalabari than in the Ikwerre group. Comparing this result with the findings of the Taiwan study where it was stated that the various axial positions differed significantly<sup>17</sup> contradicts and does not agree with the result obtained in this present study.

## CONCLUSION

This study has shown that there is a slight variation in the Palmar crease and position of the axial triradius between the Kalabari and Ikwerre ethnic groups of Rivers State. Further studies should be done in the other regions of Nigeria and compared to see if there are similarities in close and distant ethnic groups.

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