

## A Study of Dermatoglyphic Patterns (angles 'atd' 'tad' 'tda') of Hands in Patients of Breast Cancer in Jhalawar Region

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### Abstract

An effort has been made to find correlation between breast cancer and the dermal ridge pattern of palm. The dermatoglyphic study was carried out on 50 patients of breast cancer and 50 normal persons as controls. The study was conducted in breast cancer patient attending indoor of surgery Department J.M.C Hospital, Jhalawar. Angle between lines drawn from first and fourth interdigital triradii to Axial triradius is called 'atd' angle. It means angle between index finger triradius (a) and little finger triradius (d) to the axial triradius (t). More distal axial triradii is used if more than one axial triradii is present. They however do not change significantly thereafter, thus maintaining stability not greatly affected by age. The fingerprints could thus be used for screening or to guide future research in this direction and one day the screening of breast cancers could well be at our fingertips. The result showed a significant correlation between angle pattern and breast cancer. It is therefore concluded that if the angle pattern is known, the breast cancer can be predicted.

**Keywords:** Breast Cancer; Dermatoglyphics; Angles (atd, tad, tda).

### Introduction

The study of epidermal ridge on volar aspect of the hands and feet which form a variety of pattern configuration called "dermatoglyphics" Dermatoglyphics was derived from the Greek word, "dermis" meaning skin and "glyph" meaning curving. Dermatoglyphics is the science of configuration of epidermal ridges of the volar surfaces of the fingers, toes, palms and soles [1]. The specific breast cancer predisposing genes are BRCA1, BRCA2 and p53. BRCA2, the second breast cancer susceptibility gene, was mapped to chromosome 13q12-q13. The human p53 gene, located on the short arm of chromosome 17, is known to be a tumor suppressor gene that can be evident at about the 6<sup>th</sup>

week of gestation and reach maximal size by the 12<sup>th</sup> to 13<sup>th</sup> week [2]. The dermal pattern once formed remains constant throughout life. Dermatoglyphics is considered as a window of congenital abnormalities.

The epidermal ridges of the fingers and palms as well as mammary glands are formed from the same embryonic tissues (ectoderm) during the same embryonic period (6-9 weeks). Breast cancer is one such disease which has genetic predilection which requires to be studied and may show dermatoglyphics pattern peculiar of at risk group. The angles pattern (atd, tad, tda) of dermatoglyphics can thus represent non-invasive anatomical marker of breast cancer risk and thus facilitate early detection and treatment. The purpose of this study was to determine whether the angle pattern shows any significant changes in patients suffering from cancer of breast.

### Aims & Objectives

To examine the relationship between malignant mammary neoplasm and angles pattern (atd,tad,tda) of Dermatoglyphics of palm.

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## Materials and Methods

The study was conducted in breast cancer patients attending indoor of surgery Department J.M.C. Hospital, Jhalawar during 2010-2012. The cases of carcinoma of breast and the normal controls were selected from the Jhalawar population. A total of 50 patients and 50 controls were included in this study. An effort has been made to find correlation between breast cancer and angle pattern of dermatoglyphics of palm. An ink-print fingerprints method was used. Palmar prints were recorded with Camel duplicating ink and rolled prints were taken of both palms.

Instruments and equipment used:

- A. Dermatoglyphic printing
- B. Camel duplicating ink
- C. Durable plain white paper size of 8½"×11
- D. Inking glass slab
- E. A round bottle
- F. Magnifying glass

Hands of subjects were washed with soap and water and ether is used for the removal of greasy material from hand. A small daub of printer's ink is squeezed out on inking slab, and spread with the help of roller in to a thin film. Palm is carefully smeared uniformly with inked roller to cover the whole area of palm to be printed.

Now the paper is set over the round bottle and the partly opened fingers and palm were pressed edge down against the paper margin and rolled to opposite edge on it permitting the bottle and paper to move forward so that whole of the palm and finger prints are obtained.

The rolled finger prints are taken by rotation of the finger both in inking and printing in order to obtain complete impression of finger tip.

In finger tip imprint anatomical adaptation to rotation of hand and arm is applied to minimize discomfited manipulations. So, thumb has to be placed with ulnar edge downward and rolled towards body and other digits are placed with radial edge downward and rolled away from body.

This method enables us to record the complete

imprint of palm including palmer surfaces of all 5 digits in one attempt.

Now these prints are studied with the help of a magnifying lens for observation under different heads. Other accessory items required are scale, pointed HB-pencil, biological pointed indispensable needle, a protractor and observation chart.

Precautions to be taken for recording good finger print impressions:

1. The inking slab should be clean.
2. Very small quantity of ink should be applied to the hand and evenly spread in the thinnest possible film so that impression obtained may be clear and sharply defined.
3. Roller should be cleaned daily and kept clean.
4. Paper used for taking prints should be white and its surface should not be too glazed unless it is sufficiently absorbent.

The data obtained was subjected to statistical analysis using Microsoft Excel 2007. The descriptive statistics was used and student t-test was used to test for significant differences between control and patient.

## Observation and Result

The mean 'atd' angle of right and left hand are 44.56° and 44.12° respectively in control. These values are lower in patients 38.84° and 39.58° (Table 1).

The mean 'tad' angle of right and left hand are 55.22° and 53.98° respectively in control. These values are higher in patients 58.68° and 58.34° (Table 2).

The mean 'tda' angle of right and left hand are 80.22° and 81.9° respectively in control. These values are higher in patients 82.48° and 82.02° (Table 3).

It was observed that angle patterns were statistically significant among the cancer patients as compared to controls. It was also seen that 'atd' angle was decreased and 'tad' 'tda' angles were found increased among the cases as compared to controls. The differences between mean pattern intensity

**Table 1:** Mean ± SD of 'atd' according to side in controls and patients

Side	Mean±SD		t value	P value	Significance
	control	Case			
Right	44.56±4.68	38.84±4.65	6.13	<0.05	Sig
Left	44.12±4.83	39.58±4.94	4.64	<0.05	Sig

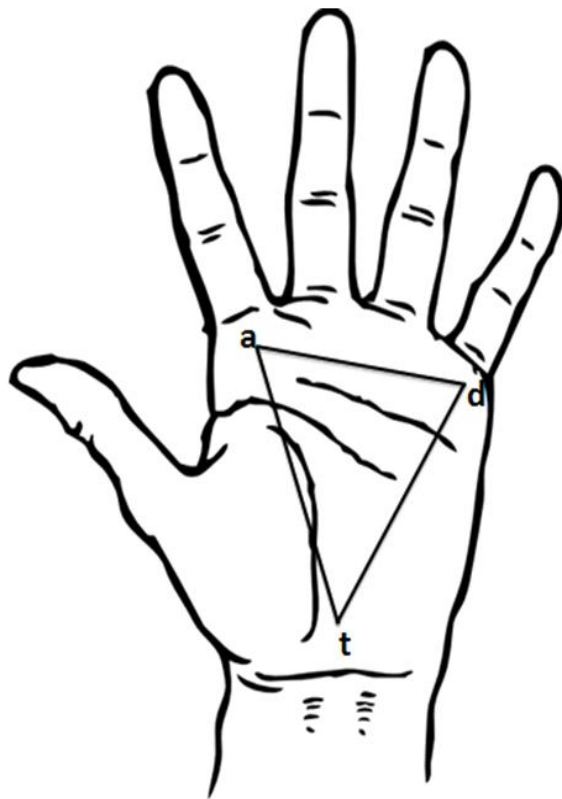
**Table 2:** Mean  $\pm$  SD of 'tad' according to side in controls and patients

Side	Mean $\pm$ SD		t value	P value	Significance
	control	case			
Right	55.22 $\pm$ 4.77	58.68 $\pm$ 4.84	3.60	<0.05	Sig
Left	53.98 $\pm$ 3.79	58.34 $\pm$ 4.64	5.14	<0.05	Sig

**Table 3:** Mean  $\pm$  SD of 'tda' according to side in controls and patients

Side	Mean $\pm$ SD		t value	P value	Significance
	control	case			
Right	80.22 $\pm$ 4.93	82.48 $\pm$ 4.42	2.14	<0.05	Sig
Left	81.9 $\pm$ 4.11	82.02 $\pm$ 4.42	0.21	<0.05	Sig

**Fig. 1:** 'atd' angle presentation



index of cases and controls were found to be statistically significant.

### Discussion

Natekar PE et al [3] (2006), were observed that the frequency of axial triradius 't' was significantly higher in right hand and left hand in breast cancer patients. Similarly a double triradius (t + t') was also seen in right hand as well as left hand of these patients. The incidence of double triradius was significantly higher in both hands of carcinoma of breast patients as compared to the controls.

Chintamani et al [4] (2007), found significantly reduced arches in breast cancer patients than in control group. The whorls are increased in cancer

patients as compared to controls. Sakorafas [5] (1999), state that breast cancer is the commonest neoplastic disease in women in the western world, with a lifetime risk of 11-12 per cent in the general population. Sakorafas et al [6] (2000), further states that hereditary breast cancers account for 5-10 per cent of all breast cancer cases wherein about 90 per cent of hereditary breast cancers involve mutation of the BRCA1 and/or BRCA2 genes.

According to Oladipo [7] study, there was decrease in the 'atd' angles of both hands of patients. In our study, the mean 'atd' angles were also lower in both right and left hands and reach significant. The mean 'tad' angle of right and left hand were higher in patients. According to Oladipo study, there was increase in the 'tda' angles of both hands of patients. The mean of 'tda' angles in right and left hands were higher in patients.

The study of N.S. Sridevi, C.R. Wilma Delphine Silvai, Roopa kulkarni, C. Seshagiri [8] (2010), reveals that the mean of 'atd' angles, 'dat' angles are not being statically significant in both right and left hand of both cases and controls but the mean of 'atd' angle on the right hand and left hand of cases were statistically different from that of the controls. So our study corresponds to the N.S Sridevi C.R Wilma Delphine Silvia study to some extent.

Earlier studies in breast cancer patients were centered on the dermatoglyphics patterns of the fingers in individuals suffering from breast cancer. Studies by Seltzer et al [9] (1990), reveal that a pattern of six or more digital whorls was identified more frequently in women with breast cancer than in those without the disease. According to Bierman et al [10] (1984), four significantly associated finger patterns were observed with breast cancer: accidentals, transitional, angled ulnar loops and horizontal ulnar loops. Further, Huang et al [11] (1987), reported significant excess of radial loops on the left hand and increased frequency of ulnar loops on the left hand in pre menopausal women with breast cancer, whereas excess of radial loops on the left hand in

postmenopausal women with breast cancer. Abbasi Set al [12] (2006), reveal a pattern of 6 or more digital Whorls was identified more frequently in women with breast cancer (48.7%) as compared in the control group to (27.5%) ( $P < 0.05$ )

In the present study, the mean 'atd' angles of right and left hand were lower in patients. The mean of 'tad' and 'tda' angles in right and left hands were higher in patients.

### Conclusion

The mean 'atd' angle of right and left hand are lower in patients where as the mean 'tad' angles are higher. The mean 'tda' angles of right and left hand are found to be higher. The present study concludes that as there is a genetic influence on the angle patterns, which do not change throughout the life. Hence with the aid of this dermatoglyphic angle pattern we can predict the occurrence of breast cancer. Thus dermatoglyphic features of this study may be used as diagnostic tool for identifying cases at risk or suffering from breast cancer. It can be used in rural areas where genetical test is not available easily and it is cheaper than the test. After this the subject can be sent for confirmative test. It is early diagnostic test for identification of women at risk. In person with a family history of carcinoma, this procedure predicts the risk of breast cancer in future.

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### References

1. Cummins and Midlo—Finger Prints palm and soles, introduction to dermatoglyphics Dover publication Inc. New York, 1961.
2. Babler W. Embryologic development of epidermal ridges and their configurations. *In: Dermatoglyphics: Science in transition. Birth defects* (Edited by: CC P, RM G, BA S). Wiley-Liss: New York, 1991; 95-112.
3. Natekar PE, Desouza S, Pandey Axial AK: Triradii in carcinoma Breast. *Anthropologist*, 2006; 8(3): 193-195.
4. Chintamani, Rohan Khandelwal, Aliza Mittal, Sai Saijanani Amita Tutejal, Anju Bansal, Dinesh Bhatnagar, and Sunita . Qualitative and quantitative dermatoglyphic traits in patients with breast cancer: A prospective clinical study. *BMC Cancer* 2007, doi: 101186/1471-2407-7-44.
5. Sakorafas, G.H.: Breast Cancer. Lagos Medical Publications, Athens (1999).
6. Sakorafas, G.H. and Tsiotou, A.G.: Genetic predisposition to breast cancer: A surgical perspective. *British J. Surg.* 2000; 87: 149-162.
7. Oladipo, G.S, Paul, C.W., Bob –Manuel, I.F., Fawehinmi, H. B., Edibamode, E.I. Study of digital and palmar dermatoglyphic patterns of Nigerian women with malignant mammary neoplasm . *Journal of Applied Biosciences*, 2009; 15: 829-834.
8. N.S.Sridevi, C.R. Wilma Delphine Silvia, Roopa Kulkarni, C. Seshagiri palmar dermatoglyphics in carcinomabreast of Indian women *Romanian Journal of Morphology and Embryology*, 2010; 51(3): 547-550.
9. Seltzer, M.H., Plato, C.C. and Fox, K.M.: Dermatoglyphics in the identification of women either with or at risk for breast cancer. *Am. J. Med. Genet.*, 1990; 4: 482-8.
10. Bierman, H.R., Faith, M.R. and Stewart, M.E.: Digital dermatoglyphics in mammary cancer. *Cancer Invest.*, 1988; 6(1): 15-27.
11. Huang, C.M. and Mi, M.P.: Digital dermal patterns in breast cancer. *Proc Natl Sci Counc Repub China B.*, 1987; 11(2): 133-6.
12. Abbasi S, Einollahi N, Vaez – Zadeh F: Study of dermatoglyphic patterns of Hands in Women with Breast cancer. *Pak J Med Sci.* 2006; 22: 18-22.