

**Original Article****Correlation of atd angle with Non-Insulin Dependent Diabetes Mellitus in Gujarati population**

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**ABSTRACT**

**Introduction:** Dermatoglyphics, “derma-skin and glyphe-curve”, is the name given to the study of the ridge patterning of skin of the fingers, palms, toes and soles. Study of the patterns of the epidermal ridges can also serve as an aid to the diagnosis of many diseases, particularly those caused by chromosomal abnormalities. As Non-Insulin Dependent Diabetes Mellitus (NIDDM) has genetic predisposition, dermatoglyphics can be used to find out possibility of occurring of disease in future.

**Material & Method:** The dermatoglyphic patterns of 100 patients (Cases) (50 male, 50 female) of NIDDM between age group of 40-75 years have been taken. Similarly 100 normal healthy individual (50 male, 50 female) without NIDDM of the same age group have been included in the study as controls. The dermatoglyphic prints in present study have been taken by Ink method. atd angle was measured.

**Results:** Mean atd angle (°) was higher in right hand of cases (43.87°) than controls (40.81°), with P value was 0.002(<0.01). So, it was statistically highly significant while Mean atd angle (°) was higher in left hand of cases (41.58°) than controls (40.27°), with P value was 0.09. So, it was not statistically significant.

**Conclusion:** From the present study, it can be concluded that there is significant difference in atd angle between NIDDM patients and normal individuals. atd angle can be helpful to find out high risk individuals for NIDDM.

**Key words:** dermatoglyphics, atd angle, non-insulin dependent diabetes mellitus

**INTRODUCTION**

Dermatoglyphics, “derma-skin and glyphe-curve”, is the name given to the study of the ridge patterning of skin of the fingers, palms, toes and soles [1]. The epidermal ridges correspond to an underlying interlocking pattern of dermal papillae, an arrangement which helps to anchor the two layers firmly together. The patterns of dermal papillae determine the early development of epidermal ridges [2].

Diabetes mellitus is a non-communicable disease and significant public health problem. Among all types of Diabetes Mellitus, Non-Insulin Dependent Diabetes Mellitus (NIDDM) is predominant in India. NIDDM results from an interaction between genetic and

environmental factors. Family history is a strong risk factor and it indicates genetic predisposition [3].

Dermatoglyphics is a genetically based study, less costly and easy to do. As NIDDM has genetic predisposition, dermatoglyphics can be used to find out possibility of occurring of disease in future. In past, some studies have been done to evaluate any correlation between dermatoglyphics and NIDDM. There are some positive findings in those studies. Therefore in present study, an attempt has been made to find out the association between dermatoglyphics and NIDDM.

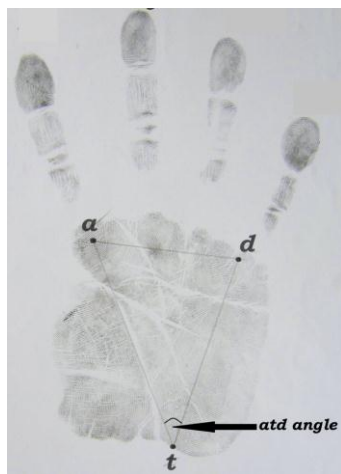
**MATERIAL AND METHODS**

The dermatoglyphic patterns of 100 patients (50 male, 50 female) of NIDDM between age group of 40-75 years have been taken. These patients have been diagnosed as a NIDDM more than a year and their diabetes status were confirmed with the records of their blood sugar level. Similarly 100 normal healthy individual (50 male, 50 female) without NIDDM of the same age group have been included in the study as controls. Patients and controls are selected randomly from G.G.G. Hospital, Jamnagar, Gujarat. Informed consent of all subjects has been taken. The present study was conducted after approval from the Institutional Ethics Committee.

The dermatoglyphic prints in present study have been taken by Ink method [4].

Four digital triradii are normally situated at the bases of digits ii, iii, iv and v. These are known as a, b, c and d, respectively. Axial triradius is located most near the proximal margin of the palm, in the space between thenar and hypothenar eminences. Depending upon the level of position, the axial triradius is termed as t, t' or t". When the angle at axial triradius t, between straight line drawn from t to a and t to d, it is atd angle [Figure 1] [4].

Fig. 1: Showing atd angle in right hand of subject



atd angle of cases and controls were compared by student's 't' test to check their statistical significance and P value was obtained from it. If the P value is > 0.05 then the difference is not statistically significant. If the P value is between 0.05 and 0.01 then the difference is statistically significant. If the P value is

<0.05 then the difference is statistically highly significant [9, 10].

## RESULTS

In present study, atd angle has been measured in 100 NIDDM patients (CASES) out of them 50 Male & 50 Female and on 100 normal individuals (CONTROLS) out of them 50 Male & 50 Female. Both age groups were between 40-75 years. Results are statistically analyzed.

Table 1 shows that mean atd angle ( $^{\circ}$ ) was higher in right hand of male cases ( $44.68^{\circ}$ ) than male controls ( $39.86^{\circ}$ ) with P value was  $0.005 (<0.01)$ . So, it was statistically highly significant while Mean atd angle ( $^{\circ}$ ) was higher in left hand of male cases ( $41.82^{\circ}$ ) than male controls ( $39.38^{\circ}$ ), with P value was 0.05. So, it was not statistically significant.

Table 1: showing atd angle ( $^{\circ}$ ) in cases and controls in both sexes and its statistical analysis.

(M=Male, F=Female, R=Right, L=Left, SD=Standard Deviation, HS=Highly Significant, NS=Non significant)

Sex	Side	CASE		CONTROL		P Value
		MEAN (Mean $\pm$ 2SD) ( $^{\circ}$ )	SD ( $^{\circ}$ )	MEAN (Mean $\pm$ 2SD) ( $^{\circ}$ )	SD ( $^{\circ}$ )	
M	R	44.68 (65.62-23.74)	10.47	39.86 (51.08-28.64)	5.61	0.005
	L	41.82 (56.00-27.64)	7.09	39.38 (50.56-28.20)	5.59	0.05
F	R	43.06 (54.48-31.98)	5.71	41.76 (50.80-32.72)	4.52	0.21
	L	41.34 (50.70-31.98)	4.68	41.16 (50.14-32.18)	4.49	0.84
M+F	R	43.87 (60.73-27.01)	8.43	40.81 (51.13-30.49)	5.16	0.002
	L	41.58 (53.56-29.60)	5.99	40.27 (50.51-30.03)	5.12	0.09

Table 1 also shows that mean atd angle ( $^{\circ}$ ) was higher in right hand of female cases ( $43.06^{\circ}$ ) than female controls ( $41.76^{\circ}$ ), with P value was 0.21. So, it was not statistically significant and Mean atd angle ( $^{\circ}$ ) was higher in left hand of female cases ( $41.34^{\circ}$ ) than female

Table 2: Showing the comparison of atd angle (°) in both sexes of Cases and Controls of present study with the findings of other workers

Researcher	Sample Size	Sex	Side	Mean Angle(°) in Cases	Mean Angle(°) in Controls	P Value	Remarks
Gabriel SO and Babajide MO (2004)[5]	49 Cases 52 Controls	M	R	40.20	40.50	<0.05	S
			L	40.60	39.00	<0.05	S
		F	R	36.10	41.60	<0.05	S
			L	38.90	43.00	<0.05	S
Rajnigandha V et al (2006)[6]	112 Cases 142 Controls	M	R	52.51	44.26	<0.001	HS
			L	52.13	43.60	<0.001	HS
		F	R	55.57	45.12	<0.001	HS
			L	58.08	45.64	<0.001	HS
		M+F	R	53.85	44.73	<0.001	HS
			L	54.73	44.70	<0.001	HS
Padmini MP et al (2011)[7]	200 Cases 200 Controls	M	R	39.15	41.68	>0.02	NS
			L	41.67	40.92	<0.4	NS
		F	R	42.61	42.32	<0.7	NS
			L	40.06	43.25	>0.01	S
		M+F	R	42.15	40.73	0.02	S
			L	40.69	42.09	>0.1	NS
Sharma MK and Sharma H (2012)[8]	50 Cases 50 Controls	M	R	42.12	39.17	>0.05	NS
			L	39.92	40.93	>0.05	NS
		F	R	45.2	44.37	>0.05	NS
			L	44.52	36.87	<0.001	HS
		M+F	R	43.66	40.00	<0.01	HS
			L	42.22	40.28	>0.05	NS
Present Study (2013)	100 Cases 100 Controls	M	R	44.68	39.86	0.005	HS
			L	41.82	39.38	0.05	NS
		F	R	43.06	41.76	0.21	NS
			L	41.34	41.16	0.84	NS
		M+F	R	43.87	40.81	0.002	HS
			L	41.58	40.27	0.09	NS

(M=Male, F=Female, R=Right, L=Left, SD=Standard Deviation, HS=Highly Significant, NS=Non significant, S=Significant)

controls (41.16°), with P value was 0.84. So, it was not statistically significant.

From Table 1, Mean atd angle (°) was higher in right hand of cases (43.87°) than controls (40.81°), with P value was 0.002(<0.01). So, it was statistically highly significant while Mean atd angle (°) was higher in left hand of cases (41.58°) than controls (40.27°), with P value was 0.09. So, it was not statistically significant.

## DISCUSSION

Study on correlation between atd angle and NIDDM have also been done by Gabriel SO and Babajide MO (2004), Rajnigandha V et al (2006), Padmini MP et al (2011) and Sharma MK and Sharma H (2012) [5,6,7,8].

Table 2 shows in Present study (2013) it was found that atd angle significantly increased in right hand of male cases than in right hand of male controls which was similar with findings of Rajnigandha V et al (2006) [6]. While in findings of Sharma MK and Sharma H (2012) there was increase in atd angle in right hand of male

cases but not statistically significant [8]. There was significant increase in atd angle in right hand of male controls in the findings of Gabriel SO and Babajide MO (2004) [5]. While in the findings of Padmini MP et al (2011) there was increase in atd angle in right hand of male controls, but not statistically significant [7].

There was increase in atd angle in left hand of male cases than in left hand of male controls but not statistically significant in Present Study (2013) which are similar with findings of Padmini MP et al (2011) [7]. While in findings of Gabriel SO and Babajide MO (2004) and Rajnigandha V et al (2006), there was significant increase in atd angle in left hand of male cases and increase in atd angle in left hand of male controls in the findings of Sharma MK and Sharma H (2012) but not statistically significant [5,6,8].

atd angle increased in right hand of female cases than in right hand of female controls in Present study (2013) but not statistically significant which was similar with findings of Padmini MP et al (2011) and Sharma MK and Sharma H (2012) [7,8]. While in findings of Rajnigandha V et al (2006), there was significant increase in atd angle in right hand of female case and significant increase in atd angle right hand of female controls in findings of Gabriel SO and Babajide MO (2004) [5,6].

In Present study (2013), atd angle increased in left hand of female cases than in left hand of female controls but not statistically significant while in the findings of Rajnigandha V et al (2006) and Sharma MK and Sharma H (2012) there was significant increase in atd angle in left hand of cases and significant increase in atd angle in left hand of female controls in the findings of Gabriel SO and Babajide MO (2004) and Padmini MP et al (2011) [5,6,7,8].

atd angle significantly increased in right hand of total cases than in right hand of total controls in Present study (2013) which was similar with findings of Rajnigandha V et al (2006), Padmini MP et al (2011) and Sharma MK and Sharma H (2012) [6,7,8].

There was increase in atd angle in left hand of total cases than in left hand of total controls but not statistically significant which was similar with findings of Sharma MK and Sharma H (2012) [8]. While in the

findings of Rajnigandha V et al (2006) there was significant increase in atd angle in left hand of total cases and increase in atd angle in left hand of total

controls in the findings of Padmini MP et al (2011) but not statistically significant [6,7].

So, in Present study (2013) it was found that atd angle significantly increased in right hand of male cases than in right hand of male controls which was similar with findings of Rajnigandha V et al (2006) while atd angle significantly increased in right hand of total cases than in right hand of total controls which was similar with findings of Rajnigandha V et al (2006), Padmini MP et al (2011) and Sharma MK and Sharma H (2012) [6,7,8].

The variation in findings of present study and other studies may be due to variation in populations.

## CONCLUSION

So, from the present study, it can be concluded that there is significant difference in atd angle between NIDDM patients and normal individuals. Therefore atd angle can be helpful to find out high risk individuals for NIDDM. Therefore, primary prevention will be done in the high risk individuals, which will help in decrease in prevalence rate of NIDDM in future.

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## How to write and check reference

Authors of the chapter  
↓  
• Miyano T, Kobayashi H, Chen SC. Long term results of biliary atresia. In: Gupta DK, editor. Text Book of Neonatal Surgery, 1<sup>st</sup> ed. New Delhi: Modern Publishers; 2000. p. 288-91.

Title of the chapter  
↓  
Long term results of biliary atresia

Name of the book  
Text Book of Neonatal Surgery

City of publication  
New Delhi

Name of publisher  
Modern Publishers

Edition no  
1<sup>st</sup> ed.

Year and page no.  
2000. p. 288-91.

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Coma followed by space after each author do not write **and** before the last author  
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Full stop after the last author followed by space and then the article title  
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