International Journal of Research in Medical Sciences
Ali S et al. Int J Res Med Sci. 2014 May;2(2):557-559
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: 10.5455/2320-6012.ijrms20140536

Research Article

A study of dermatoglyphics in club foot

Sadakat Ali*, Mani Arora, Abhishek P. Sinha, R. K. Rohatgi

Department of Anatomy, Himalayan Institute of Medical Sciences, Jolly Grant, Dehradun, Uttarakhand, India

Received: 31 January 2014
Accepted: 1 March 2014

***Correspondence:**
Dr. Sadakat Ali,
E-mail: drsadakat786@gmail.com

ABSTRACT

Background: Development of dermatoglyphics pattern is under genetic control and it is established that aetiology of club foot is partly environmental and partly genetic. So study of dermatoglyphics pattern in club foot patient may become a diagnostic tool to know the development & inheritance of this clinical disorder.
Methods: A total of 42 male child aged b/w 1-8 year were included, for obtaining the palmar and finger tip print standard ink method suggested by Kilgariff was used, and each palmar and finger print were examined for important parameters like loops, whorls, arches, a-t-d angle, a-b ridge count and TFRC count. Then results were tabulated and analysed statistically.
Results: Frequency of whorls increase in both hands significantly, frequency of arches and ulnar loops decrease significantly, frequency of radial loops increase in right hand and decrease in left hand but difference was not significant. TFRC count was reduced significantly and no significant difference was found in a-t-d angle and a-b ridge count.
Conclusion: Dermatoglyphics is a genetically determined reliable marker for detecting the incidence of club foot. Merely by identifying the dermatoglyphics pattern of couples with family history of club foot may be at risk of having their offspring affected, and they can be diagnosed early and preventive measures can be taken.

Keywords: Dermatoglyphics, a-t-d angle, a-b ridge count, TFRC count, Club foot.

INTRODUCTION

Club foot is a clinical disorder in which foot is planter flexed & inverted. The term 'dermatoglyphics' was first coined by Harold Cummins & Midlo (1924)[1] which literally means skin carvings. Eldeston EM[2] reported that abnormalities in the epidermal ridges may result from genetic alteration occurring around the first trimester. Stevens CA et al.[3] noted that the development of dermatoglyphics pattern is under genetic control. Fuller IC[4] analyses the dermatoglyphics pattern & established as useful diagnostic & research tool in genetics, medicine & anthropology providing important insight into inheritance and embryological development of many clinical disorders. It is established that the aetiology of club foot is partly environmental and partly genetic Palmer (1964).[5] Till date there is no data available about the dermatoglyphic patterns of club foot patient in west U. P. & Uttarakhand, therefore this work need to be carried out in this particular region of India.

METHODS

A total of 42 male patients of age between 5 months to 7 years and equal number of control of same age group were studied from the orthopaedics clinic of TMMC & RC Moradabad, HIHT Jolly Grant Dehradun, and many private orthopaedic centres of Roorkee and Dehradun. Standard ink method as suggested by Kilgariff[6] was used for obtaining the palmer & fingertip prints which

requires: white A3 size papers, fast drying printer ink, flat smooth transparent glass slab of 20 x 30inches, divider, rubber roller, protractor, pencil & sharpener, magnifying lens, diluent, soap & water, hand towel, a smooth surface table.

RESULTS

Each of the palmar and fingertip patterns was examined for the presence of important parameters as well as the quality of prints. It was ensured that all tri-radii were visible, no white space was present in the centre of the palm, most of the fingertip area was present and the distal wrist crease could be located. In our study important parameters: whorls, loops (ulnar & radial), arches, a-t-d angle, a-b ridge count, TFRC count were studied. Results were recorded and analysed statistically by applying z test. The frequency of whorls increase in both hands significantly, frequency of arches and ulnar loops decrease significantly, frequency of radial loops increase in right hand and decrease in left hand but difference was not significant. TFRC count was reducing significantly in both hands, and no significant difference was found in a-t-d angle and a-b ridge count (Table 1).

Table 1: Incidence of important parameters in cases and controls.

Sr. No.	Parameters	Cases (42)		Control (42)		P value
		Right	Left	Right	Left	
1	Whorls	60% (126)	42.86% (90)	35.23% (74)	28.57% (60)	Significant
2	Arches	6.19% (13)	7.61% (16)	12.85% (27)	16.66% (35)	Significant
3	Loop-ulnar	37.14% (75)	48.57% (102)	55.23% (116)	64.76% (136)	Significant
4	Loop-radial	4.76% (10)	1.90% (4)	4.21% (9)	6.67% (14)	Non-significant
5	a-t-d angle (Mean)	50.95	43.8	46.67	40.9	Non-significant
6	a-b ridge count (Mean)	36.67	68.23	46.72	51.9	Non-significant
7	TFRC count (Mean)	8	6	22	19	Significant

DISCUSSION

Club foot is rare anomaly occurring in 1 to 4 in 1000 lives, affects mainly males than females. Development of dermatoglyphics pattern is under genetic control and now it is clearly understood that this disorder is inherited in families but mode of inheritance is still ambiguous. S. Kumar et al. in (1994)[7] studied the dermatoglyphics pattern in congenital talipes equino varus along with karyotyping.

Table 2: Comparison of findings of different workers.

Sr. No.	Parameters	Workers	Cases (42)		Control (42)		P value
			Right	Left	Right	Left	
1	Whorls	S.Kumar	47.37	39.75	48	42	Non-Significant
		Kulkarni PR	74	68	24.5	28	Significant
		Present study	60	42.86	35.23	28.57	Significant
2	Arches	S.Kumar	6.32	6.32	16.8	10	Significant
		Kulkarni PR	6.5	10	18	19.5	Significant
		Present study	6.19	7.61	12.85	16.66	Significant
3	Loop-ulnar	S.Kumar	6.32	1.58	3.75	4.38	Non-significant
		Kulkarni PR	1	0.5	4.5	10.5	Non-significant
		Present study	4.76	1.9	4.21	6.66	Non-significant
4	Loop-radial	S.Kumar	40	51.05	46.88	60	Significant
		Kulkarni PR	18.5	21.5	48	42	Significant
		Present study	37.14	48.57	55.23	64.76	Significant
5	a-t-d angle (Mean)	S.Kumar	48.7	46.4	45.4	45.1	Non-significant
		Kulkarni PR	48.21	50.78	46.23	49.25	Non-significant
		Present study	50.95	43.8	46.66	40.9	Non-significant
6	a-b ridge count (Mean)	S.Kumar	-	-	-	-	-
		Kulkarni PR	33.87	53.78	49.82	48.05	Non-significant
		Present study	36.67	68.23	46.72	51.9	Non-significant
7	TFRC count (Mean)	S.Kumar	-	-	-	-	-
		Kulkarni PR	-	-	-	-	-
		Present study	8	6	22	19	Significant

Kulkarni PR et al. (2006)[8] also studied dermatoglyphics in male and female child with club foot. The results of our study are compared with both the previous workers in Table 2. Dermatoglyphics is a genetically determined reliable marker for detecting the incidence of club foot.

Merely by identifying the dermatoglyphics pattern of couples with family history of club foot may be at risk of having their offspring affected, and they can be diagnosed early and preventive measures can be taken. Furthermore study of dermatoglyphic patterns can be included as a part of routine general examination in all the clinical departments to co-relate the idiopathic diseases with the other sign and symptoms of the patients.

ACKNOWLEDGEMENTS

This work becomes possible by consistent support and help of Dr. Mohd Afzal Sr. orthopaedic surgeon at Quadra hospital, Roorkee, Dr. Najam-ul-huda Khan, associate professor, department of orthopaedics at TMMC & RC Moradabad and Dr. Sanober Wasim, assistant professor, department of paediatrics, HIMS, Jolly Grant, Dehradun.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Cummin H. Epidermal ridge configuration in developmental defects impact reference to ontogenetic Factors which condition ridge direction. Am J Ant. 1926;38:89.
2. Elderton EM. On inheritance of finger print. Biometr. 1920;13:57-91.
3. Stevens CA, Carey JC, Shah M, Baglay GP. Development of human palmar and digital flexion creases. J Pediatr. 1988;113(pt1):128-32.
4. Fuller IC. Dermatoglyphics: a diagnostic aid. J Med Gene. 1973;10:165-8.
5. Palmer RM. Genetics of talipus equino varus. J Bone Joint Surg. 1964;46:545.
6. Kilgariff J. How to take dermatoglyphic prints- A self-instruction manual. Indianapolis and Bloomington. 1990:1-4.
7. S Kumar, JM Kaul, BK Dhaon, KK Jain. Dermatoglyphics in congenital talipus equinovarus. J Anat Soc India. 1994;63:44.
8. Pratima R. Kulkarni et al. Dermatoglyphics in congenital talipus equinovarus. J Anat Soc India 2006;55(1):50-1.

DOI: 10.5455/2320-6012.ijrms20140536
Cite this article as: Ali S, Arora M, Sinha AP, Rohatgi RK. A study of dermatoglyphics in club foot. Int J Res Med Sci 2014;2:557-9.