

A Qualitative Study of Palmar Dermatoglyphics in Congenital Heart Diseases

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Abstract

Introduction: The word "Dermatoglyphics" indicates the study of epidermal configuration on palms, soles and finger tips. In early foetal life the differentiation of epidermal ridges takes place. These patterns do not change in an individual throughout life and no two patterns are alike. The dermatoglyphic patterns were studied in cardiovascular disorders, but there are very few dermatoglyphic studies in congenital heart diseases (CHD). **Materials & Methods:** The cross sectional study with comparison group was designed. Hundred patients of congenital heart diseases (CHD) i.e. CHD group and hundred patients without CHD i.e. control group were examined during study period. Dermatoglyphic prints were obtained by using standard protocol method and finger tip patterns i.e. Arches, whorls, radial loops and ulnar loops were studied. **Results:** Among the qualitative parameters, finger print patterns were studied and analysed. The percent frequency of arches, whorls and radial loops showed statistically insignificant difference in CHD group and control group. While percent frequency of ulnar loops showed statistically significant difference in CHD group and control group. **Conclusion:** Ulnar loops are most frequently found in dermatoglyphic pattern of finger tips in CHD group as compared to control group

Keywords: Arches; CHD; Dermatoglyphics; Radial Loop; Ulnar Loop; Whorls.

Introduction

The term dermatoglyphics was coined by Herold Cummins in 1926, an anatomist of Tulane university of Greece. The word "Dermatoglyphics" indicates the study of epidermal configuration on palms, soles and finger tips. It has long been recognized as a scientific and valuable method for medicolegal, anthropological and genetic studies.

It reveals the congenital links between our fingers and our intrinsic qualities and talents. In early foetal life the differentiation of epidermal ridges takes place. These patterns do not change in an individual throughout life and no two patterns are alike. In recent years, many countries like U.S and Japan have applied

dermatoglyphics to diagnose Down's syndrome, congenital disorders, genetic abnormalities etc.

There are very few studies of dermatoglyphic patterns in congenital heart diseases (CHD).

Aims & Objectives

- To evaluate the significance of dermatoglyphics in congenital heart diseases(CHD)
- To study and compare the dermatoglyphic pattern in normal and CHD patients
- To compare and correlate the findings of present study with previous studies

Materials & Methods

The present study was carried out in one hundred patients of CHD and one hundred control individuals. Out of one hundred patients of CHD, sixty two were males and thirty eight were females. The control cases were fifty six males and forty four females.

The palmar prints of patients with CHD and control group were collected. The age group of CHD patients was ranging from 6-24 years and that of control group was from 18-25 years.

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The dermatoglyphic prints were taken using following method:

- Subjects were asked to wash their hands with soap and dry, to remove dust from palms
- Kores duplicating ink was applied on palms and palmar prints were taken on a white drawing paper
- For smearing the ink special ball was used, which was prepared from cotton gauze and linen
- Paper was kept on clean hard surface and the inked hand was placed on the paper
- At first, palmar aspect of patients wrist placed firmly on paper then all the fingers were firmly pressed on paper one by one
- Each finger tip was rolled for getting complete prints

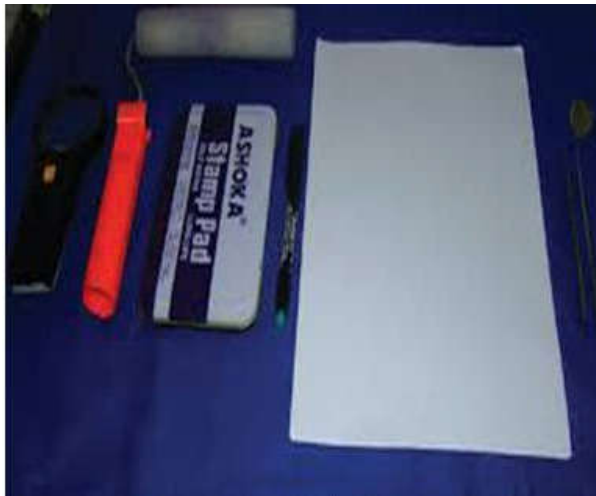


Fig. 1: Materials used for taking dermatoglyphic prints

- The prints were studied with the help of hand lens and following qualitative parameters were studied

Finger tip patterns

1. Arches
 2. Whorls
 3. Radial loops
 4. Ulnar loops
- For statistical analysis, percent frequency, mean, standard deviation and Z test (Standard error of difference between two proportions of qualitative parameters) were used
 - The results were tabulated and analysed for statistical significance

Finger tip patterns



Arch

Whorl

Radial loop

Ulnar loop

Results

38 were females. The incidence of CHD was more in males (62%) than in females (38%)

Out of 100 patients with CHD, 62 were males and

Table 1: Percent frequency of arches in right and left hands combined

Cases	CHD group Arches	Percentage	Cases	Control group Arches	Percentage	Z = 1.82 P > 0.05 Insignificant
100 (1000 digits)	35	3.5	100 (1000 digits)	48	4.8	

Refer graph 1

Table 2: Percent frequency of whorls in right and left hands combined

Cases	CHD group Whorls	Percentage	Cases	Control group Whorls	Percentage	Z = 1.88 P > 0.05 Insignificant
100 (1000 digits)	201	20.1	100 (1000 digits)	232	23.2	

Refer graph 2

Table 3: Percent frequency of radial loops in right and left hands combined

Cases	CHD group Radial loops	Percentage	Cases	Control group Radial loops	Percentage	Z = 1.28 P > 0.05 Insignificant
100 (1000 digits)	99	9.9	100 (1000 digits)	121	12.1	

Refer graph 3

Table 4: Percent frequency of ulnar loops in right and left hands combined

Cases	CHD group Ulnar loops	Percentage	Cases	Control group Ulnar loops	Percentage	Z = 3.33 P < 0.05 Significant
100 (1000 digits)	665	66.5	100 (1000 digits)	593	59.3	

Refer graph 4

Discussion

Qualitative analysis of finger tip patterns

Table 5: Comparison of percent frequency of arches in right and left hands combined

Authors (Year of study)	CHD group (Percentage)	Control group (Percentage)
Cascos AS ¹ (1964)	5.30	1.51
Rathod ² (1993)	7.09	6.23
Present study	3.50	4.80

Cascos AS [1] found that there is significant increase in the frequency of arches in CHD group while Rathod [2] found insignificant increase.

In the present study, the incidence of arches was decreased in CHD group as compared to control group but was not statistically significant.

Table 6: Comparison of percent frequency of whorls in right and left hands combined

Authors (Year of study)	CHD group (Percentage)	Control group (Percentage)
Cascos AS ¹ (1964)	46.16	42.31
Rathod ² (1993)	53.11	54.94
Present study	20.10	23.20

In the present study, the incidence of whorls was lower in CHD group as compared to control group but was statistically insignificant.

The findings of previous workers indicate insignificant difference in the frequency of whorls, which correlates with present study.

Table 7: Comparison of percent frequency of radial loops in right and left hands combined

Authors (Year of study)	CHD group (Percentage)	Control group (Percentage)
Cascos AS ¹ (1964)	5.63	5.39
Rathod ² (1993)	4.30	7.87
Present study (2014)	9.90	12.10

In the present study, incidence of radial loops in CHD group is lower than the control group which was statistically insignificant.

significant difference in the frequency of radial loops do correlate with present study.

Thus the findings of Rathod [2], indicating no

While Cascos AS found almost equal number of radial loops in both the groups.

Table 8: Comparison of percent frequency of ulnar loops in right and left hands combined

Authors (Year of study)	CHD group (Percentage)	Control group (Percentage)
Cascos AS ¹ (1964)	38.47	30.31
Rathod ² (1993)	35.48	19.89
Present study (2014)	66.50	59.30

The present study shows the incidence of ulnar loops in CHD group was higher than that of control group and it is statistically significant.

group as compared to control group

- Ulnar loops show statistically significant difference between CHD group and control group

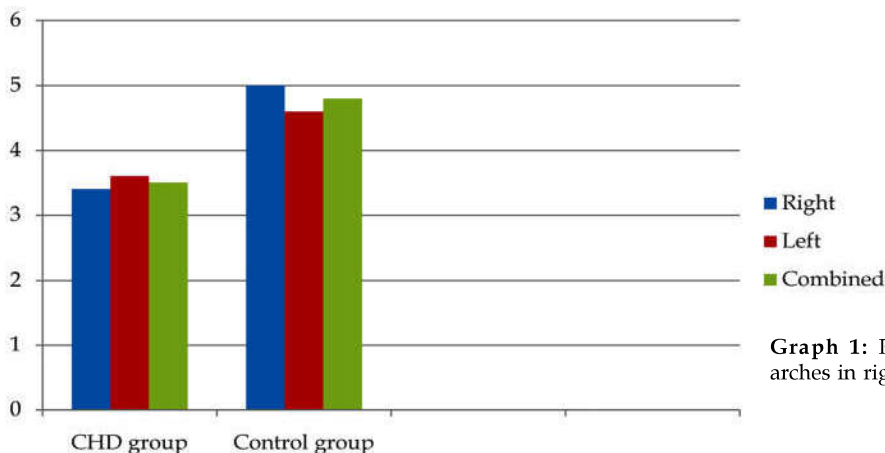
The study by Cascos AS [1] and Rathod [2] also found statistically significant increase in the incidence of ulnar loops in CHD group. Hence, present study correlates with the previous studies.

Recommendations

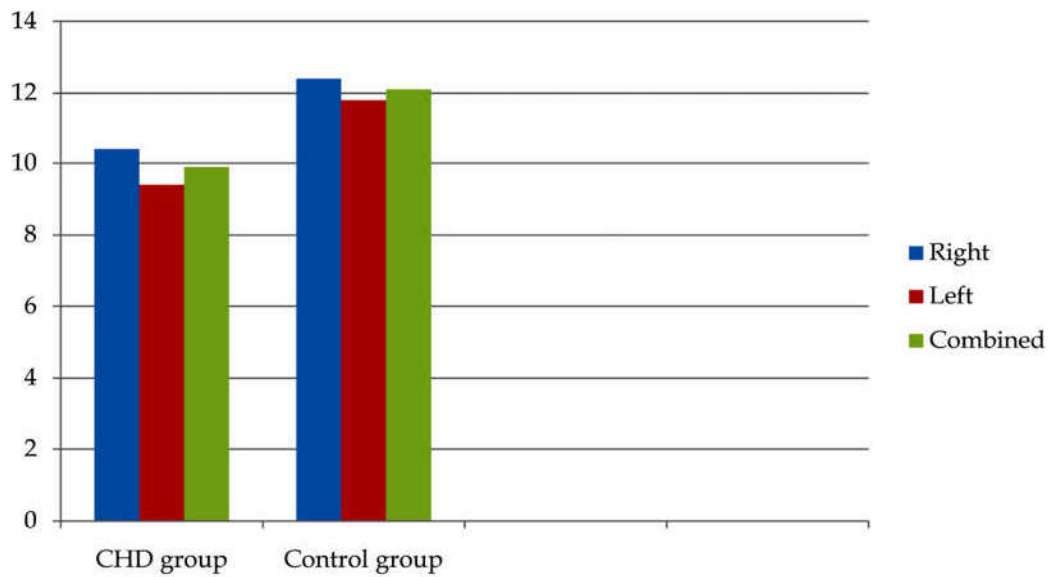
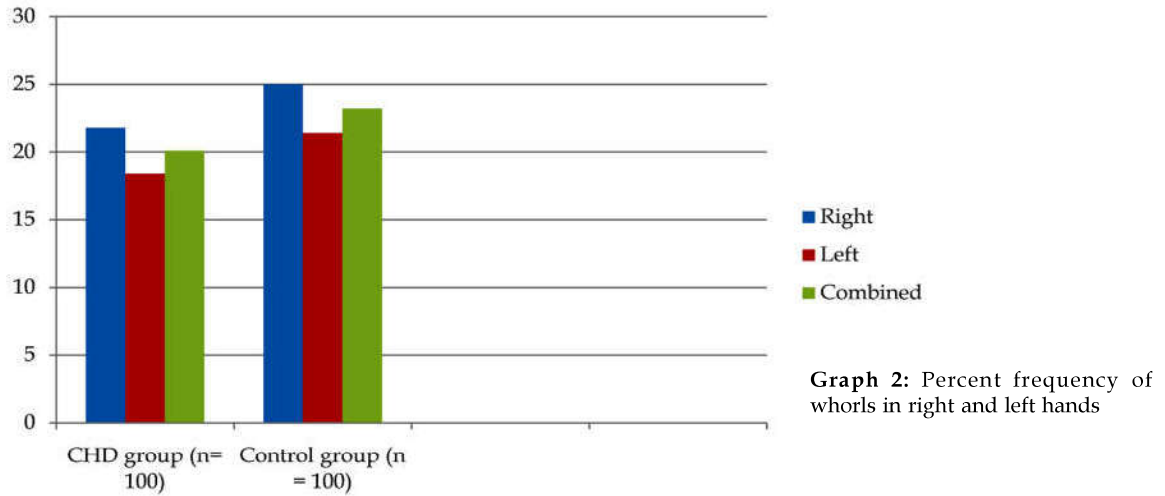
- The dermatoglyphic study is a useful investigation. It is inexpensive and can be recorded quickly. It hardly requires any elaborate equipments and analysis is a matter of training only.
- It can serve to strengthen a diagnostic impression and useful screening device to select individuals for further extensive investigations.
- A large scale study should be undertaken to draw more useful and definitive conclusions regarding the value of dermatoglyphics

Conclusions

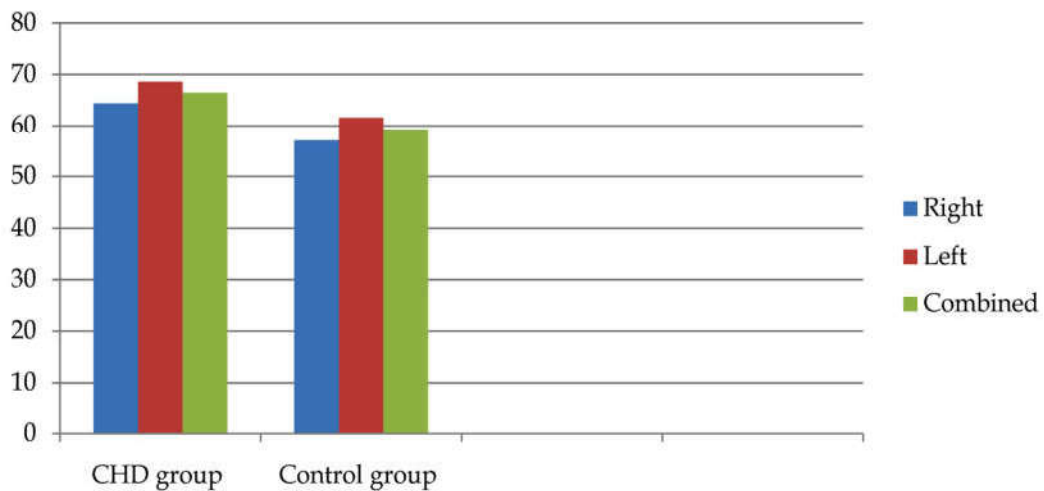
- Finger tip patterns like arches, whorls and radial loops show statistically insignificant difference in CHD group and control group
- Ulnar loops are most frequently found in dermatoglyphic pattern of finger tips in CHD



Graph 1: Percent frequency of arches in right and left hands



Graph 3: Percent frequency of radial loops in right and left hands



Graph 4: Percent frequency of ulnar loops in right and left hands

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