



Original Research Article

## Study of 'atd' Angle as Dermatoglyphic Feature in Bronchial Asthma

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Received: 27/06/2012

Revised: 09/07/2012

Accepted: 12/07/2012

### ABSTRACT

The present study was undertaken to compare 'atd' angle as a Dermatoglyphic feature in Bronchial Asthma patients and controls. Palmar prints were taken from 200 clinically diagnosed Bronchial Asthma patients, 100 males and 100 females attending outpatient department of Krishna Institute of Medical Sciences University, Karad, dist Satara, Maharashtra. Those prints were compared with 200 controls amongst medical students and staff from same institute. Informed consent was taken from the patients as well as controls and Permission from institutional ethical committee was taken in the beginning. From the print data 'atd' angle of patients were compared with controls and statistical significance was determined by applying suitable statistical tests. There was no significant difference between 'atd' angles of patients with controls, but there was significant difference between 'atd' angle of both male patients and controls with female patients and controls.

**Key words:** 'atd' angle, Dermatoglyphics, Bronchial Asthma.

### INTRODUCTION

Dermatoglyphics has been studied in certain clinical disorders associated with chromosomal and developmental defects like Mongolism, Turner's syndrome, cardiovascular disease, Diabetes mellitus, Schizophrenia and Ischaemic heart disease. Dermatoglyphic analysis has many advantages as a diagnostic tool. <sup>[1]</sup>

The palm has been divided into several anatomically defined areas to carry

out dermatoglyphic analysis. Triradius is the point of confluence from where, the ridges usually radiate in three different directions. On the palm generally there are four digital triradii in the distal portion. They are termed as a, b, c, and d proceeding in radio- ulnar direction. The axial triradius 't' is found usually near the proximal palmar margin. The triradius close to the palmar axis is termed as axial triradius. It is present normally near the proximal margin of palm

and separates the thenar and hypothenar eminences. [2] It is denoted as 't' and is usually not more than 10 % of the distance between the distal crease of the wrist and proximal crease of the middle finger.

This triradial point gets displaced in number of conditions such as Mongolism, Down's syndrome, Broad thumb syndrome, Great toe syndrome, Turner's syndrome and congenital heart defect. [3]

Much little is known as far as dermatoglyphics in 'Bronchial asthma' is concerned. These days the Dermatoglyphics as a genetic marker is attracting attentions of many workers. Genetic factors are clearly operational in case of Atopy and Asthma. Linkages have been found between similar chromosomal sites for both Atopy and Asthma. Asthma phenotypes are polygenetic, requiring that multiple genes be expressed. [4]

Goniometric value of the 'tda' angle in a Asthma patients has been studied. There exists a significant statistical value for the lower 'tda' angle in right hand. [5] Dermatoglyphics in patients with allergic disorder has been studied and it shows the mean frequency of arches and radial loops on finger tips significantly higher. But when total frequency of loops (both ulnar and radial) and whorls was considered, no significant difference compared to the controls could be observed. Mean 'dt' ridge counts were found to be decreased in both left and right palms of the patients as compared to the controls. However, the difference was significant only on left palm. A decrease in 'dt' ridge count indicates distal displacement of axial triradii. [6]

Dermatoglyphics in bronchial Asthma found a preponderance of whorl in most digits and the presence of whorl pattern on both the thumbs was a constant feature in all asthma patients irrespective of the family history. [7] Dermatoglyphics of the patients with bronchial asthma, 56% of cases shows

whorls on the fingertip, 63% cases 'atd' angle fall between the ranges 41 to 46 degrees. [8] Dermatoglyphics in Atopic (congenital) asthma found 'S' shaped (star) whorls only in patients and number of egg shaped whorls were more in patients than in controls. [9] Higher frequency of whorls was observed in first digit of bronchial asthma patients in comparison to controls. In all digits the frequency of arches was reduced in bronchial asthma patients as compared to controls. These findings proved highly statistically significant. [10]

Basically, 'atd' angle is used in interpreting the position of 't' triradius. Lines drawn from the digital triradius 'a' and 'd' to the axial triradius 't' forms 'atd' angle. In palms with more than one axial triradius, the 'atd' angle drawn from each axial triradius should be measured. If the axial triradius (t) is more distal, the 'atd' angle is larger.

There are some disadvantages in using the 'atd' angle as dermatoglyphic parameter. [1] The 'atd' angle tends to decrease with age because the palm grows much more in length than breadth. [11] This problem can be partially overcome by introducing the age correction. The size of the angle is affected by the amount of spreading of the fingers when the patterns are printed. The pressure exerted while the palm is printed can affect the 'atd' angle. Measuring the maximal 'atd' angle enabled Penrose to differentiate Down's syndrome from phenotypically normal individuals. Considering all these factors study was undertaken to find out association of 'atd' angle in bronchial asthma patients and controls.

## **MATERIAL AND METHODS**

Study was conducted in the Krishna Institute of Medical Sciences, Hospital & Medical Research Center, Karad Maharashtra on 200 clinically diagnosed

bronchial asthma patients attended outpatient department 100 males and 100 females. The patients selected were diagnosed clinically as having bronchial asthma and by doing investigations like pulmonary function test and spirometry. Controls are selected randomly without any respiratory problem or any symptoms related to asthma. From medical students, staff members and paramedical staff including nurses from Krishna Institute of Medical Sciences, Hospital & Medical Research Center, Karad.

Permission from Dean and Head of the Department was taken. An ethical approval was obtained from Institutional ethical committee of the Krishna Institute of Medical Sciences University Hospital; Karad Maharashtra.

Palmar prints were taken by standard ink method. Palm prints of both hands were obtained after inking with the help of cotton gauge ball. A uniform film of ink was obtained on the tile with cotton gauge ball. Then with the help of same cotton gauge

ball ink was spread uniformly on right hand. The hand was extended at wrist joint and touches the paper kept along with pressure pad beneath it on the table and then slowly whole of the hand was kept on the paper. Pressure was applied on the interphalangeal joints, head of metacarpals and dorsum of hand. With the help of fingers or blunt end of pencil little pressure was applied on the web-space between the fingers. Complete palm impression including the hollow of palm was obtained over the paper. The same procedure was followed for recording the palm prints of left hand. Thus palm prints of both hands were obtained and recorded. After marking a, t and d triradii the angle was marked and measured.

Data collected on study variables was of quantitative type. Sample size was large therefore; applying 'Z' test did comparison of study variable in patients and controls. For data analysis 'Z' test for standard error of difference between two means was used.

## RESULTS

**Table No. T I shows comparison of 'atd' angles in Male Patients and Controls.**

Hand	Male Patients	Male Controls	'Z' Value	Statistical Significance
	Mean ± S.D.			
Right	39.90° ± 4.73	40.27° ± 4.58	-0.56	Not Significant
Left	40.51° ± 4.69	40.04° ± 4.25	0.74	Not Significant

\*P<0.05, Highly Significant.

The above table shows-

- 1) There is decrease in value of mean 'atd' angle in right hands of male patients than controls, which is statistically not significant.
- 2) There is increase in value of mean 'atd' angle in left hands of male patients than controls, which is statistically not significant.

**Table No. TII shows comparison of 'atd' angles in Female Patients and Controls.**

Hand	Female Patients	Female Controls	'Z' Value	Statistical Significance
	Mean ± S.D.			
Right	41.25° ± 4.75	42.47° ± 5.58	-1.66	Not Significant
Left	43.06° ± 5.28	42.55° ± 5.04	0.6987	Not Significant

The above table shows-

- 1) There is decrease in value of mean 'atd' angle in right hands of female patients than controls, which is statistically not significant.
- 2) There is increase in value of mean 'atd' angle in left hands of female patients than controls, which is statistically not significant.

**Table No. TIII shows comparison of 'atd' angles in Male and Female Patients.**

Hand	Male Patients	Female Patients	'Z' Value	Statistical Significance
	Mean $\pm$ S.D.			
Right	39.90° $\pm$ 4.73	41.25° $\pm$ 4.75	-2.0140	Significant
Left	40.51° $\pm$ 4.69	43.06° $\pm$ 5.72	-3.4473	Significant

The above table shows-

- 1) There is decrease in value of mean 'atd' angle in right hands of male patients than female patients, which is statistically significant.
- 2) There is decrease in value of mean 'atd' angle in left hands of male patients than female patients, which is statistically significant.

**Table No. TIV shows comparison of 'atd' angles in Male and Female Controls.**

Hand	Male Controls	Female Controls	'Z' Value	Statistical Significance
	Mean $\pm$ S.D.			
Right	40.27° $\pm$ 4.58	42.47° $\pm$ 5.58	3.05	Significant
Left	40.04° $\pm$ 5.04	42.55° $\pm$ 4.25	-3.8076	Significant

The above table shows-

- 1) There is decrease in value of mean 'atd' angle in right hands of male controls than female controls, which is statistically significant.
- 2) There is decrease in value of mean 'atd' angle in left hands of male controls than female controls, which is statistically significant.

## DISCUSSION

In recent past much work is done in finding out an association of morphological and genetic characters with a number of diseases with the help of certain investigations. Dermatoglyphics is determined by polygenic inheritance and is one of such tools frequently used in scientific studies. Many workers have demonstrated that dermatoglyphic is an important aid in the diagnosis and understanding the genetics of many diseases.

There is very little study done in dermatoglyphics in allergic disorders like 'Bronchial Asthma'. Study on dermatoglyphics in 'Atopic asthma' by

Monteseirin et al showed lower 'atd' angle in right hands of patients than in left hands.<sup>[5]</sup> In the present study many dermatoglyphic parameters were studied and found to be statistically significant. There is decrease in mean value of 'atd' angle in right hands of male patients as compared to female patients. There is decrease in mean value of 'atd' angle in left hands of male patients as compared to female patients. There is decrease in mean value of 'atd' angle in right hands of male controls as compared to female controls. There is decrease in mean value of 'atd' angle in left hands of male controls as compared to female controls.

## CONCLUSION

Dermatoglyphic patterns are genetically transmitted and 'bronchial asthma' is also genetically transmitted disease. So the study was undertaken. Many dermatoglyphic patterns seen in 'bronchial asthma' patients are found to be statistically significant in comparison with controls. The 'atd' angle is reduced in males as compared to females in patients as well as controls. Further study of larger sample with patient's relatives is required to know whether dermatoglyphics can be used as a screening or investigative procedure for persons with respiratory ailments.

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