



BRAIN TRAIN



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What is the basis of our Sensorimotor Intensive program and what evidence informs our practice?

Research shows that:

- children with autism have difficulties coordinating sensory input and movement; and that
- sensorimotor difficulties are associated with the severity of Autism Spectrum Conditions¹.

Our sensory networks give us the ability to process and internally integrate sensory information from our bodies and the environment, including sight, sound, touch, proprioceptive (where we are) and vestibular (balance / gravity) input. Our motor networks give us the ability to move our body with control and coordination. Children with autism have sensory and motor difficulties that have been found to impact social functioning². This indicates a possible impairment in the process of sensorimotor integration (a brain process that allows the efficient connection of the sensory and motor domains)³.

What that means is, their sensory networks are not working effectively and have not integrated with their motor movement networks, which may also be impaired. A recent meta-analysis of 33 studies⁴ concluded that motor issues in autism seems to be an issue with sensorimotor integration and that people with autism seem unable to efficiently process sensory information and integrate it efficiently into a motor plan. In simple terms, they are not in complete control of their body.

Brain Train's Sensorimotor Intensive program challenges sensory processing and motor planning domains, through neurodevelopmental and other structured motor movement patterns with varying sensory stimuli, to assist with motor coordination and sensory reactivity and ultimately to encourage sensorimotor integration¹.

Many of the challenges presented by children and adults with autism and other neurological differences are at their core, a function of immature, inefficient and non-integrated neural pathways which can impact all areas of functioning and daily life. Brain Train's Sensorimotor Intensive lays the foundation for neurological efficiency. It seeks to integrate reflexes and develop more efficient and integrated neuromotor and sensorimotor networks, in an attempt to improve brain-body connections. And when that happens, many of the challenges associated with autism and other neurodevelopmental differences can improve and with that, other therapies and interventions can become more effective.

¹ Hannant P, Cassidy S, Tavasolli T, Mann F, (2016) Sensorimotor Difficulties Are Associated with the Severity of Autism Spectrum Conditions, *Frontiers in Integrative Neuroscience*, Vol 10 Article 28

² Hilton C, Graver K, LaVesser P. Relationship between social competence and sensory processing in children with high functioning autism spectrum disorder *Res Autism Spec Disord* (2007) doi:10.1016/j.rasd.2006.10.002

³ Machado S, Cunha M, Velasques B, Minc D, Tiexeira S, Domingues CA et al. Sensorimotor integration: basic concepts, abnormalities related to movement disorders and sensorimotor training-induced cortical reorganization *Rev Neurol* (2010)51(7): 427-36

⁴ Khoury E, Carment L, Lindberg P, Gaillard R, Krebs MO, Amado I, Sensorimotor Aspects and manual dexterity in autism spectrum disorders: A Literature Review, *Encephale* 2020 Apr 46(2) 135-145

Brain Train's practice is strongly influenced by a child's environment and the type of or lack of childhood physical activity⁵. All learning is dependent on the prior development of necessary sensorimotor skills⁶. Children with poor sensory and / or motor development have a poor foundation for higher-order cognition and functioning in a range of academic tasks⁷

Brain Train's Sensorimotor Intensive is an individualised support designed to improve gross motor coordination, balance, body awareness and sensory reactivity and outcomes of sensory and sensorimotor integration cited in research include improvement in social and communication skills, cognitive, self-help, behaviours, focus, stress and motor skills^{8 9}.

In addition to these papers, the NDIS commissioned a paper entitled Autism Spectrum Disorder: Evidence-based / evidence-informed good practice for supports provided to preschool children, their families and carers¹⁰ in which exercise is cited as an evidence-based strategy for autism and that finding is based on the more detailed analysis in Evidence-Based Practices for Children, Youth and Young Adults with Autism Spectrum Disorder: A Comprehensive Review¹¹ and updated to include movement and sensory integration in 2020 by the National Clearinghouse on Autism Evidence and Practice Review Team⁸.

For more information, including copies of any reports we have referred to, or if you would like to speak with one of our therapists in more detail about our program or the evidence supporting it, please call us on 1300-209-634.

⁵ Schaff, R. C. & Miller, L. J. (2005). Occupational Therapy using a Sensory Integrative Approach for Children with Developmental Disabilities. *Mental Retardation and Developmental Disabilities Research Reviews*, 11, 143-148.

⁶ Williams, M.S., and Shellenberger, S. (1994). *How does your engine run?* Albuquerque NM USA: Therapy Works

⁷ Ayres, A.J. & Robbins, J. (2005). *Sensory Integration and the Child: Understanding Hidden Sensory Challenges*. Los Angeles: Western Psychological Services

⁸ Steinbrenner, J. R., Hume, K., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., Szendrey, S., McIntyre, N. S., Yücesoy-Özkan, S., & Savage, M. N. (2020). Evidence-based practices for children, youth, and young adults with Autism. The University of North Carolina at Chapel Hill, Frank Porter Graham Child Development Institute, National Clearinghouse on Autism Evidence and Practice Review Team

⁹ Kashefimehr B, Kayihan H, Huri M, The Effect of Sensory Integration Therapy on Occupational Performance in Children with Autism, *OTJR* Apr 2018, doi: 10.1177/1539449217743456. Epub 2017 Dec 27.

¹⁰ Roberts J, Williams K, (2016) *Autism Spectrum Disorder: Evidence-based/evidence informed good practice for supports provided to preschool children, their families and carers*,

¹¹ Wong et al (2015) *Evidence-based Practices for Children, Youth and Young Adults with Autism Spectrum Disorder: A Comprehensive Review*, *J Autism Dev Disord* 45:1951-1966