

## Palmar angles: its significance in type 2 diabetes mellitus

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### Abstract

Much progress has been made in establishing Dermatoglyphics as a useful diagnostic tool in medicine, providing important insights into the inheritance and embryological development of medical disorders. The present study attempts to compare the Dermatoglyphics parameters specially palmar angles-angles atd, angle adt and angle dat, in cases of NIDDM with that of controls. Results showed a significant difference in mean values of angle adt and angle atd when put to statistical tests and 'p' value calculated.

**Keywords:** Dermatoglyphics, Palmar angles, NIDDM.

Access this article online	
Quick Response Code:	Website: www.innovativepublication.com
	DOI: 10.5958/2394-2126.2016.00085.2

### Introduction

The patterns on one's fingertips, the ridges and lines begin to form at around the 13<sup>th</sup> week of intrauterine life. These patterns are inherited in from genes of the parents but the inheritance is not pure Mendelian. The reason for the departure from pure Mendelian inheritance patterns laid down at conception are modified during the first few weeks in the intrauterine life due to pressure on the finger pads and on the palms. These result in individual characteristics but a detailed study over the qualitative and quantitative study was done by Sir Henry ER in his book "Classification and uses of finger prints".<sup>1</sup>

Considerable progress has been made in the understanding of the associations between dermatoglyphics and various medical disorders, as a result of which dermatoglyphic analysis has been established as useful diagnostic and research tool in medicine, providing important insights into the inheritance and embryologic development of many clinical disorders.<sup>2</sup> The study of dermatoglyphics has been applied to the field of medical and genetic diagnosis. Dermatoglyphic patterns once format around 18 wks of fetal age remain persistent throughout life.<sup>3</sup>

Diabetes mellitus comprise a group of common metabolic disorders that share the phenotype of hyperglycaemia. The two broad categories of diabetes mellitus are designated Type I and Type II. Distinct

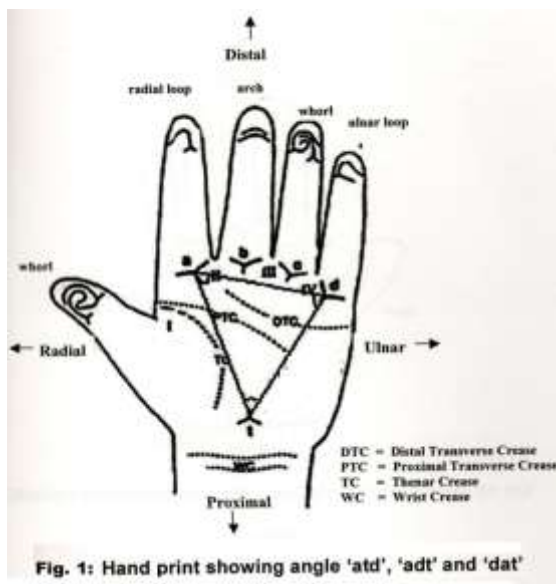
genetic and metabolic defects in insulin action and/ or secretion give rise to the common phenotype of hyperglycaemia in Type 2 diabetes mellitus.<sup>4,5,6</sup>

Diabetes mellitus being one of the curses of the human civilization is proven to be genetically linked the association of diabetes mellitus with dermatoglyphics has been used as a scientific tool for early prediction and thus prevention of diabetes mellitus in particular Type 2.<sup>7</sup>

The present study uses one of the dermatoglyphic parameter that is "palmar angles" as a tool and compares the difference in value of angles between the cases and the control group.

### Materials and Methods

The present study was conducted on a total of 65 cases who were compared to the 50 controls. The Ink paper methodology was adopted in taking the palmar and finger prints<sup>1</sup>. The prints were taken with proper consent of subjects and then they were studied for the palmar angles - angle atd, angle adt, angle dat, for both cases and control group<sup>8</sup> (Fig. 1).



the “p” value was <.001, which is significant. So, angles adt and angle atd can be used as a reliable data for assessing the diabetic cases by Dermatoglyphics.



**Observations and Results**

The data obtained from each of 65 cases and 50 controls were thoroughly studied for various palmar angles (Fig. 2). The observations were tabulated (Table 1, 2, 3) and subjected to statistical test to calculate the “t” value and “p” value. It was found that in cases angle atd and angle adt showed difference in mean values and

**Table 1: Angle “atd” of diabetic cases compared with controls**

Parameters	Controls (n=50)		Cases (n=65)	
	Rt Hand	Lt Hand	Rt Hand	Lt Hand
Range	28-54	30-58	30-46	32-48
Mean	42.15	42.85	38.96	39.02
SD	$\pm 5.69$	$\pm 6.78$	$\pm 3.70$	$\pm 3.48$
SEM	0.90	1.07	0.52	0.49
Difference of Mean	3.19		3.83	
t-value	3.21		3.47	
p-value	0.002 (<0.05)		<0.001 (<0.05)	

The difference in the mean values of the two groups is greater than would be expected by change; there is a statistically significant difference between the input groups  
Therefore angle “atd” can be used as a reliable data for assessing the diabetic cases by dermatoglyphics.

**Table 2: Angle “dat” of diabetic cases compared with controls**

	Controls (n=50)		Cases (n=65)	
	Rt Hand	Lt Hand	Rt Hand	Lt Hand
Range	51-69	46-67	37-73	31-74
Mean	59.40	58.15	59.00	58.44
SD	$\pm 4.48$	$\pm 4.61$	$\pm 5.62$	$\pm 6.27$
SEM	0.71	0.73	0.80	0.89
Difference of Mean	0.40		-0.29	
t-value	0.37		-0.24	
p-value	0.72 (>0.05)		0.81 (>0.05)	

The difference in the mean values of two groups is not great enough. There is not a statistically significant difference between the input groups.

So angle “dat” is not a reliable data for assessing the diabetic cases by dermatoglyphics.

**Table 3: Angle “adt” of diabetic cases compared with controls**

	Controls (n=50)		Cases (n=65)	
	Rt Hand	Lt Hand	Rt Hand	Lt Hand
Range	54-88	71-87	72-104	71-106
Mean	77.88	79.00	82.02	82.94
SD	+5.43	+4.25	+5.25	+5.93
SEM	0.86	0.67	0.74	0.84
Difference of Mean	-4.15		-3.94	
t-value	-3.67		-3.54	
p-value	<0.001 (<0.05)		<0.001 (0.05)	

The difference in the mean values of the two groups is greater than would be expected by chance; there is a statistically significant difference between the input groups.

Angle “adt” is a reliable data for assessing the diabetic cases by dermatoglyphics.

## Discussion

Over a period of years lot of work is going on in the field of dermatoglyphics which can be used as a method for early detection of genetic disease so that the vulnerable population can be targeted for prevention if possible, against such diseases, and the role of environmental factor is definitely important for disease to manifest.<sup>9,10</sup>

Currently dermatoglyphics analysis has been established as a useful diagnostic and research tool in medicine, providing important insight into inheritance and embryologic development of many clinical disorders.<sup>11</sup> Provided that Type I and Type II DM patients trace back to different genetic backgrounds, a mixture of both diseases might conceal rather than disclose any significant association with dermatoglyphics. Nevertheless significant difference have been found between diabetic subjects and controls by many investigators -

**Palmar angles** – In the present study significant decrease in angle ‘atd’ which was also found by Mandasescu S et al.<sup>3</sup> Contrary to the results of present study, increase in angle ‘atd’ was observed in previous studies.<sup>12,13,14</sup> Rangnath P et al, found no significant difference in ‘atd’ angles of Idiopathic epilepsy patients. So this parameter might help in differentiation of genetic basis of DM with Idiopathic epilepsy disease.<sup>15</sup>

Angle ‘atd’ was found to be significantly decreased in patients of carcinoma cervix which is similar to the findings of this study. Hence, a number of qualitative and quantitative parameters are required to be evaluated while working on the dermatoglyphics of a particular disease.<sup>16</sup> Increase in angle ‘adt’ has not been observed by other workers which was a significant finding ( $p < 0.05$ ) in both hands in present study.

## Conclusion

The aetiology of NIDDM is believed to be as a consequence of genetic and environmental factors that impair metabolism. While little can be done about the genetic component, much can be done as a preventive measure in NIDDM. Dermatoglyphic patterns form on

one’s finger pad and the palm prenatally, remain unchanged throughout life. Thus these features may serve as markers for fetal origin of adult disease like NIDDM.<sup>17</sup> In present study, angle ‘atd’ showed significant decrease and angle ‘adt’ showed significant increase in both hands of the cases as compared to controls. The difference in Mean values of both showed statistically significant ‘p’ value ( $p < 0.001$ ). Hence, the palmar angles can serve as a tool to identify the individuals with the possibility to develop NIDDM.

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