

## A Study on *atd* Angle among the Autistic Patients of Bengalee Hindu Caste Population of West Bengal, India

B. Dey<sup>1</sup>, P. Das<sup>2</sup> and A. R. Bandyopadhyay<sup>3</sup>

*Citation: Dey B, Das P and Bandyopadhyay AR. 2016. A Study on atd Angle among the Autistic Patients of Bengalee Hindu Caste Population of West Bengal, India. Human Biology Review, 5 (4), 437-442.*

<sup>1</sup>Biswarup Dey, M.Sc., Department of Anthropology, University College of Science, Technology & Agriculture, University of Calcutta. E-mail: biswa.anth@gmail.com

<sup>2</sup>Piyali Das, *Research Investigator*, Cultural Research Institution, Government of West Bengal, Backward Classes Welfare Department. E-mail: piyalidas24@gmail.com

<sup>3</sup>Arup Ratan Bandyopadhyay, *Professor*, Department of Anthropology, University College of Science, Technology & Agriculture, University of Calcutta. E-mail: arup\_cu@rediffmail.com

**Corresponding author:** Biswarup Dey, Department of Anthropology, U.C.S.T.A, University of Calcutta, Kolkata – 700019. E-mail: [biswa.anth@gmail.com](mailto:biswa.anth@gmail.com)

### **ABSTRACT**

*Alteration of the dermatoglyphic traits served as one of the major criteria for understanding the human neurodevelopmental disorders and have already been well documented globally. The present study being the first attempt from India reports the palmar dermatoglyphics variability in terms of relationship of atd angle among the Autistic patients. To achieve the purpose, bilateral palm prints of 100 (67 males and 33 females) clinically diagnosed Autistic patients (DSM-IV-TR) from Bengalee Hindu Caste population of West Bengal, India. In addition to that, bilateral palm prints of 100 (55 males and 45 females) apparently healthy individuals without any family history of Autism were collected from the same area and population and treated as controls. All the prints were obtained following standard method and classified according to the standard procedures. The result demonstrated a significantly ( $p<0.05$ ) higher atd angle among the Autistic patients than that of the controls. Thus the present study envisaged that the significantly ( $p<0.05$ ) higher atd angle among the Autistic patients might be taken as one of the additional criteria for the early prognosis of Autism among the Bengalee Hindu caste population of West Bengal, India.*

**Keyword:** Dermatoglyphics, atd Angle, Autism, Bengalee Population, West Bengal, India.

## INTRODUCTION

Dermal patterns on the volar side of the hand and the neural tissue both are originate from the ectodermal layer within the 7<sup>th</sup> to 21<sup>st</sup> week of gestation; therefore dermatoglyphic variations are informative for early developmental brain disturbances (Van *et al.*, 2001). Several studies have reported relationship between the neurodevelopmental disorders and dermatoglyphics and have been well documented from different parts of the world (Schumann and Altar, 1976). Autism spectrum disorders (ASDs) are the complex brain condition that express at around age two with a core set of symptoms that include unusual ways of relating to people, of language developments and delay, and as well as repetitive or stereotyped behaviors (Losh *et al.*, 2008). Being a multifactorial disease, the genetic and epigenetic factors both could have concomitant effect towards Autism (Schroer *et al.*, 1998; Philippe *et al.*, 1999). Contemporary genetic investigations revealed the mutation on RELN protein on 7q22 locus (Muhle *et al.*, 2004), MET gene on 7q31 locus (Losh *et al.*, 2008), SHANK3 gene on chromosome 22q13 locus (Losh *et al.*, 2008; Benvenuto *et al.*, 2009) and X-linked Neuroligins (Grigorenko, 2009). Therefore, cell adhesion molecules that play a prominent role in synaptic maturation and function are regarded as plausible candidates implicated the chronic language and socialization deficits as well as the cerebral imbalance on Autism (Chih *et al.*, 2004). To best of the knowledge, the present study is a first attempt to understand the association of *atd* angle among the Autistic patients from India.

## MATERIALS AND METHODS

To achieve the purpose, bilateral palm prints of 100 (67 males and 33 females) clinically diagnosed Autistic patients (according to DSM-IV-TR - American Psychiatric Association, 2000) and 100 (55 males and 45 females) healthy individuals without having any family history of Autism as controls were apparently collected from the Bengalee Hindu caste population of West Bengal, India. All the prints were obtained following the standard ink-roller method (Cummins and Midlo, 1961) and classified according to the standard procedure (Schumann and Alter, 1976). Data were cross checked and analyzed in SPSS (16.0) and the cut off value was set as  $p=0.05$ .

## RESULTS

Examination on *atd* angle among the Autistic male patients revealed significantly ( $p<0.05$ ) higher *atd* angle in the left and right hands with that of control males (table 1). However, the Autistic female patients showed significantly ( $p<0.05$ ) higher *atd* angle in the left and right hands with that of control females (table 2). Therefore, the Autistic patients have significantly ( $p<0.05$ ) higher *atd* angle in comparison to the control irrespective of sexual differences for both hands (table 3).

## DISCUSSION

Apart from other dermatoglyphic traits *atd* angle also suggested being a useful criterion of medical disorders and congenital malformations as well (Schumann and Alter, 1976). The occurrence of higher *atd* angle among the Trisomy 21 or Down's syndrome probably is being best documented (Cummins and Midlo, 1961). Earlier studies also provided the close relationship between the higher values of *atd* angle and embryonic stress as well as neurodevelopmental imbalance (Van *et al.*, 2001). Being a complex neurodevelopmental condition along with strong genetic etiology (Losh *et al.*, 2008) several worldwide studies already demonstrated the relationship between alteration of dermatoglyphic traits and Autism (Tarca and Barabolski, 2003; Milicic *et al.*, 2003; Stosljević *et al.*, 2013; Oladipo *et al.*, 2013). In Indian context, the presence of multiple palmar axial triradii t (Dey *et al.*, 2014) on single palm of the Autistic patients and the shorter Transpalmar Distance (Dey *et al.*, 2015) among the Autistic males have already been reported from Bengalee Hindu Caste Population. However, contrasting results towards comparative lesser *atd* angle from Zagreb (Milicic *et al.*, 2003) and comparative greater *atd* angle from Siberia (Stošljević and Adamović, 2013) among the Autistic boys in comparison to the controls. Nevertheless, the present study demonstrated the higher *atd* angle among the Autistic patients than that of controls irrespective of sex.

## CONCLUSION

Therefore, the present study concluded as clinical importance of dermatoglyphic intervention on neurodevelopmental disorders as well as imperative use of dermatoglyphic traits like higher *atd* angle as additional prognosis criteria of Autism among the Bengalee Hindu caste population.

**Table 1: bilateral distribution of *atd* angle among the Autistic males and control males**

| <i>atd</i> angle |                                  |                                 |
|------------------|----------------------------------|---------------------------------|
|                  | Autistic males (n=67)<br>Mean±SD | Control males (n=55)<br>Mean±SD |
| Left Hand        | 49.04±15.04*                     | 43.47±7.45                      |
| Right Hand       | 48.48±13.81*                     | 43.91±6.78                      |

\*p&lt;0.05

**Table 2: bilateral distribution of *atd* angle among the Autistic females and control females**

| <i>atd</i> angle |                                    |                                   |
|------------------|------------------------------------|-----------------------------------|
|                  | Autistic females (n=33)<br>Mean±SD | Control females (n=45)<br>Mean±SD |
| Left Hand        | 51.27±11.64*                       | 46.27±9.35                        |
| Right Hand       | 49.20±8.83*                        | 45.01±8.81                        |

\*p&lt;0.05

**Table 3: bilateral distribution of *atd* angle among the Autistic patients and controls**

| <i>atd</i> angle |                                      |                             |
|------------------|--------------------------------------|-----------------------------|
|                  | Autistic patients (n=100)<br>Mean±SD | Controls (n=100)<br>Mean±SD |
| Left Hand        | 49.49±13.96*                         | 44.73±8.43                  |
| Right Hand       | 48.84±12.39*                         | 44.46±7.82                  |

\*p&lt;0.05

**ACKNOWLEDGMENTS**

Authors are thankful to all the participants and the authority of different Autism management centers of West Bengal. Moreover acknowledgement is also owed to the Department of Anthropology, U.C.S.T.A, University of Calcutta for providing all the necessity for the present study. Partial funding assistance has been made from BI (8 & 9) grant, University of Calcutta.

**REFERENCES**

- American Psychiatric Association. 2000. DSM-IV-TR - Diagnostic and Statistical Manual of Mental Disorders 4th Ed. *American Psychiatric Association*. Washington DC (America).
- Benvenuto S. 2009. Le projet de la psychiatrie phénoménologique. *Evol. psychiatr.* **71**: 11–29.
- Chih B, Afridi SK, Clark L, Scheiffele P. 2004. Disorder-associated mutations lead to functional inactivation of neuroligins. *Hum Mol Genet.* **15**:1471-1477.

- Cummins H, Midlo C. 1961. Finger prints, palms and soles: an introduction to dermatoglyphics. *Dover Publication, INC.* New York.
- Dey B, Ghosh JR, Bandyopadhyay AR. 2014. A study on axial triradius among the Autistic patients of Bengalee Hindu Caste Populations of West Bengal. *Int J Biomed Res.* **05(11)**: 715-716.
- Dey B, Ghosh JR., Das P, Bandyopadhyay AR. 2015. A study on transpalmar distance among the autistic males of Bengalee Hindu caste population of West Bengal, India. *Clinic Derma.* **3(2)**: 41-43.
- Grigorenko EL. 2009. Pathogenesis of Autism: a patchwork of genetic causes. *Future. Neurol.* **4**: 591-599.
- Losh M, Sullivan PF, Franzcp MD, Trembath D, Piven J. 2008. Current developments in the genetics of Autism: from Phenome to Genome. *J. Neuropathol. Exp. Neurol.* **67**: 829- 837.
- Miličić J, Petković ZB, Božikov J. 2003. Dermatoglyphs of Digito-Palmar Complex in Autistic Disorder: Family Analysis. *Croat Med J.* **44**: 469-476.
- Muhle R, Trentacoste SV, Rapin I. 2004. The genetics of autism. *Pediatrics.* **113**: 472-486.
- Oladipo GS, Okoh PD, Oghenemavwe LE, Yorkum LK. 2013. Dermatoglyphic Patterns of Autistic Children in Nigeria. *J Bio Agri Healthcare.* **3(7)**: 80-3.
- Philippe A, Martinez M, Guilloud-Bataille M, Gillberg C, Rastam M, Sponheim E. 1999. Genome-wide scan for autism susceptibility genes. Paris Autism research International Sib pair Study. *Hum. Mol. Genet.* **8**: 805-812.
- Schauman B, Alter M. 1976. Dermatoglyphics in Medical Disorders. *Springer Verlag.* New York-Heidelberg Berlin.
- Schroer RJ, Phelan MC, Michaelis RC, Crawford EC, Skinner SA, Cuccaro M, Simensen R.J, Bishop J, Skinner C, Fender D, Stevenson RE. 1998. Autism and maternally derived aberrations of chromosome 15q. *Am. J. Hum. Genet.* **76**: 327-336.
- Stošljević M, Adamović M. 2013. Dermayoglyphic characteristics of digito-palmar complex in Autistic boys in Serbia. *Vojnosanitetski. Pregled.* **70(4)**: 386-390.
- Țarcă A, Barabolski C. 2003. Pathology of Dermatoglyphics in Infant Autism. *J Primitive Med.* **70**: 117-118.
- Van Ocj, Baare WF, Hulshoff PHE, Haag J, Balazs J, Dingemans A, Kahn RS, Sitskoorn MM. 2001. Differentiating between low and high susceptibility to schizophrenia in twins:

the significance of dermatoglyphic indices in relation to other determinants of brain development. *Schizophr Res.* **52**:181-93.