



Role of Yoga Therapy and Hydrotherapy for management of autism spectrum disorder: a narrative review

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Abstract:

Autism spectrum disorder (ASD) is an important cause of developmental disability worldwide. Autism spectrum disorders (ASDs) are a spectrum of disorders characterized by pervasive impairments in social reciprocity and/or communication, stereotyped behavior, and restricted interests ⁵. Incidence of Autism Spectrum Disorder (ASD) is increasing across the globe and no data is available from India regarding the risk factors of ASD. Approximately one in 68 children is identified with ASD according to estimates from Centers for Disease Control and Prevention (CDC)'s Autism and Developmental Disabilities Monitoring (ADDM) Network ⁶. Yoga is essentially spiritual discipline based on extremely subtle science which focuses on bringing harmony between mind and the body. Yoga being non-competitive in nature can help people with Autism deal with day to day challenges in a more relaxed and effective way ⁷. Yoga should be used as an important therapeutic intervention along with the other rehabilitation techniques because yoga is not only for the body but also to control the mind, behavior, attitude, perception, and memory ⁸.

Keywords: Yoga, ASD, Diet, Naturopathy, Hydrotherapy

Background: Autism spectrum disorder, the name adopted in 2013, is a developmental disorder characterized by persistent problems in social communication and interaction, along with restricted and repetitive patterns of behavior, interests or activities ¹. Autism spectrum disorder impacts the nervous system and affects the overall cognitive, emotional, social and physical health of the affected individual ². Early recognition, as well as behavioral, educational and family therapies may reduce symptoms and support development and learning ³. Autism is strongly genetic: Families with one child with autism have an increased risk of having another child with autism when compared with the general population ⁴.

Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive):

- Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions⁹.
- Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication¹⁰.
- Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers¹¹.

Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive):

- Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases)¹².
- Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day)¹³.
- Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests)¹⁴.
- Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement)¹⁵.

Types of autism:-¹⁶

- Autism spectrum disorder (ASD)
- Asperger's syndrome.
- Childhood disintegrative disorder.
- Kanner's syndrome
- Rett syndrome
- Pervasive developmental disorder-not otherwise specified.

Autism in young children: Signs of autism in young children include:-¹⁷

- Not responding to their name
- avoiding eye contact
- not smiling when you smile at them
- getting very upset if they do not like a certain taste, smell or sound
- repetitive movements, such as flapping their hands, flicking their fingers or rocking their body
- not talking as much as other children
- repeating the same phrases

Autism in older children: Signs of autism in older children include:¹⁸

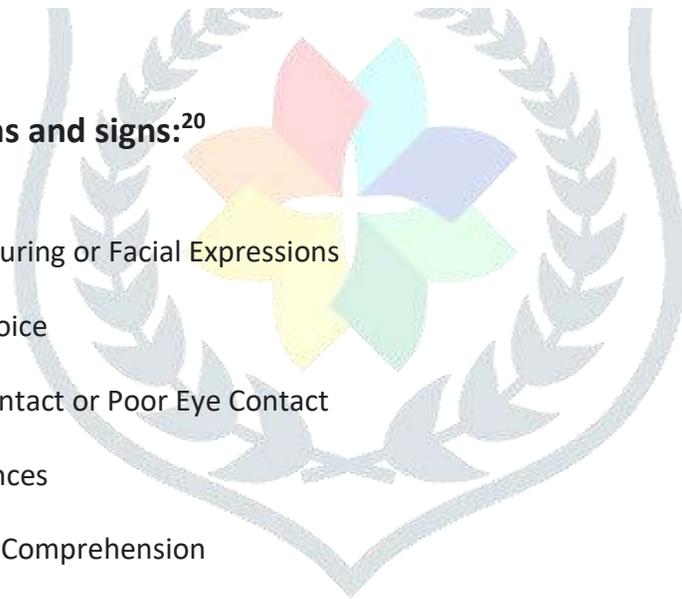
- not seeming to understand what others are thinking or feeling
- finding it hard to say how they feel
- liking a strict daily routine and getting very upset if it changes
- having a very keen interest in certain subjects or activities
- getting very upset if you ask them to do something
- finding it hard to make friends or preferring to be on their own
- taking things very literally – for example, they may not understand phrases like "break a leg"

Autism in girls and boys:-¹⁹

Autism can sometimes be different in girls and boys. For example, autistic girls may be quieter, may hide their feelings and may appear to cope better with social situations. This means autism can be harder to spot in girls.

Other autism symptoms and signs:²⁰

- Abnormal Body Posturing or Facial Expressions
- Abnormal Tone of Voice
- Avoidance of Eye Contact or Poor Eye Contact
- Behavioral Disturbances
- Deficits in Language Comprehension
- Delay in Learning to Speak
- Flat or Monotonous Speech
- Inappropriate Social Interaction
- Intense Focus on One Topic
- Lack of Empathy
- Lack of Understanding Social Cues
- Learning Disability or Difficulty



- Not Engaging in Play With Peers
- Preoccupation With Specific Topics
- Problems With Two-Way Conversation
- Repeating Words or Phrases
- Repetitive Movements
- Self-Abusive Behaviors
- Sleep Disturbances
- Social Withdrawal
- Unusual Reactions in Social Settings
- Using Odd Words or Phrases

Some of the suspected risk factors for autism include:²¹

- having an immediate family member with autism
- genetic mutations
- fragile X syndrome and other genetic disorders
- being born to older parents
- low birth weight
- metabolic imbalances
- exposure to heavy metals and environmental toxins
- a history of viral infections
- fetal exposure to the medications valproic acid (Depakene) or thalidomide (Thalomid)

Diagnosis of Autism:-

Diagnosing autism spectrum disorder (ASD) can be difficult because there is no medical test, like a blood test, to diagnose the disorder. Doctors look at the child's developmental history and behavior to make a diagnosis. ASD can sometimes be detected at 18 months or younger ²².

These tools include the Childhood Autism Rating Scale (CARS), Gilliam Autism Rating Scale (GARS), Autism Diagnostic Observation Schedule (ADOS) and the Autism Diagnostic Interview- Revised (ADI-R) ²³.

- DNA testing for genetic diseases
- behavioral evaluation
- visual and audio tests to rule out any issues with vision and hearing that aren't related to autism
- occupational therapy screening
- developmental questionnaires, such as the Autism Diagnostic Observation Schedule (ADOS)

Materials and method:

We performed a Pubmed/ google scholar electronic database search to review the relevant articles in English literature using the keyword "Yoga for management of Autism spectrum disorder" & "Hydrotherapy for management of autism spectrum disorder" A total of 386 articles were available till october 22, 2021. All the relevant articles that fit into the following inclusion and exclusion criteria were reported in this review. **Inclusion criteria:** These are clinical trials, controlled trials, randomized controlled trials, systematic reviews, and meta-analysis that are dealing with yoga, hydrotherapy alone or in combination with physiotherapy and medicine. **Exclusion criteria:** comments, and articles that do not have either abstract or full text, articles with similar information. Of 386 articles, 40 relevant articles were reported in this review.

Therapeutic applications and its effect:

Yoga provides a calming atmosphere, allowing children to slow down. Breathing strategies help reduce irritability, regulate heart rates and release difficult emotions. Mindful breathwork also serves as a self-soothing tool and potential replacement behavior for other obsessive, aggressive or self-stimulatory behaviors ²⁸.

Pediatric aquatic therapy can help children with Autism to improve their concentration and attention span. The therapy focuses on play-based functional movement, facilitating neurodevelopmental growth and improving range of motion ²⁹.

In addition, according to Autism Speaks.org aerobic exercise like swimming has been shown to reduce negative behaviors common in children with autism, such as rocking, spinning, head-nodding, hand flapping, object-tapping, and light gazing ³⁰.

Some of the yoga modules for autistic kids: 41, 35, 36, 42

Tree Pose. Vrikshasana Warrior Pose

- Lion's Breath. ...
- Downward Facing Dog Pose. ...
- Cat/Cow Pose
- Frog pose
- Butterfly pose
- Setubandhasana

Warm –up practices-

- jogging
- forward and backward bending in standing posture

Loosening practices-

- neck exercises
- waist-back bending exercises
- waist forward bending

Strengthening asana-

- trikonasana (triangle pose)
- veerbhadrasana (warrior pose)
- parvathasana (mountain pose)
- sasankasana (moon pose)

Calming asanas-

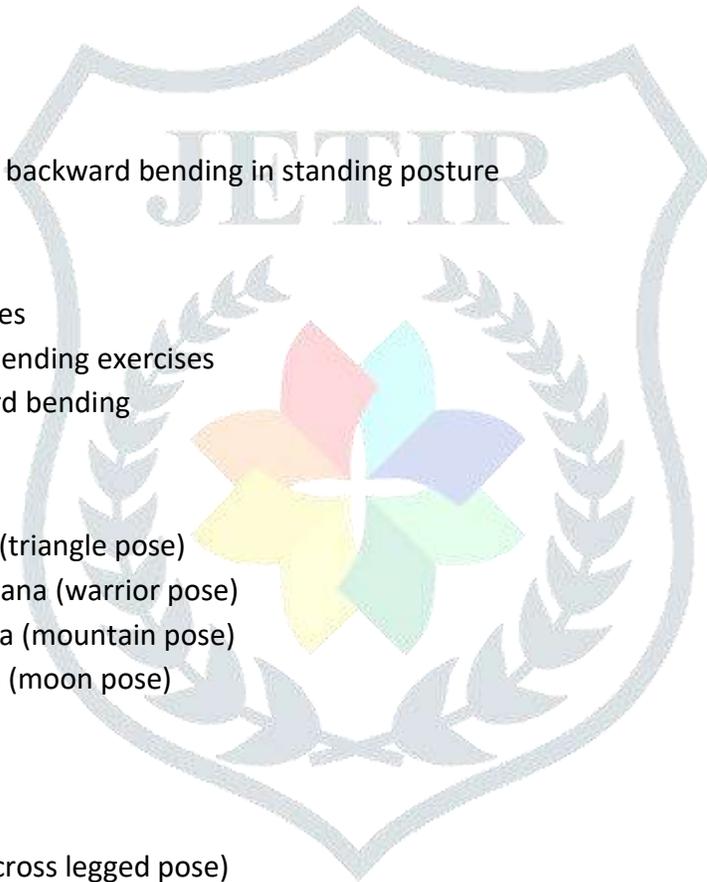
- sukhasana (cross legged pose)
- shavasana (corpse pose)
- makarasana (crocodile pose)

Yogic breathing practices-

- preparatory blowing exercises
- sasha swasa (rabbit breathing)
- vyaghra swasa (lion pose)
- hasta prasarita swasa (hands in and out breathing)

Relaxation-

Chanting-



- AAAA, UUUU, MMM, OMM
- short mantras

Hydrotherapy for Autism is a pool based water safety program for people with ASD. A physiotherapist will work with you 1:1 to improve your confidence, fitness and motor skills in a low sensory environment ³¹.

Sensory Tools for Meltdowns:³²

- Noise-cancelling headphones. A pair of noise cancelling headphones can help calm an autistic child when the noise gets too loud for them.
- Sunglasses. ...
- Weighted blanket/lap pad. ...
- Snacks that are chewy or crunchy. ...
- Fidget toy. ...
- Scented hand lotion. ...
- Hand wipes.
- Greens, blues, pinks, soft oranges and neutrals can be very comforting. Keeping the colors muted, these tones can quiet the mind and create calm ³³.

Diet for autism:

According to the Autism Network, nearly one in five children with autism are on a special diet. There is no specific ASD diet, but removing certain proteins may relieve symptoms. The gluten-free, casein-free (GFCF) diet has the most research and is one of the most common dietary interventions ²⁴. For our patients with autism, we often recommend an elimination diet—eliminating gluten, dairy, sugar, corn, soy, and other categories of potentially allergenic foods for one month ²⁵. They found that children with ASD are five times more likely to have mealtime challenges such as tantrums, extreme food selectivity and ritualistic eating behaviors ²⁶. They also found inadequate nutrition to be more common among children with autism than in those unaffected by the disorder ²⁷.

Conclusion:

Yoga as a creative intervention was found as a promising tool to enhance the motor and imitation skills of children with ASD.³⁴ Yoga interventions being non-invasive to support children with ASD cause parasympathetic dominance, and help them achieve physiological as well as psychological balance.³⁵ Structured yoga intervention for ASD children with parent's involvement can be used as alternative therapy to reduce the severity of symptoms.³⁶ Significant improvements in imitation and other skills, and in behavior at home and family relationships can be elicited with parental participation.³⁷ Yoga is an experiential science (Anubuthi Shastra) which can be used as a supplemental therapy for ASD.³⁸ Pool therapy helps improve confidence and sensory skills.^{31,39,40} The special diet advised is a Gluten free and casein free diet.^{24,25,27} sensory tools for meltdown are found helpful.³²

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