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The Relationship Between the Presence of Triradius (A) and Triradius (D) Doubly with the Pattern of the Special Finger

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ABSTRACT The relationship between the presence of triradius (a) and triradius (d) have been doubly studied with the pattern of the second finger (index) and the fifth (little finger) respectively in a sample of 200 persons (50 for each sex) and they were compared with (100 persons) as a control sample (50) for each sex .When comparison was conducted among studied samples, there appeared many differences in the repetition of the patterns and for each sex separately where the occurrence of whorls of the second and fifth fingers increased in the double samples of males (54%, 36%) compared with the control sample(16%, 46%) respectively whereas the occurrence of ulnar loops in these (2) samples and for the second and fifth fingers decreased (26%, 64%) compared with the control sample (32%, 84%) respectively. As regards the females, the case was pretty much complicated where the occurrence of whorls decreased to (38%) and the occurrence of ulnar loops and arches for the second finger of the female sample increased to (16%, 38%) compared with the control sample (62%) and (6%, 24%) respectively. As for the double female triradius (d) sample, the whorls and arches occurrence has increased to (24%, 8%) and the ulnar loops occurrence decreased to (66%) compared with the control sample (18%, 0%) and (82%) respectively. Some of these differences have reached an significant level while the others were not when using.(χ^2) test for comparison. The double male triradius (a) sample showed the sum of the mean higher for both unilateral and bilateral analyses compared with the control , and also the double male triradius (d) sample as related to the bilateral analysis. As for the other samples, they showed the sum of mean lesser compared with the control.

INTRODUCTION

What distinguishes the ridge counts in the palm is the presence of triradii (the triradius is the area whereby three lines meet) in different areas of it. There is, in each finger's base except the thumb, a triradius called triradius (a) in the base of the index finger, triradius (b) in the base of the middle finger, triradius (c) in the base of the ring finger, and triradius (d) in the base of the little finger. Out of the top of each triradius appears a main line going towards one of the areas of the palm (Schaumann and Alter, 1976).There are also a number of triradii in other areas of the palm as triradius t, t^{-}, $t^{=}$, z, z^{-},and $z^{=}$ (for further information quid vid Al-Saadi, 1990).The significance of functional and genetic of the ridge counts (they do form in the first months of pregnancy and remain constant all life long) (Mellor, 1968; Schweikel, 1971; Suzumori, 1980). Studies have dealt with them from different perspectives, there are studies which have dealt with the relationship of the ridge counts of some diseases (Al-Juboory, 2001; Avila et al., 2003; Ravindranath et al., 2003), some studied the ridge counts in various societies especially the one with indigenous (Al-Juboory, 2002; Igbigbi and Msamati, 2002; Sengupta and Karmakar, 2003), There are studies that dealt with the influence of environmental factors on the process of forming the ridge counts (Lopuszanska and Jankowska, 2001; Bokhari et al., 2002; Al-Juboory, 2004).

What is noteworthy is that the studies that dealt with the study of triradii in the bases of fingers have focused on the absence of (c) triradius more that the other triradii (Rodewald et al., 1979; Franceschini et al., 2002; Al-Juboory, 2003).

MATERIALS AND METHODS

The present study includes a sample of (300 individuals) which are divided as follows:

100 individuals having double triradius (a) (50 individual for each sex)

100 individuals having double triradius (d) (50 individual for each sex)

100 individuals who have neither double triradius nor absent triradius as a control (50 individuals for each sex).

The sample were collected from Karbala University, wherein the age of males ranged from (18-25) years, and female samples ranged from

(18-23) years and the geographical origin is Karbala province.

Finger prints and palm of the hand were taken using the ink method (Schaumann and Alter, 1976) and (Cummins and Midlo, 1961) methods were used to classify the finger prints into whorls (W), ulnar loops (Lu), radial loops (Lr), and arches (A). Holt (1968) method was used to count the number of ridges. Chi-saquare test was used to check the differences that reach the significant level between the pattern of finger prints. t- test was used check the differences that reach the significant level for the unilateral and bilateral analyses.

RESULTS AND DISCUSSIONS

I. Qualitative Analysis

Table 1 shows the observable values and the percentage of the second finger patterns (index) in the two male samples which have the double triradius (a) and the control. The increase of whorls is noted (54%) and the decrease of the ulnar loops (26%) in the double male sample compared with the control (46%) and (32%) respectively. The presence of all patterns is noted (W, Lu, Lr, and A) in this finger and for the samples under study.

Table 1: The frequency distribution of the second finger patterns (index) in the two male samples.

Samples	*Patterns*							
	A		*Lr*		*Lu*		*W*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Control	6	12.0	5	10.0	16	32.0	23	46.0
Double	5	10.0	5	10.0	13	26.0	27	54.0

n=50

Table 2 shows the observable values and the percentage of the patterns of the second finger (index) in the two female samples which have the double triradius (a) and the control. The female samples showed exactly the opposite of what was found in the male samples, where it is noticed that there is a decrease in the whorls (38%) and an increase in the ulnar loops (38%) and arches (16%) In the double female sample compared with the control, where the percentage of the patterns mentioned above (62%, 24%, 6%) respectively.

Table 2: The frequency distribution of the patterns of the second finger (index) in the two female samples.

Samples	*Patterns*							
	A		*Lr*		*Lu*		*W*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Control	3	6.0	4	8.0	12	24.0	31	62.0
Double	8	16.0	4	8.0	19	38.0	19	38.0

n=50

Table 3 shows the observable values and the percentage of the pattern of the fifth finger (little) in the two male samples which have the double triradius (d) and the control where the double male sample showed an increase in the whorls(36%) and a decrease in the ulnar loops (64%) compared with the control(16%) and (84%) respectively. This result is similar to what was found in the double triradius (a) male sample, and the reason probably ascribed to the genes responsible for forming triradius (a) and triradius (d) in a double manner are the same genes, which may have a joint influence on in forming the finger prints related to each triradius.

Table 3: The frequency distribution of the pattern of the fifth finger (little) in the two male samples.

Samples	*Patterns*							
	A		*Lr*		*Lu*		*W*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Control	0		0		42	84.0	8	16.0
Double	0		0		32	64.0	18	36.0

n=50

Table 4 shows the observable values and the percentage of the patterns of the fifth finger (little) in the two female samples which have the double triradius (d) and the control where an increase in the whorls(24%) is noted and arches (8%) and a decrease in the frequency of ulnar loops (66%) in the double female sample compared with the control (18%, 0%, 82%) respectively.

Table 4: The frequency distrbution of the patterns of the fifth finger (little) in the two female samples.

Samples	*Patterns*							
	A		*Lr*		*Lu*		*W*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
Control	0		0		41	82.0	9	18.0
Double	4	8.0	1	2.0	33	66.0	12	24.0

n=50

When using (χ^2) to compare the samples under study, it is found that some differences reached the significant level and the other did not, where the value of.(χ^2) and for one degree of freedom is .($\chi^2 = 5.192, P< 0.05$) when comparing the two male samples of the double triradius (d)with the control. The value of (χ^2) and for 2 degrees of freedom is .($\chi^2 = 6.732, P< 0.05$) when comparing the two female samples of the double triradius (a) with the control. The value of (χ^2) and for 2 degrees of freedom is .($\chi^2 = 6.292$, P< 0.05) when comparing the two female samples of the double triradius (d) with the control.

The result that the current study has arrived to regarding the two male samples of the double triradius (a) and triradius (d) and the double female samples of the triradius (d) regarding the increase of the frequency of whorls and the decrease of the ulnar loops were the opposite to what (Al-Juboory, 2003) has arrived to when studying the relationship between the absence of triradius (c) and the pattern of the fourth finger (ring), where an increase in the frequency of ulnar loops is found in the two absent triradius (c) male and female samples and a decrease in the whorls. This could mean that the genes responsible for the pattern (whorls) and the presence of double of triradius in the palm are the same genes or the genes that are lie near to each other on the same chromosome , thus they do affect each other. we have to emphasize that the pattern (whorls) contains two triradii, thus there might be, as regards the form, a similarity in the presence of the double triradii in the palm. As regards the pattern (ulnar loops) their genes could have a relationship with the genes or the gene responsible for the absence of triradius in the palm, and the relationship is of opposite nature with the genes that show the triradius doubly. The current result is similar to what (Al-Juboory, 1995, 2004) has arrived into wherein the (index) has all the patterns and all the studied samples.

II. The Quantitative Analysis

1-Unilateral Analysis: Table 5 shows the mean with the standard error**,** the standard deviation, and the variance coefficient of the second finger (index) and for all the studied samples. It is found that the highest mean is carried by the control female sample (12.82) followed by the double male sample (12.34). As regards the highest variance coefficient, it belongs to the double female sample (72.01%) the followed by the control male sample (55.89%). Table 6 shows the mean with the standard error**,** the standard deviation, and the variance coefficient of the (5^{th}) finger (ring) for all studied samples. It is found that the highest mean belongs to the control female sample too(13.12) followed by the control male sample (12.92). As regards the highest variance coefficient, it belongs to the double female sample (43.67%) followed by the double male sample

Table 5: The mean values with the standard error, the standard deviation, and the variance coefficient of the second finger (index) and for all the studied samples.

Samples	*TRC*			*ARC*		
	Mean ± S.E	*S.D*	*V.C%*	*Mean ± S.E*	*S.D*	*V.C%*
Control Males	11.06 ± 0.874	6.182	55.89	16.26 ± 1.595	11.295	69.46
Double Males	12.34 ± 0.734	5.193	42.08	18.1 ± 1.394	9.857	54.45
Control Females	12.82 ± 0.777	5.495	42.86	20.22 ± 1.656	11.708	57.9
Doubled Females	9.7 ± 0.988	6.985	72.01	14.42 ± 1.728	12.216	84.71

Table 6: The mean values with the standard error, the standard deviation, and the variance coefficient of the (5^{th}) finger (ring) for all studied samples.

Samples	*TRC*			*ARC*		
	Mean ± S.E	*S.D*	*V.C%*	*Mean ± S.E*	*S.D*	*V.C%*
Control Males	12.92 ± 0.482	3.41	26.39	14.5 ± 0.839	5.936	40.93
Double Males	12.24 ± 0.752	5.317	43.43	14.98 ± 1.072	7.577	50.58
Control Females	13.12 ± 0.74	5.232	39.87	15.06 ± 1.077	7.614	50.55
Doubled Females	11.26 ± 0.743	5.256	46.67	13.52 ± 1.102	7.791	57.62

TRC: Total finger ridge count
ARC: Absolute finger ridge count
S.E: Standard Error
S.D: Standard Deviation
V.C: Variance Coefficient

(43.43%).The differences did not reach to the significant level between the two male samples when using t- test for comparison,but the differences are significant when using t-test for comparing the two double triradius (a) female samples and the control, where the t-test value and for 98 degree of freedom is ($t = 2.482$, $P < 0.025$).

2- Bilateral Analysis: Table 5 shows the mean with the standard error**,** the standard deviation, and the variance coefficient of the second finger (index) and for all the studied samples. The result is similar to what is found in the unilateral analysis where the control female sample has-for the highest mean- (20.22) followed by the double male sample (18.1) .The highest variance coefficient belongs to the double female sample (84.71%) followed by the control male sample (69.46%). Table 6 shows the mean with the standard error**,** the standard deviation, and the variance coefficient of the (5^{th}) finger (ring) for all studied samples. The case is also similar to what is found in the unilateral analysis where the control female sample has-for the highest mean- (15.06) followed by the double male sample (14.98).As regards the highest variance coefficient belongs to the double female sample (57.62%) followed by the double male sample (50.58%).There is also an significant difference when using t-test when comparing the two double triradius (a) female samples and the control ($t = 2.424$, $P < 0.025$).

It is noted from the above-mentioned results that the quantitative characters of the patterns at the end of the fingers are not affected when the qualitative characters. This shows that the genes in charge of the quantitative characters are not the same genes in charge of showing the different patterns. Thus, we notice that there is an increase in the frequency of whorls in the samples of [the double male triradius (a) samples, the double triradius (d) male samples, and the double triradius (d) female samples] with a decrease of the frequency of the ulnar loops in these samples. But there is no obvious effect regarding the mean of the ridge counts in these samples compared with the control and for the unilateral and bilateral analyses, The difference remains little.

REFERENCES

Al-Juboory, H.H.M.A.: *A Study of Dermatoglyphic in Diabetes mellitus*. M. Sc. thesis, College of Education-Ibn Al-Haitham, University of Baghdad (1995).

Al-Juboory, H.H.M.A.: A study of interdigital area in Diabetes mellitus patients. *Babylon Univ. J*., **6(3):** 720-24 (2001).

Al-Juboory, H.H.M.A.: Palmar mainline terminations in Shathatha region. *Babylon Univ. J*., **7(3):** 942-48 (2002).

Al-Juboory, H.H.M.A.: The relationship between IV pattern ((Ring)) and the absence of –C- triradius. *J. Kerbala Univ*., **4(1):** 59-66 (2003).

Al-Juboory, H.H.M.A.: The relationship between maternal nutrition during the pregnancy with fetal fingerprint patterns. *College of Education J*., **1**: 128-139 (2004).

Al-Saadi, A.H.: *Inheritance of Dermatoglyphic Characteristics in Iraqi Families*. M.Sc. Thesis, College of education-Ibn Al-Haitham, Universty of Baghdad (1990).

Avila, M.T., Sherr, J., Valentine, L.E., Blaxton, T.A. and Thker, G.K.: Neurodevelopment interactions conferring risk for schizophrenia: a study of dermatoglyphic markers in patients and relatives. *Schizophr. Bull*., **29**(**3):** 595-605 (2003).

Bokhari, A., Coull, B.A. and Holmes, L.B.: Effect of prenatal exposure to anticonvulsant drugs on dermal ridge patterns of fingers. *Teratology*, **66(1):**19-23 (2002).

Cummins, H. and Midlo, C.: *Fingerprints Palms and Soles. An Introduction to Dermatoglyphics*, Dover Publications, New York (1961).

Franceschini, P., Guala, A., Besana, D., Licata, D., Di-Cara, G. and Franceschini, D.: A mentally retarded female with distinct facial dysmorphism, joint laxity, clinodactyly and abnormal dermatoglyphics. *Genet. Couns*., **13(1):** 55-58 (2002).

Holt, S.B.: *The Genetic of Dermal Ridges*. Charles C.Thomas, Springfield, Illinois (1968).

Igbigbi, P.S.and Msamati, B.C.: Palmar and digital dermatoglyphics of indigenous black Zimbabweans. *Med. Sci. Monit*., **8(11):** CR757-61 (2002).

Lopuszanska, M. and Jankowska, E.A.: Dermatoglyphic morphology in some diseases. *Pol-Merkuriusz. Lek*., **11(63):** 282-286 (2001).

Mellor, C.S.: Dermatoglyphics in Schizophrenia. *Brit. J. Psychiat*, **114**: 1387-97 (1968).

Ravindranath, R., Shubha, R., Nagesh, H.V., Johnson, J. and Rajangam, S.: Dermatoglyphics in rheumatoid arthritis. *Indian J. Med. Sci*., **57(10):** 437-41 (2003).

Rodewald, A., Stengel Rutkowski, S. and Zankl, M.: The dermatoglyphic pattern of the trisomy 9p syndrome. *Clin. Genet*., **16(6):** 405-417 (1979).

Schaumann, B. and Alter, M.: *Dermatoglyphics in Medical Disorder*. Springer Verlag. New York (1976).

Schweichel, J.U.: Das bild der hautleisten und fruchen und einige uberlegungen zun problem inhcer entstehung. Pp. 1-44 In: Hautleisten und Krankheiten, W. Hirsch (Ed.). Ernst-Reuter-Gesellschaft, cited from Mohaissin, A.H. 1990, M. Sc.Thesis (1971).

Sengupta, M. and Karwakar, B.: Intergenerational trend of some dermatoglyphic traits in Vaidyas of West Bengal, India. *Coll. Anthropol*., **27(2):** 515-21 (2003).

Suzumori, K.: Dermatoglyphic analysis of fetuses with chromosomal abnormalities. *Am. J. Hum. Genet*., **32(6):** 859-68 (1980).