The Inheritance of Elbow Crease Trait in a group of families in Erbil city/ Iraq

دراسة توارث صفة خط الساعد في مجموعة من العوائل في محافظة اربيل / العراق

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Abstract

The present study aimed to know the inheritance method of elbow crease trait in human from parents to their offspring, our study included (100) families (parents, sons and daughters) however we have studied the effect of parent degree of consanguinity, blood groups on the transmission of this trait from parents to their offspring. The result indicates there was no significant association between parents degree of consanguinity and transmission of elbow crease because the ratio of randomly selected foreigner parents were %65. In addition our study involved the study of some other factors like blood groups which has also no significant effect. There were several significant association of presence of elbow crease in both parents and their offspring.

المستخلص

إستهدفت الدراسة الحالية بيان طريقة توارث صفة خط الساعد الرئيسي والثانوي لكلا الذراعين اليمنى واليسرى في 100 عائلة وشملت (الأب والأم والولد والبنت) حيث تمت دراسة تأثير كل من درجات القرابة الأولى والثانية والثالثة بين الوالدين وكذلك مجاميع دمائهم على انتقال و ظهور هذه الصفة في الجيل الناتج، وتبين عدم وجود أي تأثير معنوي للعاملين على توارث هذه الصفة حيث كانت نسبة الوالدين الغرباء المشمولين بالدراسة 65%. كما لوحظ وجود فروقات عالية المعنوية بين قيم المشاهدة والمتوقعة للمشاهدات التي شملتها الدراسة الحالية باستخدام اختبار مربع كاى حيث ظهر انتقال هذه الصفة من الوالدين إلى النسل الناتج في حالات عديدة وهذا يشير إلى أن وجود أو عدم وجود هذا الخط في النسل الناتج والذي لا يكون صدفة بل يبدو انه محكم بنظام وراثي معين، وقد يؤثر حدوث التغيير الجيني لهذه الصفة او عدم حدوثه اثناء فترة النمو الجنيني او اصابة الام ببعض الامراض الوراثية على ظهور او اختفاء هذه الصفة في النسل الناتج.

Introduction

The word dermatoglyphics comes from two Greek words (derma, skin and glyphe, carve) and refers to the friction ridge formations which appear on the palms of the hands and soles of the feet [1]. The ridging formations serve well to enhance contact, an area of multiple nerve endings (Dermal Papillae) and aids in the prevention of slippage. People of African ancestry display reduced skin pigmentation in the designated locations [2]. All studies of the dermal ridge arrangements including genetics, anthropology and Egyptology are classified under the term dermatoglyphics[3]. The ridge formations of the skin of an individual begin to appear during the third and fourth month of fetal development [4]. The ridge detail is intact displaying an ulnar loop pattern in reference to the frequency of patterns over the ten digits; ulnar loops maintain the highest frequency of about 60%. This is especially true for the little finger in which the ulnar loop is its dominant pattern [5]. In terms of the evolution of fingerprint patterns, the ulnar loop resides midway between the whorl(the first pattern to appear on the person of individuals)

Keywords: elbow crease, consanguinity, blood group

and the arch (that which was last) [6]. Dermatoglyphics is the scientific study of the patterns on the fingers and hands. People have been studying each other's palms and hands for centuries and many cultures have a history of believing that the features on the hands can provide insights into someone's character or future, but dermatoglyphics takes a more scientific approach, looking for features which are associated with certain disorders [7]. A number of claims are made about dermatoglyphics, some of which are true, some of which are less so. The formation of the hands begins very early on in fetal development [8]. As a result, people with congenital abnormalities, especially severe ones, often develop unusual or abnormal dermatoglyphics. Children with trisomy 21, for example, tend to have broad hands with stubby fingers, and certain types of formations in their fingerprints are especially common [9]. Doctors can sometimes use dermatoglyphics as a diagnostic tool to identify congenital abnormalities, and the errors in fetal development which contribute to abnormal dermatoglyphics are also a topic of scientific interest.

Specific variations in fingerprints have been linked with a number of chromosomal abnormalities, as have general variations in the structure, shape, and size of the hands and feet. Usually numerous other diagnostic clues exist to indicate that someone has a severe genetic abnormality, but studying the hands and feet can still be of interest [10]. Some people also claim that dermatoglyphics can be used in the diagnosis of disease, ranging from mental disorders to certain cancers. Studies seem to suggest that dermatoglyphics cannot be used for this purpose, as there are no notable and distinct differences between study samples and the general population [11]. The study of dermatoglyphics is also important in fingerprint analysis, a technique which is used to link fingerprints associated with a crime or event to a specific individual [12]. Finger-prints are highly unique, and especially when a sample includes prints from several fingers, it can be used to link someone with an event. Fingerprints can also be used to identify deceased individuals who lack identification, and because fingerprints linger so long, scientists have even successfully taken fingerprints from ancient mummies by carefully rehydrating the skin [13]. The aim of this study is to know the inheritance methods of elbow crease in human from parents to their offspring, also to know the effect of consanguinity degree and blood groups of parent on transmission of this trait from parents to their offspring.

Materials and Methods

The information about the different parameters of this study had been collected from different Kurdish families in Erbil. The total sample involved 100 families (parents, sons and daughters). The information had been registered in a private list which contains different questions about the studied sample (parents, sons, daughters).

Two or one elbow crease can be observed 5cm away from the forearm in the direction of wrist it may be present in one or both arms in some individuals while some others have not such crease, elbow crease is a white skin straight line it is obvious in the hand of some people in the form of cross line, some times researcher try to pull the skin up down then we can seen the elbow crease clearly some individuals have second additional crease which called secondary elbow crease [14].

Statistical Analysis

χ^2 test (chi-square test) has been applied to know if there is any significance or non-significance difference between observed values and expected values of observation using chi-square formula [15].

Results and discussion

1. There was not significant association between parent's degree of consanguinity and transmission of elbow crease trait because most of the randomly tested parents were foreigner. This result agrees with [16] who registered the same result. As it shown in figure (1). The formation of elbow crease belong certain autosomal genes during organogenesis stage of embryo within 3-4 months of gestation almost the polygenes are responsible of exhibition of this trait and the parents degree of consanguinity hasn't any relation with formation elbow crease trait in human.

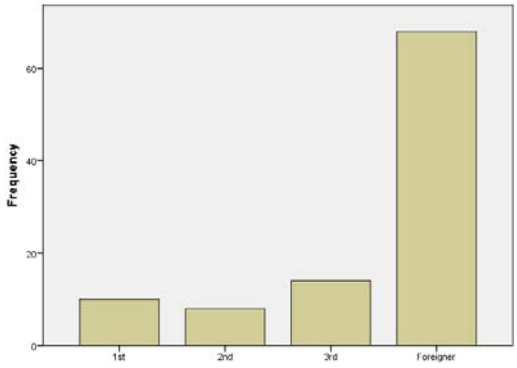

Fig. (1): Degree of consanguinity between parents

2. The results of recent study indicate that wasn't any significant relationship between blood group and presence of elbow crease in the offspring. the blood groups (O+) had been observed in most of tested parents and offspring followed by (A+), (B+), (AB+), this result agrees with [17] who obtained the same result as it shown in figure (2). The method of inheritance of blood groups is under the control of multiple alleles which are differing from the action of genes which determine the formation of elbow crease trait.

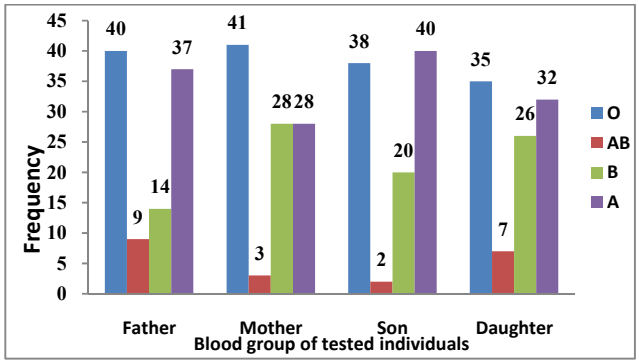

Fig. (2) Blood group of tested individuals

3. Table(1, 2, 3, 4) show the number of transmission cases (presence) gene expression of elbow crease trait and non transmission (absence) no gene expression of both main and secondary type of it on both right & left arm of tested parents, sons, daughters . There were a highly significant and significant differences as it clear in Tables (1, 2, 3, 4) between observed and expected values of studied observations by using chi-

square test, except in one case (transmission of secondary elbow crease trait wasn't happen from mothers to their daughters) the and this case means that there may be a defect in gene expression which is responsible of existing of this trait in mothers as it clear in Table (2) P. value= 0.089. These results are agree with results of [18], who also registered significance and highly significance differences between observed and expected values studied observations in relation with transmission of both main and secondary elbow crease from parents in to their offspring, except in one case the differences were no significant in relation with transmission (presence) or (absence) of main elbow crease of left arm of fathers in their sons, daughters p-value= 0.0776. It prefers to carry out on more researches and studies about the inheritance of elbow crease in relation to some disease like cancer, hemophilia, green red blindness, thalassemia, mental retardation, Down syndrome, Turner's syndrome, patau syndrome, and klienfilter syndrome.

Table (1): shows the number of transmission cases (presence and absence) of main elbow crease on the right arm of (parents and their sons, daughter)

		Son		Daughter	
		Yes	No	Yes	No
Father	Yes	69	4	60	13
	No	14	13	17	10
	Total	83	17	77	23
	Test	X^2=25.432 ,P-Value=0.000 (HS)		X^2=4.115 ,P-Value=0.043 (S)	
Mother	Yes	73	7	65	15
	No	10	10	12	8
	Total	83	17	77	23
	Test	X^2=19.295 ,P-Value=0.000 (HS)		X^2=4.080 ,P-Value=0.043 (S)	

P-value ≤0.01 H.S.
0.01 < p-value ≤ 0.05 S
0.02 P-value>0.05 NS

Table (2): shows the number of transmissions cases (presence and absence) of secondary elbow crease on the right arm of parents and their sons, daughters)

		Son		Daughter	
		Yes	No	Yes	No
Father	Yes	24	12	21	15
	No	18	46	26	38
	Total	42	58	47	53
	Test	X^2=14.05 ,P-Value=0.000 (HS)		X^2=2.90 ,P-Value=0.089 (NS)	
Mother	Yes	24	14	24	14
	No	18	44	23	39
	Total	42	58	47	53
	Test	X^2=11.263 (HS)	,P-Value=0.001	X^2=6.424 ,P-Value=0.011 (S)	

Table (3): shows the number of transmissions cases (presence and absence) of main elbow crease on the left arm of parents and their sons, daughters)

		Son		Daughter	
		Yes	No	Yes	No
Father	Yes	61	10	63	8
	No	15	14	21	8
	Total	76	24	84	16
	Test	X^2=13.197 ,P-Value=0.000 (HS)		X^2=4.080 ,P-Value=0.043 (S)	
Mother	Yes	61	10	64	7
	No	15	14	20	9
	Total	76	24	84	16
	Test	X^2=13.197 ,P-Value=0.000 (HS)		X^2=6.869 ,P-Value=0.009 (HS)	

Table (4) shows the number of transmissions cases (presence and absence) of secondary elbow crease on the left arm of parents and their sons, daughters)

		Son		Daughter	
		Yes	No	Yes	No
Father	Yes	21	8	20	9
	No	18	53	30	41
	Total	39	61	50	50
	Test	X^2=19.169 ,P-Value=0.000 (HS)		X^2=5.877 ,P-Value=0.015 (S)	
Mother	Yes	24	17	30	11
	No	15	44	20	39
	Total	39	61	50	50
	Test	X^2=11.149 ,P-Value=0.001 (HS)		X^2=14.924 ,P-Value=0.000 (HS)	

References

1. Chen, Y. F., Zhang, H.G., Shen, C.F., Lai, C.H. (2008). A dermatoglyphics study of the amis aboriginal population of Taiwan. Science in china, series c Life science. 51: 80-85.
2. Shiono, H. (2009). Dermatoglyphics in medicine. Am. J. Forensic Med. Pathol. 7(2), 120-126.
3. Miller, J.R., and Giroux, J. (2006). Dermatoglyphics in pediatric practice. j. Pediatr.69, 120-126.
4. Anne, R. H., and Lowell, A.G. (2008) . The skin in Embryos genes and birth defect. Supra. 27: 251-280.
5. Jaegers, S. (2007). Fingerprints and skin patterns. J.dermatoglyphics. 6: 43-44.
6. The history of finger prints. Onin feb (2010). http://www.onin.com/fp/fphistory.html. Retrieved. (2010).
7. Katznelson, M., and Goldman, B. (2002). Dermatoglyphics of fetal; clin. Genet. 21(8), 237-242.
8. Suzumori, K. (1980). Dermatoglyphics analysis of fetuses with chromosomal bnormalities. Am. J. Hum. Genet. 32(6), 589-568.

9. Al-Najar, N. A.A. (2002). A study of dermatoglyphics trait and sex chromatin in Down's syndrome children and their parents in the population of northern Iraq. PhD thesis.

10. Viswanathn, Ga., and Rojesh, S. (2006). Dermatoglyphics analysis of astigmatic patients from Bandlore. J. Ecobiology.

11. Robinson, R. (2003). Health in your Hands, A new Look At modern palmistry and your health, Newcastle publishing. 85-97.

12. Cole, S. (2001). Suspect identities. A history of finger printing and criminal identification. Cambridge, Massachusetts; Harvard university press. 20, 60-61.

13. Hansen, D. (2004). Secrets of palm, ACS publications, Inc.,San Diego. 15, 22-27.

14. Abdullah, N.F. (1989). Inheritance of Elbow crease in group of Iraqi families. J.Ibn-A-Haitham. Univ. of Baghdad. 9(2), 25-32.

15. Larson, R., and Farber, B. (2003). Elementary of statistics. 2nd ed. Prentice-hall Inc. upper shaddle River, New Jersey. pp 363.

16. Lyon, E.J., Frodsam, A.L., Zhangm L., Hill, A.V., Amos, W. (2009). Consanguinity and Suceptibility to infectious disease in human. Boil. Lett. 5(4), 574-576.

17. Frances, C. (2008). Evolutionary dynamics of the human ABO gene. Hum. Genet. 124(2), 123-135.

18. John, M.I., Stamatios, A.P., suketu, V. Robert, G. (2009). The relationship between main and secondary elbow crease and anatomy of the elbow crease joint. Surg. radiol. Anat. 31, 55-58.