



## "The study of palmar dermatoglyphic patterns in breast cancer"

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### ABSTRACT

**Introduction:** Dermatoglyphics is the study of epidermal ridges of palms, soles and fingers. Dermatoglyphic pattern has been studied in various diseases. Dermatoglyphics as a diagnostic aid is now well established in a number of diseases, which have a strong hereditary basis, and is employed as a method of screening abnormal anomalies. The present study is undertaken with an aim to evaluate dermatoglyphic patterns in breast cancer patients.

**Method:** The study consists of 100 female patients of breast cancer diagnosed histopathologically and 100 healthy females as controls for comparison. The dermatoglyphic prints were taken by the "INK METHOD". Chi-square test was used to find the significance of frequencies of fingertip pattern between cases and controls. Statistical software SPSS 19.0 was used for the analysis of the data.

**Results:** The results of the study indicated statistically significant changes in fingertip pattern of breast cancer patients. The statistically significant difference was observed in fingertip patterns of digit II and digit III of right hand and digit IV and digit V of left hand ( $P < 0.05$ ). The arch pattern was more (6.8%) on both hands of cases when compared with arches (3.4%) on both hands of controls.

**Discussion:** Since breast cancer is one of the commonest malignancies affecting females in India, the qualitative analysis of dermatoglyphic finger tip pattern like loops, whorls and arches can be of immense help to screen out of risk group population, for early detection and early treatment.

### KEYWORDS

Dermatoglyphics, Breast cancer, Dermatoglyphic patterns, Loops, Whorls, Arches.

### INTRODUCTION

Prior to 1926, when the word dermatoglyphics was proposed there had been no satisfactory term embracing the skin patternings of fingers, toes, palms, and soles. Dermatoglyphics (derma, skin + glyphe, carve) is a collective name for all these integumentary features, within the limits to be defined, and it applies also to the division of anatomy which embraces their study<sup>[1]</sup>.

Dermatoglyphics as a diagnostic aid is now well established in a number of diseases, which have a strong hereditary basis, and is employed as a method of screening abnormal anomalies<sup>[2]</sup>. There are many diseases known to be caused by abnormal genes. Whenever there is any abnormality in the genetic makeup of parents it is inherited to the children and is reflected in dermatoglyphic pattern<sup>[3]</sup>. Dermatoglyphic studies of many genetically inherited diseases like Down's syndrome, leukaemia, schizophrenia, diabetes, hypertension, epilepsy have been studied. Breast cancer is one of the most extensively studied cancer and its genetic basis is well established<sup>[4,5]</sup>.

Family history of breast cancer has often shown an increased incidence in the same family. The risk is greatest in patients with 1<sup>st</sup> degree relatives (mother or sister) affected, particularly if they were under the age of 50 years when the disease developed. With affection of 2<sup>nd</sup> degree relatives the risk is less. There is probably a direct genetic factor involved in it. It has been experimented that while BRCA1 predisposes to both breast and ovarian cancer in families, BRCA2 appears to be restricted to breast cancer, even

male breast cancer. Together BRCA1 and BRCA2 account for approximately 75% of all hereditary breast cancers<sup>[6]</sup>.

As per WHO cancer country profiles 2014, in India out of 100 cancer deaths in females, 21 females are dying because of breast cancer<sup>[7]</sup>.

Considering the high mortality and high morbidity rate due to breast cancer in India, the present study aims at to compare dermatoglyphic fingertip pattern in breast cancer patients with those of controls. It may helps to screen out breast cancer patients from normal population.

### AIM

- 1] To study the qualitative dermatoglyphic pattern of fingertips in breast cancer patients.
- 2] To study and compare same parameters in control group.

### MATERIAL AND METHODS

The present study was carried out among 100 female patients within age group of 30-60 years. All the patients were taken from NKP Salve medical college and Lata Mangeshkar Hospital, Nagpur Maharashtra State. Inclusion criteria-The patients who were diagnosed after histopathology report were only included in the study. Exclusion criteria-Patients with diabetes mellitus / hypertension /cardiac disease/neurological disorders / psychiatric illness /blind / deaf / asthma /skin disorders were excluded.

Similarly equal numbers of normal healthy females were included

as controls for comparison. The controls were women of 30–60 year-old with no signs and symptoms or a family history of carcinoma breast. After obtaining the approval of Ethical committee of medical college, and the consent of the subjects dermatoglyphic prints were taken by the “INK METHOD” as described by CUMMINS and MIDLO (1961)<sup>[8]</sup>. This method was selected because of its simple technique, low cost and being less time consuming.

The material used were 1) Kores quick drying duplicating ink, 2) Rubber roller , 3)Cotton puffs ,4)Thin glass sheet, 5)White paper 6) Magnifying hand lens. The patients and controls were asked to wash their hands with soap and water. The requisite amount of ink daub was placed on the glass sheet. It was uniformly spread by the rubber roller to get even ink film on the glass sheet. The thin film of ink was applied to fingertips of the subjects by placing fingertips on the glass sheet. The fingers of the right hand of the subject were then printed on the white paper one by one. The tip of the fingers was rolled from radial to ulnar side to include all the patterns. The same procedure was repeated for left hand on separate paper. The printed sheets were coded with the name, age and for case group and control group.

The prints were subjected for detail dermatoglyphic analysis with the help of magnifying hand lens. Chi-square test was used to find the significance of frequencies of fingertip pattern between cases and controls. Statistical software SPSS 19.0 was used for the analysis of the data.

The Study was done for qualitative analysis of Finger tip patterns  
1) Loops  
2) Whorls and  
3) Arches



Figure 1. Showing fingertip patterns of subject

RESULTS:

Table1: Fingertip pattern in digits of cases and controls

Digit	Type	Right Hand		p-value	Left Hand		p-value
		Cases (%)	Controls (%)		Cases (%)	Controls (%)	
Digit I	Loop	52	50	0.959	52	52	0.8
	Whorl	44	46		42	44	
	Arch	4	4		6	4	
Digit II	Loop	44	64	0.017*	45	59	0.123
	Whorl	42	28		39	31	
	Arch	14	8		16	10	
Digit III	Loop	63	75	0.024*	62	64	0.691
	Whorl	26	23		30	31	
	Arch	11	2		8	5	
Digit IV	Loop	45	43	0.551	50	41	0.039*
	Whorl	52	56		46	59	
	Arch	3	1		4	0	
Digit V	Loop	81	71	0.151	87	71	0.012*
	Whorl	18	29		12	29	
	Arch	1	0		1	0	

\*- significant

Table 1 – The statistically significant difference was observed in fingertip patterns of digit II and digit III of right hand and digit IV and digit V of left hand (P<0.05). Whorl pattern and arch pattern on digit II in right hand, arch pattern on digit III in right hand, loop

pattern on digit IV and digit V of left hand, were observed more in cases as compared to controls.

Table 2. Fingertip pattern in each digit of both hands in cases and controls.

Digit	Type	Cases		Controls		p-value
		Number	Percent age	Number	Percent age	
Digit I	Loop	104	52	102	51	0.847
	Whorl	86	43	90	45	
	Arch	10	5	8	4	
Digit II	Loop	89	45.5	123	61.5	0.003*
	Whorl	81	40.5	59	29.5	
	Arch	30	15	18	9	
Digit III	Loop	125	62.5	139	69.5	0.042*
	Whorl	56	28	54	27	
	Arch	19	9.5	7	3.5	
Digit IV	Loop	95	47.5	84	42	0.64
	Whorl	98	49	115	57.5	
	Arch	7	3.5	1	0.5	
Digit V	Loop	168	84	142	71	0.006*
	Whorl	30	15	58	29	
	Arch	2	1	0	0	

\*- significant

Table 2. The statistically significant difference was observed in cases and controls with different fingertip patterns in digit II, III, and V in both the hands. Cases had higher percentage of whorls in digit II, arches in digit III and loops in digit V of both hands when compared to controls.

Table 3. Shows Fingertip pattern in all digits in cases and controls.

Hand	Type	Cases		Controls		p-value
		Number	Percent age	Number	Percent age	
Right Hand	Loop	285	57	303	60.6	0.026*
	Whorl	182	36.4	182	36.4	
	Arch	33	6.6	15	3	
Left Hand	Loop	296	59.2	287	57.4	0.037*
	Whorl	169	33.8	194	38.8	
	Arch	35	7	19	3.8	
Both Hands	Loop	581	58.1	590	59	0.002*
	Whorl	351	35.1	376	37.6	
	Arch	68	6.8	34	3.4	

\*-Significant

Table 3. The arch pattern was more in cases when compared with controls on right hand, on left hand and both the hands and this difference were found to be statistically significant. The arch pattern was more (6.8%) on both hands of cases when compared with arches (3.4%) on both hands of controls.

DISCUSSION

King MC et al<sup>[9]</sup>, Haung C and Mi M<sup>[10]</sup>, observed that the whorl pattern are more in breast cancer patients than in control group. In the present study, it was observed that the whorls are more in digit II of right hand of cases when compared with digit II of right hand of controls.

Seidman HM et al<sup>[11]</sup>, found more loops in breast cancer cases than in control group. Howard R. Bierman et al<sup>[12]</sup>, analyzed the four patterns of ulnar loops significantly associated with breast cancer and classified them as accidentals, transitional, angled ulnar loops, and horizontal ulnar loops. Chintamani et al<sup>[13]</sup>, conducted a study on 60 histopathologically confirmed breast cancer patients and their digital dermatoglyphic patterns were studied to assess their association with the type and onset of breast cancer. Similarly 60 age-matched controls were also selected that had no self or

familial history of a diagnosed breast cancer. They found more loops in breast cancer cases. In the present study, it was observed that more arches were seen in breast cancer patients.

N.S .Sridevi<sup>[14]</sup>, found fingertip pattern of right hand of cases and controls, loop showed a statistically significant difference in digit III and digit IV ( $P<0.05$ ) indicating a significant increase in the number of ulnar loops in digit III and digit IV of right hand of Cases. In the present study, it was observed that loop showed a statistically significant difference in digit IV and digit V ( $P<0.05$ ) indicating a significant increase in the number of loops in digit IV and digit V of left hand of Cases.

## CONCLUSION

In the present study, the statistically significant difference was observed in fingertip patterns of digit II and digit III of right hand and digit IV and digit V of left hand ( $P<0.05$ ). The arch pattern was more (6.8%) on both hands of cases when compared with arches (3.4%) on both hands of controls. These relatively noninvasive techniques could reasonably be used on selected nonsymptomatic women (e.g., those with a positive family history) as part of definitive risk assessment strategy. The use of dermatoglyphics is rather a unique approach at low cost for identifying such risk group population. In a developing country with limited resources particularly in rural places sophisticated screening are not affordable. Qualitative analyses of dermatoglyphic pattern like loops, whorls, and arches can be of immense help to screen out of risk group which then can be subjected to other investigations.

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