

The dentist's role in the treatment of autistic children and sleep disordered breathing

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Editor's note: Having conducted an interview with Dr. Leonard Kundel about children on the autistic spectrum and reasons for poor sleep, there was agreement on the importance of emphasizing that the ever growing number of children diagnosed on the autistic spectrum were children first and foremost. This was also true of children with any non-neuro-typical, genetic or traumatically induced physical, mental, chemical or intellectual disabilities. They are all children first. And, as is true for all humans, big and small, there is the frequent unfortunate occurrence of comorbidities. A wholistic approach evaluating children is the most effective route to discern the root causes of a problem and what treatment protocol will best ameliorate some, if not in some cases, all of their symptoms as was documented by a mother of a young man with behavioral issues in the moving video entitled *Finding Connor Deegan*.¹ This last commentary is a segue to Dr. Cantwell's manuscript, "The dentist's role in the treatment of sleep disordered breathing."

Breathing disordered sleep or sleep disordered breathing - which comes first, the chicken or the egg? Is sleep so poor that breathing is compromised or is one sleeping poorly because breathing is compromised? Both sides of the coin are valid. If the body must struggle to move air in and out, whether it's due to a pulmonary disorder, thoracic spine/rib restriction or an obstructed airway due to enlarged tonsils and adenoids, chronic inflammation (allergies), hyoid displacement or a malformed palate or a tongue tie or tongue size,^{2,4} then essentially "nothing will be right." How can it be? If someone is drowning, no amount of psychotherapy nor nutritional supplements will save them. They need a life vest! If breathing becomes easier, the body can function normally. There is an inherent wisdom in the body which is about checks and balances: what is okay and what is not okay? If there is even a small amount of difficulty in obtaining oxygen, behavior will change based on the adaptive capacity - some people can handle the challenges and adapt readily and some fall into distress much more quickly.⁵

The skeletal structures of children since industrialization have become less well developed. The cranium and orofacial structures are not growing ideally lacking the stimulus of early introduction to "hard" textured foods which triggers chewing, lateralizing food between the molars with the tongue and swallowing. Proper swallow becomes compromised early in life when parents prematurely introduce spoons, usually at around six months, when the throat anatomy is not yet mature enough to accommodate an adult-like swallow. This continues with the introduction of nourishment through sucking conduits such as bottles, sippy cups, straws, and food pouches. When a problem is noted, the child is prescribed feeding, speech or myofunctional therapy and their aberrant swallow is overlooked and remains undiagnosed, therefore never addressed and corrected. Proper swallow provides a coherent message to the brain guiding growth and development. In the author's opinion, children of the last several generations appear to be suffering from "the disease of the aristocracy." Parents strive to do everything for their children in the name of good

parenting - children have little need to struggle to survive. Foods are soft and less nutritious. Muscles do not load on bones, therefore bones do not respond to the stimulus and grow optimally. Children are attached to pacifiers, are thumb suckers, tongue thrusters, mouth breathers and are generally unhealthy (plagued by allergies, chronic ear infections and sinusitis, gastrointestinal issues and obesity, to name a few health concerns). Tongue and other muscles of mastication must provide a coherent message to the brain and then to the jaws and surrounding bones (directly or indirectly) how to grow in size, density, position and shape.⁶

Parents who pay attention to nutrition often observe that their child's overall development improves with better nutrition. This may be related to the quality of the food (minerals and other nutrients), but also to the density and texture of the foods. "Baby Led Weaning" has been popularized to return to the act of masticating hard foods, avoiding infantile oral behaviors and promoting proper oral motor skills and craniofacial development.⁷ There is no one ideal approach but this offers a combination of optimizing function (masticating/swallowing) and nutrition (healthy food; bountiful nutrients/minerals). Children wind up having deficient airways because of poor osseous structural development) and have the "dis-ease" of breathing which increases their sympathetic tone. These children do not go into REM sleep and as a result their behaviors make life for everyone around them difficult because they are sleep deprived and do not know how to manage it or modulate themselves. This is true of neurotypical children as well as children on the spectrum (and just as true for their parents if they are sleep deprived because their children do not sleep!). Studies have been conducted worldwide to evaluate orofacial dysfunction and sleep disordered breathing in school age children, including recommendations for dental and orthodontic practitioners to evaluate this in every child they examine.^{8,9}

On a molecular level, metabolic problems like poor iron intake or absorption (either they "don't eat it, don't absorb it and don't retain it") and low ferritin levels result in poor

capacity to oxygenate muscles. The association between low iron and sleep disordered breathing (SDB) in children has not been clearly elucidated. Iron deficiency is associated with pediatric sleep disturbances, in particular, restless leg syndrome (RLS) and periodic limb movement disorder (PLMD). Correction of iron deficiency has been shown to improve sleep disordered breathing in certain adult populations.¹⁰

Another reason for poor iron absorption can be due to an imbalance in the microbiome where pathogenic bacteria are using up all the iron in the gut for its own survival leaving none for the child to absorb resulting in the perpetuation of the symptoms caused by the pathogenic bacteria as well as the failure to increase their blood's ability to carry oxygen to the muscles.^{11,12} The end result can be problems with sleep wake transition or a more common occurrence of muscle cramping, particularly noticed in the legs coined "restless leg syndrome" which manifests as subclinical shaking and a body that is in constant movement in sleep. When this is happening, the brain cannot rest and breathing is compromised.^{13,14} A study published in 2007 by Dosman demonstrated that seventy-seven percent of the autistic children that participated had restless sleep at baseline, which improved significantly with iron therapy, suggesting a relationship between sleep disturbance and iron deficiency in children with autism spectrum disorder.¹⁵

Lack of Vitamin D, lack of magnesium and other essential minerals all play a role in changing the chemistry of our bodies which is reflected in how well does our body function daily. Children on the autistic spectrum often suffer from aversion to foods due to taste, texture, or color. This leads to nutrient deficiencies that need to be detected and addressed.¹⁶

Although not necessarily coming from an airway perspective, the book, *WHY WE SLEEP*, authored by Matthew Walker, MD, includes statistics on how sleep affects our performance. Walker defines our youthful society as more of an under-slept generation – early school, blue light and lots of screen time, not enough sleep resulting in mood changes, differences in perception, muscle tension and causing restricted range of motion. Children often hyperventilate when stressed (shallow breathing and over breathing). Clinically the patients are often breathing too much, or they are breathing incorrectly.¹⁷ Patrick McKuen – foremost teacher of Boteyko breathing teaches we are breathing too fast and too often.¹⁸ In his famous book *BREATH*, James Nestor writes in an easy-to-understand manner about how breathing incorrectly changes our life and technics how to correct our breathing and improve our overall health.¹⁹

Another book written in the 50's-60's by Dr. Alfred Fonder titled *The Dental Physician*, contributes some interesting

observations on the interrelationship of the very sensitive temporomandibular joint and the autonomic nervous system (another "player" in the sleep/wake cycle as well as ability to adapt or cave under stress).²⁰ Fonder was a dentist working and teaching at the university of Chicago and was 50 years ahead of his time. Only now are we beginning to appreciate his brilliant, far reaching jaw concepts and his teaching about how jaw posture affects head and neck posture and spinal posture. He proposed that the mouth is essentially a powerful nervous system that is totally underappreciated by dentists, medical doctors, osteopaths and chiropractors alike. If someone had headaches, they might have been better off having utilized Fonder's approach of jaw balancing than pursuing a pharmaceutical program once any serious pathology was ruled out. Fonder wrote extensively about "dental distress syndrome" hypothesizing about the mouth and TMJ's affect on the entire body.²⁰

The Central Nervous System (CNS) has allocated a certain amount of resources to deal with sensory information being received whether that be pain or a physical stressor (for example reduced oxygen intake as a result of airway compromise). It has to pay attention to that particular situation (reduced oxygen) and goes into survival mode, and as a result, other critical physiologic functions suffer. For example, poor development of the prefrontal cortex, therefore executive function, a healthy microbiome and gastrointestinal function or the ability to learn attend to instructions are only a few of the problems children in our culture, as well as children who have been diagnosed on the spectrum suffer from that might be related to airway dysfunction.²¹

In his book, Fonder documented for example, how someone's health improved when they realigned the jaw's temporomandibular joints (TMJ). He discusses how we all have adaptive capacity with room for error. The TMJ can be slightly off but if "too off" problems as simple as neck tension to as severe as psychosis may occur. Fonder conducted an experiment with women who complained of head and neck pain/TMJ pain. He recorded their symptoms and then began to change their bite demonstrating a reduction in symptomatology, including surprisingly, psychosocial issues and genitourinary problems (again, issues often shared by the autistic child and adult).²⁰

Fonder relates another case report of a male child with a diagnosis of Down syndrome, a genetic diagnosis of a developmentally delayed child (13-year-old at the level of a 5-year-old); they utilized dental devices (braces, expanders) and they readily expanded his palate to see what would change. With the resultant craniofacial development that occurred over a matter of several months of wearing the appliances, the 13 year's behavior matured to an appropriate level. Their hypothesis was that he improved so much because

the pituitary gland was able to function more appropriately because of the shift in the cranial bones with the expansion of the palate. They did not consider improvement in respiratory function which would contribute to appropriate oxygenation of the prefrontal cortex encouraging neurologic maturation. Then, for an unknown reason, they abandoned the treatment, and everything regressed. As the expansion receded and the cranial bone positions reverted, his behavior regressed to that of a 5-year-old.²⁰ Since then, other papers have been authored about sleep-disordered breathing in the pediatric setting in a variety of genetic disorders as well as elucidating the genetic markers for the potential for sleep disordered breathing in both neurotypical and neuroatypical children.²²⁻²⁴

During sleep, neuromuscular tone supports a patent airway for breathing. A decrease in tone, or mechanical obstruction from adenoid and tonsil hypertrophy, craniofacial underdevelopment or segmental dysfunction or soft tissue imbalance can result in a tendency for the upper airway to collapse resulting in reduced air flow (which can cause oxygen desaturation) and arousal (bruxing, grinding, night terrors, waking to feed) resulting in fragmented or lack of restorative sleep which can result in failure to thrive, behavioral problems, inattention, aggression, restlessness, depression and cardiovascular problems.²⁵

Inverventional orthodontics will often be recommended to promote proper bone growth and support a airway. Back in Fonder's day, dentists were not yet using more functional appliances that are available today, nor did they use "oral orthotics" to build up the bite. Rather, they used graded fillings (mercury fillings, no less) to build up the bite. Nowadays, the dentist or orthodontist will take an x-ray, assess the architecture and the mechanics of the TMJ and project where the jaw joint should be and correct the position of the lower jaw with a dental appliance. Today's dental appliances range from both traditional or newer functional metal devices to those made of a variety of plastics (or combinations thereof). The patient is then re-x-rayed to confirm the corrected position of the TMJ. This alignment correction's goal is to reduce the firing of the CNS and the patient should be relieved of symptoms of high sympathetic tone (migraine, tension headaches, neck pain, sleep disruption, behavioral aberrations).^{8,26,27,28}

Dentists can play a significant role in the early detection of some craniofacial causes for sleep disordered breathing. Including the dentist as a member of the multidisciplinary team in the early evaluation of children for any of the wide variety of causes of these airway issues that might disrupt sleep should not be underestimated.^{8,9,28,29}

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