

## Addressing Autism Spectrum Disorder through Yoga as a Complementary Therapy

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Date of

Submission: 09-06-2018

Acceptance: 16-06-2018

Access this article online

Quick Response Code



<https://www.jbcahs.org>

### ABSTRACT

Autism is a neuro-developmental disorder characterized by restricted, repetitive activities and impaired social interaction. Its severity varies from individual to individual. Yoga, a mind-body intervention is often used as a complementary approach to enhance mental equipoise and focus and can be performed by all including those with acute or chronic painful disabilities. The emotional impact is difficult and devastating for people with autism and their families/caregivers. People with Autism Spectrum Disorder (ASD) should be regarded simply as 'different' rather than 'disordered'; as they may have no speech or may have other complexities needing full-time care. Yogic techniques for ASD such as basic Jathis and Kriyas help to improve flexibility, Asanas work increase muscles and joints circulation and physical functioning becomes more integrated and less stressful. Pranayama and Asanas work hand-in-hand to balance and integrate different physiological functions, dissolve emotional blockages and negative habitual patterns. Yoga harmonises mind-body-emotion complex building up, helps to develop social relationships, promotes positive outlook, self-confidence and self-sufficiency. It also improves loco-motor skills, psycho-motor coordination, eye-hand coordination, attention span, immunity, appetite, sleep and promotes overall health. Regular practice reduces hyperactivity, aggression and dependency of drugs along with reduction in negative traits and tendencies to cause injury to self and others. In conclusion, yoga is an experiential science (Anubuthi Shastra) which can be used as a supplemental therapy for ASD.

### Keywords:

Self-sufficiency, Social relationships, Mental health, Psycho-motor coordination

### INTRODUCTION

Autism is one of the most common life-long neuro-developmental disorders diagnosed in early childhood. It is characterized by restricted, stereotyped repetitive activities, impaired social interaction, difficulty in communication, forming relationships and find it hard to understand and make sense of the world around them.<sup>1</sup> Autism Spectrum Disorder (ASD) varies in severity and impact from those with no speech and severe learning disabilities to people with intelligence quotients (IQ) in an average range and who can hold a job or start a family.

Children with ASD are unable to understand and process information that they receive from the environment.

They also have deficits in imitation skills necessary for learning complex behaviours. Asperger's Syndrome is a form of ASD in which speech development and IQ are normal but social disability accompanied by depression and mental health problems are seen. The prevalence of ASD is increasing and currently it is estimated to be 1 in 110 children wherein boys are five times more likely to be diagnosed with autism than girls, with male predilection of 5:1.<sup>2</sup> The most recent figure released by the Centres for Disease Control and Prevention (CDC 2012) is that 1 in 88 children are now diagnosed with ASD.<sup>3</sup> According to a recent survey, ASD is estimated to affect 1 out of every 68 children in the United States (equal to 1.47%), including 1 in 42 boys (equal to 2.38%).<sup>4</sup>

The increase in prevalence of ASD has led to a corresponding surge in demand for novel, effective, and safe clinical interventions. Evidence-based treatment options for ASD are limited, resulting in a high utilization rate of complementary and alternative medicine (CAM) treatments.<sup>5</sup> Yoga is a CAM therapy practiced by over 20 million people all over the world. It has been investigated as a possible effective treatment intervention for patients with ASD.<sup>6</sup> Patients with ASD could potentially benefit from yoga either directly, through the targeting of core ASD symptoms, or indirectly through the improvement of commonly occurring co-morbid psychiatric conditions.<sup>7</sup> Deep breathing, meditation and yoga have been recognised as complementary and alternative medicine therapies with deep breathing and yoga as the most commonly used interventions with children.<sup>8</sup>

Yoga is classified as a mind–body intervention and is often used as a complementary approach to enhance mental equipoise and focus. Yoga has never recognized any barriers of age, sex, religion, or creed.<sup>9</sup> Yoga can be performed by those with acute or chronic and painful disabilities, those who suffer from chronic illnesses and those with missing limbs too. Hatha Pradipika states that, “Yoga improves the health of all alike and wards off diseases of one who tirelessly practices yoga whether they are young, old, decrepit, diseased or weak, provided they abide to the rules and regulations properly” (*Yuvavrddho'thivrddhova vyadbito durvalo' piva abhyasat siddimapnoti sarva yogeshvatandritab-* Hathapradipika I: 64).<sup>10</sup>

## THE IMPACT OF ASD

For the individual with autism, the world can be a confusing and lonely place, where everyone except them understands the rules of appropriate behaviour. For the family of an autistic child life is often stressful. Parents and siblings usually have to cope with unyielding challenging behaviour and possibly sleep deprivation, as many children with autism do not sleep for long periods of time. As the children and adults with autism find it difficult to manage in social situations, many families become isolated and experience extreme mental distress.

The emotional impact of autism is often difficult and sometimes devastating for people with autism and the families of those affected, but they cope well with the additional challenges it brings. Many argue that people with autism should be regarded simply as ‘different’ rather than ‘disordered’, there is no doubt

of the real distress that autism can cause. People with autism and learning disabilities may have no speech or may have other complexities and may need full-time care.

## YOGIC TECHNIQUES FOR ASD

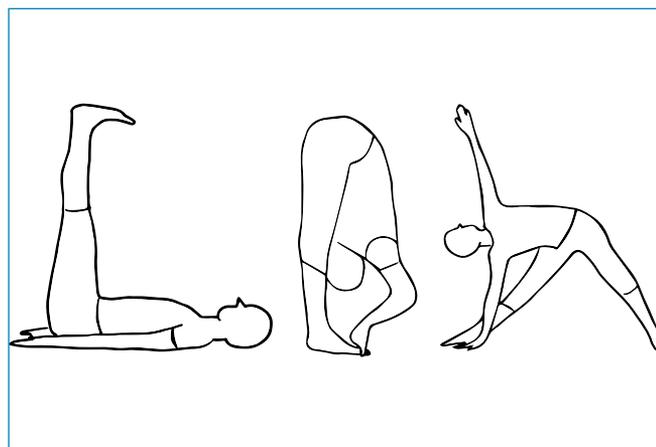
Basic *Jathis* and *Kriyas* are given as a part of warm up practices with *Surya Namaskar* to help improve flexibility, create awareness and enhance energy circulation throughout the body.

‘*Asanas*’ are psycho-physiological practices in which mind is totally focused on incoming and outgoing breaths helping harmonise mind and body. *Asanas* work on muscles and joints, help increase circulation and improve flexibility. Physical functioning becomes more integrated and less stressful.

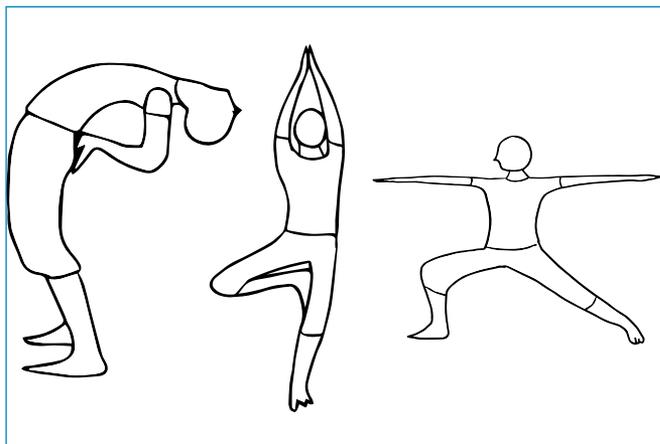
Demonstration of the asana is more effective than the explanation. (This holds good for all the yogic techniques). Postures are tailored as per the ability of individual child.

Postures like *Viparitkarani*, (*topsy-turvy posture*) *Sarvangasana* (shoulder-stand), *Matsyasana* (fish posture), *Halasana* (plough posture), alternating with standing postures such as *Padahasthasana* (hand to foot posture), *Trikonasana* (triangle posture), *Padangushtasana* (clasping big toe like a hook) helps increasing blood flow to the head region and help activate the brain cells. (Figure 1) Balancing postures such as *Vrikshasana* (tree posture), *Ardhachakrasana* (half-wheel posture) and *Natarajasana* (posture of Lord Nataraja) enable them to achieve stability, but they have to be supported initially. (Figure 2)

**Figure 1 :** Postures to improve blood flow to the brain such as *dwipadauttana*, *padanghusta* and *trikonasana*.

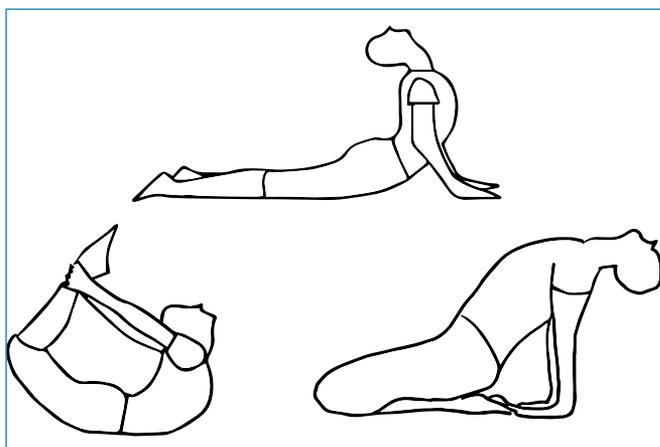


**Figure 2 :** Postures to improve balance such as ardhachakra, veera, and vrikshasana.



Back bending postures such as *Bhujangasana* (serpent posture), *Ushtrasana* (camel posture), *Chakrasana* (wheel posture), *Dhanurasana* (bow posture) opens shoulders and chest region are useful for enhancing vital capacity as well as improving self confidence and body posture. *Simhasana* (lion posture) improves stammering, stuttering and some ear, nose and throat defects of the children. (Figure 3) Starting from simple movements and dynamic postures, they can be slowly led on to static postures.<sup>11</sup>

**Figure 3 :** Back bending postures to improve vital capacity and self confidence such as bhujanga, dhanura and ardha ustrasana.



*Pranayama* controls and regulates breathing and is very beneficial in ASD. Sounds of animals make it interesting for them to perform. *Kukkuriya Pranayama* (dog panting breath), *Vyagraba Pranayama* with *Sharabha Kriya* and *Kapalabhati* are very useful. *Nada Pranayama* such as *Pranava Pranayama* helps alleviate stress as well as sublimate suppressed and regressed emotions. *Mukha Bhastrika* is also known as ‘cleansing

breath’ helps remove old, stagnant air from lungs and cleanses bloodstream of excess carbon dioxide. Its practice also decreases response time and enhances memory and comprehension. Research also suggests that it is useful in combating learning disorders, Attention Deficit Disorder and mental retardation.<sup>12</sup>

*Pranayama* and *Asanas* work hand-in-hand to balance and integrate different physiological functions and help dissolve emotional blockages and negative habitual patterns that can obstruct flow of vital energy within mind-body complex.

Some of the *Sbatkarmas* such as *Trataka*, *Kapalabhati* are useful for developing concentration and also act as tranquillizers. These children suffer from numerous eye related problems and *Trataka* and *Neti* are highly beneficial along with a diet rich in vitamins A and C.

*Bhujangini Mudra* and *Brahma Mudra*, working with breath and sound vibration induces a sense of relaxation and reinvigorates head and neck region reducing stress. *Hasta Mudras* and *Kaya Mudras* (*Yoga Mudra*, *Manduka Mudra*) helps drive away depression, bringing out a sense of joy and happiness.

Unrealistic expectations at home and outside add powerful peer pressures on them. *Shava Asana* (corpse posture) with *Kaya Kriya* and *Spanda-Nishpanda* relaxes all aspects of the musculoskeletal system thereby promoting complete relaxation and harmonisation of mind, body and emotions.

Prayer and chanting of simple mantras makes them less aggressive, purifies speech, calms the mind and helps reduce distraction. Hence chanting *Pranava Mantra AUM* can benefit these children. It helps maintain their concentration, improves alertness with rest and relaxation, helps gain emotional and mental strength as well as produces a calming and healing effect on nervous system and psyche.<sup>13,14</sup>

## BENEFITS OF YOGA

Yoga coordinates activities of mind building up focus and concentration. It improves quality of day to day living to the degree which could never otherwise be achieved. Develops social relationships, promotes positive outlook, self-confidence and self-sufficiency. Improves loco-motor skills, psycho-motor coordination, eye-hand coordination, attention span, immunity, appetite, sleep and promotes overall health. It also reduces hyperactivity, aggression and dependency of

drugs along with reduction in negative traits and tendencies to cause injuries to self and others

The first step in teaching yoga to an autistic child is to establish a strong bond. The teacher must stoop down to the level of the child, gain child's complete confidence, gradually develop mutual trust and friendship and later introduce practices that will help to bring the child with ASD out of his or her shell and out into the world. *Yoga provides perfect platform to build all vital skills required for self-sufficiency.*<sup>14, 15</sup>

## RESEARCH FINDINGS

Yoga is increasingly used in classrooms across the globe to have an impact on and also to enhance students' behavioural and academic functioning, such as their attention, concentration or focusing ability, impulse control, strength, motor coordination, and social skills.<sup>16-21</sup>

In a controlled experimental study carried out by Chan et al, low-achieving children with behavioural problems who participated in yoga intervention showed significant reductions in behavioural problems including withdrawn behaviours and attention problems.<sup>22</sup>

Students who participated in a yoga program demonstrated significant improvements in anger control with less fatigue and improvement in anxiety, mood, perceived stress, and resilience, whereas the control group, who participated in regular physical education classes, showed a worsening on all mental health outcome measures. Khalsa et al found that yoga may exhibit protective or preventive role among adolescents with mental health variables.<sup>23</sup>

Koenig et al concluded that students diagnosed with ASD, receiving yoga intervention showed a reduction in behaviours including irritability, lethargy, social withdrawal, hyperactivity, and noncompliance.<sup>24</sup>

## CONCLUSION

Yoga is an experiential science (*Anubuthi Shastra*). Although modern medical approaches are being used to cure the disabilities, they have achieved only a small amount of success. Mostly major and minor tranquilizers, antidepressants and anti-convulsants are given to these children. It has been observed that many of these drugs have wide action and a considerable number of side effects. In comparison to the treatment

given to such children, yogic therapy has been found to be more beneficial. Yoga is a conventional long-established and time-tested art and therapeutic science that has positive contribution to maintenance of general wellbeing and happiness of all. Yoga is a great boon to civilized man having preventive, curative as well as rehabilitative potential. It is a spiritual science for the integrated and holistic development and helps manifest our potentialities.

## ACKNOWLEDGEMENTS

Support of Sri Balaji Vidyapeeth University is gratefully acknowledged. We thank management of SADAY, Karunai and Satya Special School, Pondicherry where we are currently involved in research activities on children with autism and other special needs.

## CONFLICTS OF INTEREST

None.

## References

1. Radhakrishna S. Application of integrated yoga therapy to increase imitation skills in children with autism spectrum disorder. *Int J Yoga* 2010; 3:26-30
2. Orellana LM, Martinez-Sanchis, Silvestre FJ. Training adults and children with an autism spectrum disorder to be compliant with a clinical dental assessment using a TEACCH-based approach. *J Autism Dev Disord* 2014; 44:776-85.
3. Centers for Disease Control and Prevention. Prevalence of autism spectrum disorders-Autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *MMWR Surveill Summ.* 2012; 61:1-19.
4. Centers for Disease Control and Prevention. Prevalence of autism spectrum disorder among children aged 8 years - Autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *MMWR Surveill Summ.* 2014; 63:1-21.
5. Barnes PM, Bloom B, Nahin RL. Complementary and alternative medicine use among adults and children: United States, 2007. *Natl Health Stat Report* 2008; 10 :1-23.
6. Radhakrishna S, Nagarathna R, Nagendra HR. Integrated approach to yoga therapy and autism spectrum disorders. *J Ayurveda Integ Med.* 2010; 1:120-4.
7. Gwynette MF, Warren NJ, Warthen J, Trulove JS, Ross CP, Snook CA. Yoga as an intervention for patients with autism spectrum disorder: A review of the evidence and future directions. *Autism Open Access* 2015; 5:3.
8. Ehleringer J. Yoga for children on the autism spectrum. *Int J Yoga Therap.* 2010; 20:131-9
9. Bhavanani AB. Role of yoga in health and disease. *J Symptoms and Signs* 2014; 3: 399-406.
10. Bhatt GP, Sinh P, Vasu RBSC. *The Forceful Yoga: being the translation of the Hathayoga-Pradipika, Gheranda-Samhita and Siva-Samhita.* Motihlal Banarsidass Publishers Private Limited, Delhi. 2014.
11. Teaching yogasana to the mentally retarded persons: A guide book for personally serving the mentally retarded persons. Madras, India: Krishnamacharya Yoga Mandiram, Vijay Human Services; 1988

12. Vijay Human Services (Madras, India), & Krishnamacharya Yoga Mandiram (Chennai, India). Teaching Yogasana to the mentally retarded persons: A guide book for personnel serving the mentally retarded persons. Madras, India: Krishnamacharya Yoga Mandiram. 1988
13. Bhavanani AB, Ramanathan M, Harichandrakumar KT. Immediate effect of mukhabhastrika (a bellows type pranayama) on reaction time in mentally challenged adolescents. *Indian J Physiol Pharmacol* 2012; 56: 174-80
14. Bhavanani AB. Yoga Chikitsa: Application of yoga as a therapy. 1<sup>st</sup> ed. Pondicherry, India: Dhivyananda Creations;2013
15. Ramanathan M. Applied Yoga- Application of yoga in various fields of human activity. 2<sup>nd</sup> ed. Puducherry, India: Arogya Yogalayam;2011
16. Usha Ram, Children with special needs ; All that you wanted to know. New Delhi, India: Frank Bros & Co (Publishers) Ltd; 2004
17. Galantino ML, Galbavy R, Quinn L. Therapeutic effects of yoga for children: A systematic review of the literature. *Pediatr Phys Ther*. 2008; 20:66–80.
18. Harrison LJ, Manocha R, Rubia K. Sahaja yoga meditation as a family treatment programme for children with attention deficit–hyperactivity disorder. *Clin Child Psychol Psychiatry*. 2004; 9 :479–97.
19. Kenny M. Integrated movement therapy: Yoga-based therapy as a viable and effective intervention for autism spectrum and related disorders. *Int J Yoga Therap*. 2002; 12: 71–9.
20. Klatt M. Integrating yoga, meditation, and occupational therapy for inner-city children. *Explore: Journal of Science and Healing*. 2009; 5:152–3
21. Uma K, Nagendra HR, Nagarathna R, Vaidehi S, Seethalakshmi R. The integrated approach of yoga: A therapeutic tool for mentally retarded children: A one-year controlled study. *J Ment Defic Res*. 1989; 33 (Pt 5):415-21.
22. Chan AS, Cheung M, Sze SL. Effect of mind/ body training on children with behavioral and learning problems: A randomized controlled study. In: DeLuca B (Ed.). *Mind–body and relaxation research focus*. Hauppauge, NY: Nova Science; 2008.p. 165– 93.
23. Khalsa SS, Hickey-Schultz L, Cohen D, Steiner N, Cope S. Evaluation of the mental health benefits of yoga in a secondary school: A preliminary randomized controlled trial. *J Behav Health Serv Res*. 2012; 39: 80–90
24. Koenig KP, Buckley-Reen A, Garg S. Efficacy of the get ready to learn yoga program among children with autism spectrum disorders: A pretest–post-test control group design. *Am J Occup Ther*. 2012; 66: 538-546.

## Aspirin Antiplatelet Effect Enhanced by the Coadministration of Statins

We studied the influence of cardiovascular (CV) risk factors, previous CV events, and cotreatments with preventive medicines, on residual platelet thromboxane (TX)B<sub>2</sub> production in 182 patients chronically treated with enteric coated (EC)-aspirin (100 mg/day). The response to aspirin was also verified by assessing arachidonic acid-induced platelet aggregation and urinary 11-dehydro-TXB<sub>2</sub> levels. Residual serum TXB<sub>2</sub> levels exceeded the upper limit value for an adequate aspirin response in 14% of individuals. This phenomenon was detected at 12 hours after dosing with aspirin. The coadministration of statins (mostly atorvastatin) was an independent predictor of residual serum TXB<sub>2</sub> levels, and the percentage of patients with enhanced values was significantly lower in statin users vs. nonusers. We provide evidence in vitro that atorvastatin reduced residual TXB<sub>2</sub> generation by increasing the extent of acetylation of platelet COX-1 by aspirin. In conclusion, the coadministration of statins may counter the mechanisms associated with reduced bioavailability of aspirin detected in some individuals with CV disease.

*Source: Tacconelli S et al. Clin Pharmacol Ther* 2018; 104:111-119