

THE AUTONOMIC NERVOUS SYSTEM, SENSORY DISORDERS AND ASD

Regaining homeostasis and self-regulation...

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Over the last few years in my practice, I've seen a significant rise in the use of psychotropic drugs in the treatment regimens of children with ASD. While these medications can sometimes help with severe behavioral issues, there are a few physicians who have started digging deeper for root causes of extreme behavioral manifestations. The most greatly affected are children with limited language and communication abilities along with severe sensory processing challenges. Unable to verbally express feelings, emotions and possibly sensory symptoms that are unpleasant and distressful to their system in general, the children lash out behaviorally. I've been blessed with being able to train with great minds and great physicians like Dietrich Klinghardt, Aristo Vojdani and Thomas Rau and would like to share with you what I've learned so far.

A BRIEF OVERVIEW

The human nervous system is divided into the central nervous system and the peripheral nervous system (PNS).

- ▶ In turn, the PNS is divided into the somatic nervous system and the autonomic nervous system (ANS).
- ▶ The ANS contains the sensory and motor neurons that “innervate”—those are woven into and guide—the internal organs and the digestive tract.

The ANS plays a major role in the regulation of behavior to maintain a steady internal environment in response to changing external conditions. The ANS is divided into the sympathetic, parasympathetic, and enteric nervous systems. This article focuses on the first two of these, but briefly, the enteric system pervades our digestive tract and has enough autonomy that some scientists call it a “second brain.”

The ANS is responsible for maintaining the equilibrium of our vital functions: breathing, heartbeat, glandular secretions, salivation, and perspiration. On autopilot, it's directed by the brain stem and spinal cord. It carries out its responsibilities through three kinds of nerve assemblies:

- ▶ **Sensory** These bring information in, and are called “afferent.”
- ▶ **Decision-makers** These process sensory information and decide what to do.
- ▶ **Motor** These carry out the plan of the decision-makers by sending instructions throughout the body; they're called “efferent.”

The sympathetic nervous system conducts activities of wakefulness and alertness. It is involved in fight or flight, where energy is reserved and used for defense. Dysfunction in this system appears as nervousness, stress, and anxiety with triggers including excitement; emotions of fear, anger or elation; prolonged or chronic stress; extreme exercise; extreme cold; or when life is endangered.

The parasympathetic nervous system generally conducts activities of the night (rest) and digestion. It is involved with healing, regeneration, nourishment and elimination. Dysfunction appears if this system gets “too relaxed”, with lethargy and fatigue setting in.



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UNDERSTANDING ANS DYSFUNCTION

The literature reports atypical responsivity to sensory stimuli may be as high as 95% in individuals with ASD. What we now know is that these sensory symptoms may be far worse than just a feeling of discomfort with clothing, certain foods, certain sounds, bright light and motor challenges. Some children actually experience increased heart rate, possibly palpitations, feelings of dizziness, nausea, and feelings of impending doom. It's like a panic attack, and they're unable to find words to communicate those feelings or correctly identify the symptoms.

It is now appreciated that ASD can produce symptoms linked to various organ systems when severe sensory processing challenges are present. A few examples would be unexplained constipation or diarrhea, urinary retention, bed wetting, cold and clammy extremities, sleep disturbances, digestive difficulties, very picky eating, visual field defects, and many of the ANS imbalance symptoms mentioned above. These suggest underlying autonomic nervous system challenges.

Signs of sympathetic hyperfunction include: inability to relax, over-alertness, inner tension, jitteriness, sleeplessness, restlessness, fast metabolism, hyperthyroidism, cardiac arrhythmia (tachycardia), diarrhea, sweating, trembling, headache, irritable colon, wide pupils, damp and pale skin, and high blood pressure.

Signs of parasympathetic hypofunction include: loss of interest, tired face, tendency to sleep due to tiredness and exhaustion, sluggishness, adrenal fatigue, slow metabolism, constriction of the lungs and asthma, hypothyroidism, constipation, cramps of the inner organs (bladder, gallbladder, intestines), migraines or tension headaches, eczema, narrow pupils (miosis), dry skin, gastric ulcers and low blood pressure.

The physiological systems seem to be unable to calm and rebalance these changes resulting in a prolonged stress response which in turn leads to stress on the adrenals and immune system.

When the immune system is affected, and combined with the underlying comorbid issues that exist in most children with ASD (heavy metal toxicity, chronic infections, nutri-genomic afflictions, leaky gut, and neurotransmitter imbalance to name a few), it tends to manifest with one or more of the three As of immune dysfunction:

- ▶ Anergy
 - Molecular mimicry (PANDAS/ PANS)
 - Hypercoagulation
 - Scar interference fields
- ▶ Allergy
- ▶ Autoimmunity

THE ANTI-INFLAMMATORY VAGAL PATHWAY

The Vagus nerve is the primary nerve of the parasympathetic nervous system. Disturbance of the inflammatory response in the human gut tissues is important in several clinical diseases including ASD. In the last few years, a new anti-inflammatory pathway has been discovered involving the autonomic nervous system. Several studies have shown that stimulation of the ANS can actually serve to dampen the inflammatory response and prevent loss of gut barrier integrity. In this way, activation of the autonomic nervous system can potentially prevent and even ameliorate inflammation-based complications in ASD like PANDAS, neuro-borreliosis, apraxia and more.

Because the immune and nervous systems closely interact, it is likely that inflammatory diseases have a nervous as well as an immune component. An understanding of these interactions could help in the development of new therapeutic strategies.

Scientists in the field of sensory processing have been researching into the effects of autonomic nervous system dysfunction in certain children with ASD and sensory processing disorders (SPD).

Psychophysiological research conducted by pioneers Dr. Roseanne Schaff and Dr. Lucy Miller suggests that children with SPD have difficulty regulating responses to sensory information as reflected by functions of the autonomic nervous system. These deficits and imbalances have been clinically measured in children with SPD and ASD.

High parasympathetic activity is associated with self-regulation, homeostasis, and the ability to adapt to changing stimuli. Children with sensory processing impairments have decreased vagal tone (low parasympathetic activity) when presented with sensory stimuli. According to Miller, this is consistent with previous research that shows a relationship between impaired parasympathetic functioning and developmental delays or emotional and behavioral over-reactivity.

The results from various studies conducted suggest that a compromised parasympathetic system may disrupt the individual's ability to achieve a calm and focused state of mind in the face of various challenges, transitions, and changes encountered in daily life and, by inference, affect activity participation, mood, behavior, appetite, etc.

NEUROGENIC SWITCHING

Neurogenic switching is a phenomenon in which the parasympathetic, sympathetic, or both systems are operating *opposite* to what is necessary for optimum function. The best way to determine if switching is present is to use a Heart Rate Variability (HRV) test with the patient in both the lying and standing positions. In neurogenic switching,

IMMUNE SYSTEM STRESS

When the immune system is stressed, it tends to override the nervous system. So, unless the immune system is supported, even corrected, it's nearly impossible to achieve any *permanent* balance in the nervous system. Next, clinically, it has been shown that in order to sustain long-term healing, the autonomic nervous system needs to be regulated and balanced. This regulation leads to improved sleep, detoxification, better well-being and what Pischinger describes as "better functioning of the milieu".

instead of the parasympathetic nervous system going down from lying to standing, it goes up. In essence, it regulates in the opposite direction of what it is supposed to do; hence, the term “switching”. This is also called parasympathetic *up regulation*. If, on the other hand, the sympathetic nervous system goes down from the lying to the standing position instead of going up, this is referred to as sympathetic down regulation or switching. Both the parasympathetic and

sympathetic systems may also do the opposite of what they are supposed to do; this is called a *double switch*.

When the body’s deep regulatory abilities have been altered, evaluating for these very basic regulatory processes, and detecting alterations in these processes, is critical for healing the mind and the body.

Neurogenic switching is also proposed as a hypothesis for a mechanism by which a stimulus at one site can lead to inflammation at a distant site. Neurogenic inflammation occurs when substance P and other neuropeptides released from sensory neurons produce an inflammatory response, whereas immunogenic inflammation results from the binding of antigen to antibody or leukocyte receptors. There is a crossover mechanism between these two forms of inflammation. Neurogenic switching is proposed to result when a sensory impulse from a site of activation is rerouted via the central nervous system to a distant location to produce neurogenic inflammation at the second location.

ANS IMBALANCE TREATMENT PLAN

Dr. Klinghardt often talks about looking at seven factors before establishing a treatment plan for ANS imbalance:

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| 1 Toxicity | 4 Geopathic or biophysical stress | 6 Allergies and sensitivities |
| 2 Biochemical and nutritional deficiencies | 5 Bioenergetic interference fields | 7 Unresolved psycho emotional conflicts. |
| 3 Structural problems | | |

In addition, Dr. Klinghardt is also specific about the 5 levels of healing that will have to be addressed in the right order or concurrently to achieve maximum sensory and autonomic self-regulation. The best results are reported when the entire family of the child with ASD addresses their issues at all five levels of healing the body. These are the physical body, the energy body, the mental body or consciousness, the intuitive body or subconscious mind, and finally the spiritual body. The proverbial “mind, body and spirit” have to be addressed as a whole by the entire family to help a child with ASD achieve his or her full potential.

Do consider these often overlooked factors:

- ▶ Electro Magnetic Frequencies
 - Toxic body compartments cannot be patrolled by immune cells and become a breeding ground for microbes which leads to increased toxins—vicious cycle, plateaued and ill patient.
 - Electromagnetic radiation (EMR) drives the growth of microbes and molds which in turn put out far more virulent toxins/ mycotoxins.
 - Infants do not have a blood brain barrier until 18 months of age and are very vulnerable to EMR. Even teens are far more sensitive than adults.
- ▶ Sensory tolerance threshold is bio-individual. Custom protocols work best.
- ▶ Support any methylation defects: polymorphisms and enzyme deficiencies.
- ▶ Toxins interfering with proper neurotransmitter production.
- ▶ Inflammation can jam certain neural pathways needed for proper signaling within the complex network of the brain and ANS.
- ▶ Structural problems can distort membranes, pinch lymphatic vessels, and narrow nutrient delivering arteries.
- ▶ Mold, and mycotoxin, exposure.
- ▶ Biotoxin-producing intestinal infection.
- ▶ Toxicity from root filled teeth.
- ▶ Adrenal fatigue.

Without correction of the nervous system (inhibitory/excitatory balance), there is no guarantee of a healthy immune system.

Without correction/support of the immune system, there can be no permanent balancing of the nervous system to achieve autonomic homeostasis.

LIFESTYLE TIPS TO MAINTAIN ANS HOMEOSTASIS

- ▶ Practice good sleep habits and get between eight and nine hours of sleep each day.
- ▶ No TV or computer/screen time two hours before bedtime.
- ▶ 30 minutes of aerobic exercise four to five times a week.
- ▶ Engage in mental exercise by trying new skills and information.
- ▶ Avoid exposure to chemicals in skincare, hair care, food.
- ▶ Build positive relationships, practice clear communication, cooperation and forgiveness.
- ▶ Listen to good music or better still, sing and play an instrument.
- ▶ Slow down.
- ▶ Have a nap in the middle of the day, even if it’s just 10–20 minutes.
- ▶ Spend time in nature 45–60 minutes three to four times a week.

CASE STUDY: LIAM'S RASH

Liam was diagnosed with autism at 2.8 years of age. Mom has tried all treatments including DAN! Protocols, GF/CF diet etc., all with minimal improvement and no gains in language. About 1.5 years ago, Liam suddenly developed a severe rash on large areas on back of neck, both elbows, back, behind ears, and groin. The rash was minimally responsive to antibiotics, steroid creams, systemic steroids, and dietary modifications. Liam was suffering, very uncomfortable, and terribly itchy. As a result, he became aggressive and unhappy and the rash kept flaring up quite frequently.

Dr. Dashore performed a thorough neuro-sensory assessment, Autonomic Response Testing (ART), Heart Rate Variability Analysis (HRV) and requisite lab tests were performed by the treating pediatrician. Liam was found to have underlying viral infections and Lyme disease. He also was in sympathetic overdrive with a low vagal tone which implies low parasympathetic functioning. He was therefore unable to calm down, self-regulate, and heal, both internally and externally.

A neurotoxin elimination protocol (Klinghardt approach) was then implemented for Liam along with therapeutic protocols for detox organ support, leaky gut strategies, heavy metal detox, nutritional therapies using the principles of homeopathy, homotoxicology, herbal remedies, neuro-biofeedback, singlet oxygen therapy from Sweden, and sensory integration. The GF/CF diet was maintained with the exception of 2 to 4 oz. of camel milk a day. The most important intervention was working on his parasympathetic nervous system to help calm down his physiological over-response and bring his internal system away from the perception of constant stress.

There was a dramatic improvement in rash status in two weeks! There was decreased inflammation, decreased oozing, decreased irritation and itch and overall, the rash began to heal; the wounds started to

close in from the edges. The healing properties of his therapies, including camel milk, were now working as his body was able to stay calm and process the benefits.

A month later, Liam started saying “ma” for his mom in the right context and was beginning to make many sounds, pointing, and communicating appropriately with his mother. He was able to play a hide-and-seek game with Dr. Dashore, was tolerating therapies much better, had improved focus, improved motor coordination, and had a greatly improved mood.

Liam's rash has now almost completely healed. He no longer has aggressive behaviors, demonstrates improvement in spatial awareness, social interaction with sibling, interacts with the family dog, is always smiling, is a good listener as per mom, has gained weight, has a good appetite, and excellent bowel movements.

Mom's recent email reads: “At our last appointment we noticed Liam's speech had improved. He was able to tell us ‘this one’ when he needed help with something and ‘let's go’ when we were getting ready to go out. He was also spelling small words for us like car, bus, cat, hat, juice. I was going to report to you at our appointment next week Liam's interest in his older brother and what he's doing has started. He is now watching him and wanting to do some of the things he's doing like the same potty routine, watching the same shows, looking at the same toys, even sitting down for homework—he's observing his brother. His speech is still not consistent, but he hasn't lost anything of the things he's gained!”



ACHIEVING THE OFTEN ELUSIVE ANS BALANCE

Internal well-being and overall health can depend directly on the proper functioning of the autonomic nervous system. During any prolonged stress, the ANS becomes overactive and may lead to dysfunction or organic pathology of either the parasympathetic or sympathetic nervous system, or both.

Behind most chronic conditions we see today, you can find a dysregulated and unbalanced ANS. The trigger of the initial stages of dysregulation is often a physical or psychological stress, which can perpetuate a negative feedback pattern of continued autonomic dysfunction. The key to re-regulation lies in both resolving enduring stressors (emotional, infectious, epigenetic, vaccines, or otherwise) and rebalancing the sympathetic and parasympathetic nervous systems.

Ancient Chinese medicine teachings also talk about a “Yin” and a “Yang” state and the importance of mutual balance between these two states in order to maintain

peaceful harmony in the body's internal processing. Biomedical practitioners learn to recognize these states in a patient. Research tells us that macrophages and natural killer cells are turned on in Yang states (sympathetic dominant), and the detox functions of our organs are switched on only during the rest phase—a “Yin”—or parasympathetic dominant state.

If a therapist aims to rebalance the autonomic function, allowing the body to return to “automatic” regulation, they hold a powerful tool towards well-being and health for their patients. Whether used independently or in combination with other therapies like sensory integration, neuro bio-feedback, microcurrent therapies, phospholipid therapies, laser field restructuring, and perceptual reframing.

In order to get the patient well, the therapist needs to be able to identify which system needs to be addressed. If multiple branches of the same system are affected to varying degrees, then the clinician should be able to prioritize treatment accordingly. ◀