

ADD-ADHD-OCD-LEARNING DISABILITIES-SENSORY INTEGRATION DYSFUNCTION-APRAXIA-PDD-AUTISM

CAN YOU HELP ME?

By

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Wait a minute...my child has ADHD, not Autism! Am I in the wrong place? **NO.**

Although there are many differences between ADHD, LDs, OCD and Autism, there are many similarities when it comes to the areas of the brain that are involved. It is our position that these different conditions or 'labels' are all interrelated and represent varying degrees of brain dysfunction.

What are these disorders?

The best way answer to this question is: these disorders are a developmental behavioral and biological syndrome whose symptoms and signs are quite variable and include; *inattention, hyperactivity, obsessive thoughts, poor social interaction, gastrointestinal disturbances, uncoordinated movement, food sensitivities, heightened reaction to light, sound and touch, delayed language development, poor eye contact, abnormal eye and tongue movements, self-stimming behaviors, poor posture, poor social communication, inadequate response to others' emotions, stereotypic and obsessive behaviors, complete withdrawal.*

In plain English please...

The brain functions like a super-computer, controlling and coordinating everything about the body, including all 'higher functions' like thought, emotion and communication.

The human brain contains approximately 100 billion nerve cells with over .15 quadrillion interconnections between them! With that many cells and connections, there are many windows of opportunity for things to go wrong, both prenatally and after birth. In fact, one main theory for the cause of Autistic Spectrum Disorders is that brain cells and brain areas are "underconnected" or not communicating enough. If there is underconnectivity, there is an alteration between information coming into the brain (sensory information like touch, taste, vision, hearing, smell and balance) and how it is processed to form the brain's outgoing expressions (like thinking, feeling, speaking, walking and running internal organ systems). When there is an alteration in the way the brain works, the individual experiences different symptoms. These symptoms are categorized into a 'diagnosis' or "label" so that medical providers and insurance companies can communicate about the disorder. However, it is our opinion that the "label" is not as important as evaluating and understanding what is working properly (function) and what isn't (dysfunction) in each individual, so a course of care can be created.

Every individual must be evaluated for what is working properly (function) and what isn't (dysfunction) so a course of care can be created.

Here at The S.I.R.R.I. Center, each patient is carefully evaluated for the state of their nervous system, so that areas of dysfunction can be isolated and a course of neuro-therapy can be devised to attempt to correct the dysfunction that exists. Additionally, since the ASDs affect the entire system, biomedical evaluations are performed to assess gut function, food allergies, environmental sensitivities, etc.

The S.I.R.R.I. Center approach to evaluating and treating Autistic Spectrum Disorders is based on current research into the causes and potential interventions available for ASDs. Below, you will find excerpts from the recent literature. If you have any questions about the terminology or concepts explained, please consult with us for clarification.

What about the research?

Since it is our belief that these are all interrelated disorders (Autism represents the greatest level of cortical [brain] dysfunction, while ADD represents the least), we feel that the research on Autism can be seen as an overview for all spectrum disorders.

- Autism (Spectrum Disorders) has commonly been described as a *brain-based disorder*, and as a disorder that is strongly genetic despite that, to date, no single or small number of specific genes appears to be strongly associated with Autism.
- Autism (Spectrum Disorders) should be viewed as a “genetically influenced, systemic problem” rather than a “strongly genetic, brain-based” condition.
- Autism (Spectrum Disorders) is *a behavioral syndrome with a biological basis and systemic features influenced by genes and gene-environment interactions*.
- At present, the closest we can come to an underlying common mechanism in autism (Spectrum Disorders) is some kind of abnormality in brain connectivity – i.e. the structural and/or functional factors related to brain connections and coordination – that eventuates in observable behaviors.
- Autism (Spectrum Disorders) happens when pervasive processing abnormalities are severe enough that brain dysfunction crosses a threshold to produce processing alterations that manifest as the set of defining behavioral deficits.
- Autistic (Spectrum Disorders) behaviors are consequences of widespread processing and connectivity abnormalities that preferentially target mental functions with a strong requirement for coordinated activity.
- Connectivity problems lead to deficits in specific and distributed brain systems, such as those participating in language, reward and face processing.

- Behaviors may represent secondary compensations for or responses to sensory and processing challenges.
- Somatic symptoms (such as GI, allergy/immune problems, sleep problems, etc.) may be integrally related to other defining symptoms and both are likely to derive from the same or related underlying pathophysiology.
- Both somatic and defining symptoms are manifestations of signaling and metabolic derangements that may have widespread effects.
- Regressive autism (I didn't know if you wanted to be consistent in what you wrote, versus quotes, to have Autism capitalized) may be a consequence of cumulative alterations based on metabolic changes possibly related to an accumulation of environmental exposures or stressors that reach a tipping point or threshold beyond which brain connectivity decompensates.
- The encephalopathic features of autism (Spectrum Disorders) may rest on chronic tissue abnormalities (processing and connectivity problems) and maladaptive processing patterns that may be treatable and even reversible.
- Biomedical treatment targets may be found in any pathway or pattern that contributes to degrading tissue, connectivity and/or processing.
- Altering behaviors may be aided by changing the nature of information processing through therapies that challenge sensory or social-emotional networks.

The previous points are taken from a 2005 paper in Clinical Neuropsychiatry, by Dr. Martha R. Herbert entitled AUTISM: A BRAIN DISORDER, OR A DISORDER THAT AFFECTS THE BRAIN?

- Newly emerging theories of neurological functioning in autism are highlighting interregional anatomical and functional connectivity as the likely key feature of the pathophysiology.
- The Underconnectivity Theory proposes that autism is a cognitive and neurobiological disorder associated with underfunctioning of integrative circuitry, resulting in a deficit in integration of information at the neural and cognitive levels.
- The term functional connectivity has been used to describe the interdependence of functionally related brain regions. The synchrony of the blood flow fluctuations in the functionally related brain regions implies the existence of neuronal connections that facilitate coordinated activity. Functional connectivity between two brain regions is

assessed as the correlation between pairs of measurements of cerebral blood flow (PET) or blood oxygenation level (fMRI).

- The functional connectivity hypothesized to be most affected by autism was between frontal and parietal areas.
- Normal brain function has been construed here as a collaboration of a confederation of processing centers. The new fMRI and MRI findings suggest that in autism, the confederation is loosened or underfunctioning.

The previous points are taken from a 2006 paper in *Cerebral Cortex*, by Dr. Marcel Just entitled, FUNCTIONAL AND ANATOMICAL CORTICAL UNDERCONNECTIVITY IN AUTISM: EVIDENCE FROM AN FMRI STUDY OF AN EXECUTIVE FUNCTION TASK AND CORPUS CALLOSUM MORPHOMETRY

- The cerebellum is involved in the regulation of emotions, language and cognition. Cerebellar pathology has been described in patients with autism and ADHD, suggesting that some mood and cognition deficits could be attributed to cerebellar abnormalities. **The Cerebellum, 2003: 2 pp 62-70**
- Neuropathological abnormalities of the cerebellum have been a consistent histopathological finding in autism. Reduced Purkinje cell counts are most prominent in the posterolateral cerebellar hemispheres and adjacent archicerebellar cortex.¹ Abnormalities in the inferior olive and fastigial nuclei have been reported, which are input and output structures of the oculomotor vermis (lobules VI and VII).¹⁻³ Some magnetic resonance imaging (MRI) studies have reported altered volumes of vermal lobules VI and VII.^{4 5} The cerebellum is crucial for eye movement control.^{6 7}
- Purkinje cells in the hemispheres and vermis optimize saccade accuracy by influencing the onset and offset of saccades.⁸⁻¹⁰ Markedly hypometric and hypermetric saccades are seen immediately after cerebellar lesions.^{11 12} While overall saccade accuracy typically improves gradually after cerebellar lesions, increased variability in saccade accuracy often persists after posterior vermis lesions.^{12 13} Thus, increased variability of saccade accuracy may provide a useful index for neurodevelopmental abnormalities of the cerebellum associated with autism.
- Dysmetria of saccades is commonly seen after cerebellar lesions. Acute lesions and inactivation of the cerebellar vermis and caudal fastigial nuclei result in gross hypometria and hypermetria, respectively. However, because cerebellar pathology in autism is neurodevelopmental

The previous points are taken from a 2004 paper in *J. Neurol. Neurosurg. Psychiatry*, by Dr. Y Takarae, N J Minshe, B Luna and J A Sweeney, OCULOMOTOR ABNORMALITIES PARALLEL CEREBELLAR HISTOPATHOLOGY IN AUTISM

- Broadly speaking, there are two forms of attention—focused/sustained attention, as required in recognizing objects or patterns, and visual-spatial attention, or the ability to move attention fluidly through visual space. Focused/sustained attention has been researched extensively, in part because it has been implicated in attention deficit disorder (with or without hyperactivity; ADHD/ADD): children with ADD/ADHD have difficulty focusing and sustaining attention, as required, for example, in detecting an object or figure embedded among several others (Campbell, 1973). In contrast, people with autism are actually superior to typical controls at detecting embedded figures (Shah & Frith, 1983; also see O’Riordan, Plaisted, Driver & Baron-Cohen, 2001, for evidence of superior feature detection). Such findings are consistent with evidence of overly focused attention in autism (Rincover & Ducharme, 1987), and with anecdotal reports of good pattern recognition (e.g., strong matching skills and hyper-sensitivity to disruptions or changes in pattern).
- Brain differences include: smaller cells in the limbic system (Bauman, 2001); abnormal interaction between frontal and parietal brain areas (Pavlokis, 2001), larger brains due to more growth in grey and white matter during the first three years of life (Courchesne, 2001); fewer Purkinje cells in the cerebellum (Courchesne, 2001); different activation of the fusiform gyrus for facial recognition (Pierce, 2001);. EEG brain maps show less activation in the areas of the right hemisphere that process emotional information (unpublished data from Gunkleman).
- Is there a single brain structure or system that could produce secondary malfunctions in all these other structures and systems? What region is consistently abnormal in autistic brains? So far, the most consistent neuropathological abnormalities have been found in an area which no one would have considered until recently: the cerebellum.
- While the most noticeable and diagnostic characteristics of autism are cognitive in nature (e.g., impaired social interaction and communication, restricted range of interests, [American Psychiatric Association, 1992], a number of motor abnormalities have also been noted, although they receive relatively little attention clinically and scientifically. For instance, autistic children are universally dyspraxic [Jones & Prior 1985], and manifest disturbances of gait [Vilensky & al. 1981] which persist, to some extent, into adulthood [Hallett & al. 1993]. Motor anomalies are clear enough that Adrien & al. [1992] found that blind raters were able to differentiate autistic children from normal children on the basis of mobility and other factors appearing in home movies taken before autism was suspected. In a more recent study using a battery of tests taken from a standard neurological exam, Haas & al. [1996] found that autistic patients showed abnormalities indicative of cerebellar and parietal lobe dysfunction, but did not show significant abnormalities on tests of pyramidal motor and cranial nerve abilities.

Furthermore, classical eyeblink conditioning, a hallmark of cerebellar functioning, is abnormal in autism, both in the amplitude and latency of conditioned responses and in the rate of extinction [Sears & al. 1994].

- Autism is a pervasive neurodevelopmental syndrome mainly characterized by poor social communication, inadequate response to others' emotions, and stereotypic and obsessional behaviors (1). Individuals with classic autism also have delayed language development and, in most cases, mental retardation or learning disabilities; people with Asperger's syndrome, on the other hand, present no history of significant language delays or abnormalities and have normal or superior intellectual abilities, but still show impairments of social interaction. **THE FUNCTIONAL NEUROANATOMY OF AUTISM - Functional Neurology 2004; 19(1): 9-17**
- It has been suggested that structural and biochemical abnormalities in neural networks involving the fronto-temporo-parietal cortex, limbic system, and cerebellum underlie the pathophysiology of autism **BRAIN ANATOMY AND DEVELOPMENT IN AUTISM: REVIEW OF STRUCTURAL MRI STUDIES**. Brain Res Bull 2003; 61:557-569 Brambilla P, Hardan A, di Nemi SU, Perez J, Soares JC, Barale F.

In conclusion, every person is unique and must be evaluated and treated individually. That is our goal at The L.I. Spectrum Center. Both the evaluation and treatment protocols are time consuming and intensive, but isn't your child worth it?