

Treatments FOR THOSE ON THE AUTISTIC SPECTRUM

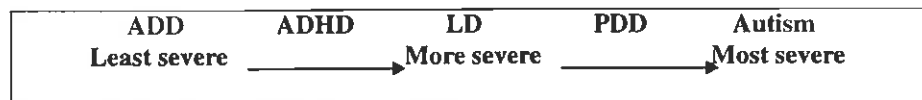


Figure 1. The Continuum of Disorders

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ABSTRACT

Recent research indicates that there is a continuum of disabilities ranging from mild to severe, with like causes and treatments, entitled the "Autistic Spectrum of Disorders." Included in this are attention deficits, learning disabilities, pervasive developmental disorders and autism. Some recent treatments address, rather than mask causes. These include structural remedies such as osteopathy, cranio-sacral therapy; treatments that boost the immune system, such as dietary modification and nutritional supplementation; and those that enhance sensory processing, such as occupational therapy.

KEY WORDS

allergies, amino acids, attention deficit disorder (ADD), attention deficit hyperactivity disorder (ADHD), auditory training, autism, allergies, antibiotics, casein, chiropractic, cranio-sacral therapy, fatty acids, gluten, homeopathy, immune system, learning disability, occupational therapy, osteopathy, pervasive developmental disorder (PDD), probiotics, Ritalin, sensory integration, special education, vaccines, vision therapy, vitamins.

In 1996 in this Journal,¹ I introduced the concept of a continuum of disabilities from attention deficits to autism, named the "autistic spectrum." Attention deficit disorder (ADD) and ADD with hyperactivity (ADHD) lie on the least severe extreme, while pervasive developmental disorders (PDD) and autism are more severe manifestations. Learning disabilities (LD) and behavioral problems are in the middle. (See Figure 1) Optometrists were urged to participate in the multidisciplinary team when evaluating and treating these patients. They were encouraged to focus history taking on possible contributors such as birth or other physical trauma; reduced immune system function as evidenced by allergies, frequent illness and systemic yeast infections; over-exposure to antibiotics, reactions to immunizations, as well as genetic and other congenital problems. This article should be viewed as a continuation of the earlier one with a look at treatments that address the causes rather than the symptoms of these disorders. Reading the first article will provide a context for understanding this one.

TRADITIONAL TREATMENTS

Traditionally, treatments for disabilities on the autistic spectrum have focused on psychological, neurological and educational issues. Until recently, medications, special education and counseling, including the use of applied behavior management, have comprised the first line

multi-disciplinary approach recommended by physicians, mental health professionals and educators. The ultimate goal is to eliminate undesirable behaviors such as reduced attention, hyperactivity, perseverative mannerisms and impulsivity, while increasing desirable outcomes such as relatedness, eye contact, self-control, attention span and confidence. Although these treatments certainly have palliative affects, especially when used in conjunction with working with the visual system, they do not address some of the basic physiological difficulties.

Medications

Since they were introduced sixty years ago, medications for behavioral and learning problems have become more specialized and powerful. At the present time, there are five classes of drugs being prescribed for children on the autistic spectrum of disorders.

First are the psychostimulants such as Ritalin, Dexedrine, Cylert, and ADDerol. At first it was thought that stimulants had a paradoxical effect by calming and alleviating undesirable behaviors. It was then found that these drugs effect dopamine and thus stimulate the part of the brain that monitors the arousal system, resulting in better regulation.²

Second are anti-depressants such as Prozac, Imiprimine, Anafranil and Wellbutrin. These affect serotonin and other neurotransmitters and thus appear to re-

duce anxiety and resultant socially inappropriate behaviors.

Next, anti-hypertensives, such as Clonidine and Tenex, lower blood pressure, and are used for calming and to improve sleep. Anti-convulsants are frequently used now to calm behavior even in the absence of seizures or spiking on the EEG.

Finally, anti-psychotics are being used increasingly to lessen undesirable behaviors such as agitation, hallucinations and aggression. Often these classes of medications are used together to balance out each other's side effects, sometimes with disastrous results. For instance, Ritalin can cause sleeping problems, so Clonidine may be added to induce sleep.

Recent media reports show a rather sharp increase in the use of medications, especially Ritalin, and speak to misuse of this drug as a result of overdiagnosis.³ Classified as Schedule 2 drugs, most of these medications are in the same category as cocaine and morphine. Although pharmaceutical preparations certainly alleviate many attentional and behavioral symptoms short-term, significant side effects are inevitable with most drugs.⁴ Short term problems include rashes, headaches, palpitations and nervousness. Visual side effects such as lack of focus or abnormal eye movements must also be considered. Long term effects that are extremely troubling are tics, loss of inhibitions as well as interference with sleep, appetite and growth.⁵ In a recent Swedish study of the long-term effects of stimulants on 62 children age 6-11 with ADHD, a majority showed poor appetite, 32% had "occasional" abdominal pain, 30% developed tics and four experienced hallucinations.⁶ Furthermore, I know of no studies demonstrating long term improvement on learning ability or academic achievement. As a mental health professional, what disturbs me most is the bland affect and loss of personality I have seen in many of my clients. Many report that they do not like how they feel when medicated and worry about the psychological dependency they develop.

Special Education

Most individuals on the autistic spectrum have trouble in school. Their problems can be educational, behavioral or both. Since 1973, federal law has mandated that students with special needs are entitled to a free and appropriate educa-

tion.⁷ The public schools must thus provide a range of services including special-ists who consult with regular education teachers about students' needs, group or individual tutoring, classroom modifications, test accommodations or even placement in a separate school.

Children with autism and pervasive developmental disorders were placed with other students of similar levels of cognitive abilities and behavior until 1993, at which time, "autism" became a discrete category of disability. Those with learning disabilities can be found both in regular classrooms, with accommodations, and in small self-contained placements. Students with attention deficits are more difficult to place. An attempt to classify this disability as a separate category failed because it was felt that most of these students could be serviced under "learning disabled" or "seriously emotionally disturbed." If neither shoe fit, then a fall-back position was a loophole in the definition of "other health impaired" which addresses attention.

The problem with special education is that placing any student with those whose needs may be more serious than theirs can deprive the less needy of stimulating learning experiences. While helping students with learning disabilities and attention problems to succeed in school by providing modifications and accommodations, we may be setting them up for failure in life.⁸ Many feel stigmatized by being singled out. Although individual tutoring can help them in certain situations by teaching specific skills, facts and figures are often learned by rote and do not generalize.

The focus of a majority of programs for students on the severe end of the spectrum is on reducing undesirable behaviors. Complicated behavior management programs using reward hierarchies take time away from content subjects such as science and social studies. Computers are often used with these students who like the tangible excitement provided by the new multi-media machines because they have poor visualization. At best, the computer is a teacher that the student can relate to; at its worst, it is a mechanical baby-sitter.

Counseling and Behavior Management

There is no question that children on the autistic spectrum and their parents require psychological support to address the social and emotional issues of being or

raising a child with special needs. Most of these children read social cues poorly, talk excessively or not at all, interrupt, are disorganized and inappropriate. Many have poor self esteem.

However, social-emotional problems, like reduced attention, hyperactivity, perseverative mannerisms and impulsivity could well be symptoms of other underlying issues. Although it is easy today to blame poverty, divorce, single-parent families, two working parents, day care, alcoholism and drug abuse as scapegoats, there are resilient children who beat the odds and do well despite these environmental impediments. Providing external methods of monitoring and handling behavior may prevent children from learning how to develop internal controls. Self esteem is not something that can be learned; it develops from internal feelings of groundedness and safety.

Unfortunately, although these traditional remedies sometimes yield positive results, they may mask the underlying problems rather than expose their causes. Thus benefits are short term at best, and future problems caused by the unaddressed offenders frequently reappear. Also of great concern is the huge financial burden placed on both the health-care and educational systems that were not designed to manage such large numbers of children with disabilities. Medicaid, managed care and the Individual Disabilities Education Act were aimed at those with the most needs. What has happened, however, is that a small percentage of the targeted population captures a majority of the funding. Those with the mild to moderate disabilities, which are the most responsive to alternative or complementary therapies, use up the bulk of the funds, while the most impaired frequently languish.

Fortunately, parents and professionals have staged a backlash against early labeling which they view as a "life sentence." In the last three generations society has moved from institutionalizing the disabled to including them in the mainstream. In the past, parents of children with mental retardation and autism were advised to institutionalize their offspring, and there were many hospitals and schools to accommodate them. Most institutions for the schizophrenic, blind and deaf have now closed. Then grandparents and parents decided that they could do as well with their

children by keeping them at home and working with them. Today's parents have gone one step further, sometimes even starting therapies prenatally, assisted by modern technology which allows them a preview of their child's genetic and chemical makeup. Increasingly, in high-risk pregnancies, health care practitioners are prescribing gene therapy, intensive movement and sensory stimulation programs along with early, aggressive nutritional support. Children with Down's and Fragile X Syndrome who begin powerful nutritional programs, along with vision enhancement and occupational therapy, are showing huge gains in muscle tone, language development, cognition, and even changes in the physical features associated with these genetic problems.⁹

ALTERNATIVE TREATMENTS

There have always been concerned health care providers who have been dissatisfied with treating symptoms. Dr. Leo Galland, a pioneer in the emerging field of integrated medicine, which combines the best of alternative and orthodox treatments, stresses the need to consider the total patient and the context in which symptoms occur.¹⁰ He does this by taking an extensive history that may include the residual effects of birth trauma, past use of medications, diet, environmental toxins, signs of nutritional deficiencies such as skin problems, chemical sensitivities, allergic reactions and human dynamics.

Although alternative treatments have historically been questioned by mainstream medicine, they are now receiving a great deal of attention. The merging of traditional medicine with other therapies has been enhanced by the addition of an Office of Alternative Medicine (OAM) and its \$12 million budget to the National Institutes of Health, (NIH). In the autism community, the work of the elite committee of doctors who published the "Defeat Autism Now! (DAN!)" protocol,¹¹ has sparked much interest.

There is growing interest in holistic treatments that are applicable to children on the autistic spectrum.¹² Dr. Thomas Armstrong, a special educator turned author and lecturer, has led the most recent backlash against the use of drugs and behavior modification for attention deficits.¹³ He notes that children show amazing resilience and the capacity to overcome and sometimes fully resolve early delays

given time and the proper environmental circumstances. Autism, ADD, PDD and ADHD then are no longer appropriate labels.

Alternative treatments will now be presented in general categories: 1) structural therapies including osteopathy, cranial-sacral therapy and chiropractic; 2) treatments that boost the immune system, including dietary modification, nutritional supplementation, homeopathy and immunotherapy; 3) treatments that address processing of sensory information, including sensory integration therapy, auditory training and vision therapy.

1. Structural Therapies

A number of complementary treatments take into account the structural and skeletal systems of the body, and their relationship to each other. If organs, fluids, bones and connective tissues are out of balance, for any reason, their functions can be affected. Many of the underlying health issues experienced by children on the autistic spectrum cluster into specific organ and muscular systems. The nervous and digestive systems are particularly affected.

Structural therapies serve to realign the body's internal parts. Pressure is applied, addressing each dysfunctional system with procedures designed to reactivate that system and bring its function back into balance.¹⁴ The reduced flow of impulses can thus be corrected. Osteopathic physicians, health professionals trained in craniosacral techniques, massage therapists, chiropractors and other "body-works" individuals can provide precise, gentle, restorative manipulative treatment to help restore health and function for children on the autistic spectrum. These procedures have been shown to be particularly beneficial for treating those who have chronic recurrent ear infections.¹⁵

Synergistic benefits emerge, as well. Many optometrists are aware of patients who report lessening of allergy symptoms following vision therapy. Likewise, The Upledger Institute reports improvement in a number of children's vision issues including nystagmus, strabismus and reduced acuity, as well as with glaucoma, following cranio-sacral adjustment.¹⁶ This is especially true when manipulation is used in conjunction with dietary modification and allergy treatments.¹⁷

Practitioners from many disciplines are trained in manipulative techniques, and it thus can be difficult to decide which type of structural therapy might be beneficial for a particular child. Because the underlying cause of the problem, rather than the diagnosis is what is important, an in-depth developmental history is essential to making this determination. Many therapists combine techniques and disciplines, since there is no clear-cut, single cause to the problems on this spectrum. For instance, some speech-language pathologists integrate cranio-sacral therapy into their practice to improve talking, while an optometrist might refer a patient to a chiropractor to adjust postural adaptations as the body responds to vision therapy. A previous article in this Journal¹⁸ details how chiropractic and optometry can work together to enhance function in this way.

Word-of-mouth often provides the best sources for referral. However, the Appendix of this article lists organizations that can provide lists of osteopathic physicians, chiropractors, and those trained in cranio-sacral techniques around the world.

2. Treatments that Boost the Immune System

In my previous article,¹ I stated that no other cause for problems on the autistic spectrum has received so much attention as reversing the breakdown of the immune system. The immune system is the body's defense against disease; a defense that is exhausted from continuous efforts to ward off repeated assaults is a weakened one. In addition, the digestive tract, respiratory function and related cognitive processes related to perception, memory and recognition can also be affected.¹⁹ Problems such as the leaky gut, asthma, over-sensitivity to sounds, although seemingly unrelated, are examples.

Before one can determine which treatments are appropriate for an individual child, it is essential to take an extensive medical and developmental history. This must be an exhaustive look at such pre-natal, natal, environmental and social factors as exposure to medications, pesticides, chemicals, or tobacco, toxic building materials, pet products, travel, changes in environment and water. Some factors may be obvious, such as moving into an older house with lead paint, but others may be

more subtle, such as lawn treatments that are daily tracked into the home. Every member of one family I know became sick when the fertilizer they had been using on their farm was unknowingly "cut" with recycled radioactive material. It took an extraordinary effort to trace the cause of illness and developmental problems in children to this source.

Health and cognitive problems can be divided into two types: those related to immune system dysfunction alone and those related to detoxification pathway problems. Treatment will depend on which symptoms are present. Many children have both problems because the immune and detoxification systems overlap and load onto each other. According to the "total load theory," the larger the load of problematic factors on the child's overall system, the more severe the attentional, behavioral and cognitive problems.

Table 1 details signs of immune system dysfunction and Table 2 details symptoms of detoxification pathway problems.

Many children on the autism spectrum have had laboratory testing for food allergies and digestive problems with negative results. There are several opinions about why this is so. Some believe that these reactions are not true allergies, but rather subtle sensitivities.^{19,20} Even though many reactions, such as hives and obvious respiratory or intestinal symptoms, are immediate, some can be delayed, taking hours or even days to appear, and may involve a cumulative exposure. Making the picture even more complicated is the fact that some foods do not trigger a reaction on their own, but may do so only when ingested with another food substance.²¹

Another belief is that what some view as allergic reactions are truly an adaptive response that the body makes to limit an individual's exposure to foreign substances and toxins. The cost of this protective mechanism can be high, sometimes fatal.²² Alternatively, it is possible that the appearance of allergy symptoms in childhood may represent an innate defect in the body's immunological capacities, which are further diminished by the utilization of antihistamines.²³

Fortunately, there are now some very sophisticated blood, urine and stool tests designed to pinpoint exactly what has gone awry with the immune, digestive and

**Table 1
Signs of Immune System
Dysfunction**

Allergies
Frequent ear, sinus or strep infections
Respiratory problems, including asthma and bronchitis
Skin problems, including eczema and poor color
Digestive problems, including constipation, chronic diarrhea or reflux
Deep circles under the eyes,
Red ears or apple cheeks
History of an extended immunization reaction
Sudden decline in function between 18-30 months
Chronic, unexplained fevers
Yeast infections

**Table 2
Signs of Detoxification
Pathways Problems**

Hyperactivity
Agitated sleep
Wild swings in mood and function
Self-injurious or violent behaviors
Regressive behavior after eating food with additives
Sensitivity to dyes, chemicals, perfumes or medications
High consumption of apple juice

respiratory systems and detoxification pathways. These tests, exhaustively detailed in the DAN! protocol,¹¹ measure the strength of both immediate and delayed systemic responses to various common foods, gluten and casein sensitivity, the presence of yeast metabolites, undesirable invaders such as intestinal parasites and toxic metals, including lead, cadmium, mercury and aluminum, amino acid abnormalities, as well as unusually high antibody titers resulting from markedly abnormal responses to childhood immunizations, including rubella, DPT, and oral polio. Be aware that these tests can be quite expensive and require a physician's interaction, but may be invaluable diagnostic tools that are often reimbursable. The DAN! group is active in providing training for interested medical practitioners who wish to follow their protocol, and can provide a list of those who have attended these sessions.

After the tests have been run, specific recommendations can be made. Some interventions can be tried without any laboratory testing. However, many parents may prefer to have concrete evidence that a significant change is indicated before trying them, because they can be particularly challenging, especially with a child who is a picky eater.

There are two ways of dealing with immune system and detoxification problems: lessening the toxic burden by removing some of what is ingested, and increasing the efficiency of the body's functioning by adding missing factors using nutritional supplementation. Two additional treatment options work by encouraging the body to strengthen its own defenses. These alternatives will be discussed in the following sequence: 1. Dietary modification including: a) elimination of colors, flavors, additives and salicylates, b) using a gluten-casein free diet, c) using a yeast, mold and sugar-free diet, and d) using filtered water. 2. Nutritional supplementation including: a) vitamins and minerals, b) essential fatty acids (EFAs), c) amino acids, d) anti-fungals and probiotics, e) miscellaneous supplements. 3. Homeopathy and 4. Immunotherapy.

Dietary Modification

My earlier article detailed the relationship between attentional and behavioral abnormalities and food additives, salicylates, gluten, casein, yeast overgrowth, and sugar.¹ General dietary guidelines for all children on the autism spectrum are to adhere as closely as possible to a natural foods diet based on whole grains, varied protein sources, including beans, fresh fruits and vegetables, nuts and seeds. Removing processed food products that contain the above mentioned offenders has shown considerable benefit in children with attention, behavior and learning problems. Parents report increase in the understanding and use of language, better eye contact and more relatedness.²⁰

Here are simple guidelines for dietary modification that should increase function in most children:

- a) Eat a diet that is unrefined, varied and free of artificial colors, flavors, additives and naturally occurring salicylates.**

Unprocessed foods are less likely to cause problems than those with additives.

A rotation diet that alternates different grains, meats, various fruits, many types of nuts, seeds, and legumes is also less likely to cause reaction. Young bodies cannot tolerate a consistent assault of single food products. Remove processed foods that contain additives and naturally occurring salicylates. The most common foods in this category are apples, almonds, all berries, cucumbers, grapes and raisins, peaches, and tomatoes. The Feingold program (See Appendix) supports these modifications with materials detailing what products to buy and recipes that are tasty. It may not be necessary to be this drastic in the reduction of foods, especially removing all salicylates, unless the child is extremely hyperactive or has sleep problems.

b) Eat a diet that is gluten and casein free.

Removal of these food products can make a marked and often immediate difference. Gluten is a protein common to many cereal grains, including wheat, rye, oats and barley, while casein is the protein product in dairy foods. Dairy foods have been found to be the cause of many related health problems such as eczema, asthma, constipation, diarrhea, and reflux, in addition to the behavioral and learning problems.²⁴ Eliminating these products from a child's diet is rather complex because they sometimes masquerade under other names, and appear in products in other forms such as barley malt (a sweetener) or as an additive to baked goods. If one is subscribing to the first dietary modification, then this second step will not be as difficult.

c) Eat a diet that is yeast, mold, and sugar free.

Children who have taken a large number of antibiotics are especially vulnerable to yeast problems.²⁵ Foods containing yeasts and molds include breads, crackers, and most other baked goods, enriched flour, mushrooms, cantaloupes, peanuts, all cheeses including cottage cheese, buttermilk, vinegar, catsup, mayonnaise, olives, pickles, some salad dressings, alcohol, malted products, many commercial vitamins, as well as anything aged or fermented. Label reading is essential, and even then yeast-containing products can sneak in. These guidelines are detailed in several books.^{19,21}

Because sugar is the food of yeast, restricting sugar is an important component of this dietary modification. Yeasts ferment sugars into alcohol, and can thus induce unfocused and hyperactive behaviors. There are more than 100 recognized substances described as sugars.¹⁹ (p.241) These include, but are not limited to sucrose, honey, fructose, barley malt, dextrose, sorbitol, xylitol, aspartame, saccharine, mannitol, and lactose. One of the most common and often over-looked sources of sugar in children are fruit juices. Many are consuming virtually quarts of juice each day. Fruit juices should be diluted and rotated. Apple and grape juice both contain salicylates, so these products are giving susceptible children a double dose of potential toxins to their bodies.

d) Filter water.

Water is a better choice than fruit juice as a beverage for most children as it has no sugar, salicylates or allergens. However, it brings other challenges which may contribute to hyperactivity or lack of relatedness. Chlorine, fluoridation, lead, aluminum and parasites are all potential problems. Chlorine reacts with organic matter to cancer-producing substances such as chloroform.²⁶ Fluoridation of water increases the possibility that the water will leach aluminum from cookware into food.²⁷ Elevated lead from old plumbing and aluminum are often overlooked as a cause of hyperactivity and subtle learning disabilities.²⁸ Parasites, such as Giardia, are becoming more and more common in the water sources of large cities¹⁰ (p.188). Filtering all water through activated charcoal can remove chlorination, fluoridation and decrease the possibility of parasite contamination.¹⁰ (p.179)

Nutritional Supplementation

"The key to a strong, healthy immune system for all children is optimal nutrition."²⁹ What comprises good nutrition, however, is a matter of great controversy. Although in the past, people were confident that they could obtain all the nutrients their bodies needed through the foods they ate, this is not longer true. As the soil has become depleted, eating habits have changed, and more foods are processed, even those who eat a wide variety may not obtain good nutrition. For the picky eater with attention deficits or pervasive developmental disorder, a diet consisting pri-

marily of processed foods made of wheat and dairy products is hardly adequate, let alone optimal. A logical step in closing the nutritional gap between what is eaten and what the body needs is the therapeutic use of supplements.

In 1993 this Journal published an article regarding the effects of nutritional supplements on accommodation, eye movements, nystagmus, refractive conditions, and perceptual/cognitive functions.³⁰ The use of nutritional aids is becoming increasingly accepted, especially for children with behavioral and developmental problems. Dorfman, a nutritionist who counsels families of children on the autistic spectrum, proposes that these youngsters need more nutrients than typical children due to poor absorption, self-restricted diets, impaired ability to detoxify environmental chemicals and pollutants, and/or inherited nutrient deficiencies.³¹ Health care providers can suggest customized combinations which are preferable to commercial multiple vitamins for children. The latter often contain colors, flavors, preservatives and fillers and may be low in important trace minerals. Some pharmacies that can produce formulas designed to fit an individual child's unique nutritional needs are listed in the Appendix.

Nutritional supplementation comes in many forms. Some are available without a prescription at health food stores and pharmacies. Others require a doctor's order and are thus monitored closely. Products that will be discussed here are: a) vitamins and minerals, b) essential fatty acids (EFAs), c) amino acids, d) anti-fungals and probiotics, and e) other miscellaneous supplements.

a) Vitamins and minerals

Some of the same vitamins and minerals that improve visual function can also enhance cognition, improve speech and language, help sleeping patterns, lessen irritability, and decrease self-injurious and self-stimulatory behavior in those on the autistic spectrum. Minerals are perhaps the most important of the body's nutrients as vitamins, proteins, enzymes, amino acids, fats, and carbohydrates all require minerals for activity.

Mineral deficiencies are very common in children who eat high carbohydrate and processed foods. Balance is the key, for if there is a shortage or overabundance of just one, then the body's whole function

can be thrown off.³² For instance, adequate zinc protects against adverse effects from heavy metals including lead, cadmium, and copper, while adequate calcium neutralizes excess aluminum. Children on dairy-free diets and others with calcium deficiency may be irritable, hyperactive, sleep-disturbed and inattentive, have stomach and muscle cramps and tingling in arms and legs. These symptoms often disappear with properly balanced supplements of calcium and magnesium.³³

Vitamins have long been used to increase immunity and cognitive function. Both deficiencies and toxic levels can contribute to poor learning and aberrant behavior. The supplements used therapeutically most often are combinations of vitamin B complex, C, and E, along with the important trace minerals, such as zinc and chromium, selenium and calcium.³³(83-84)

Rimland, has shown that supplements can improve functioning in children with autism and prevent birth defects.³⁴ He recommends a combination of folic acid, Dimethyl Glycine (DMG), Vitamin B6 and magnesium. DMG has been shown to improve language, but can also increase self-stimulatory behavior. The folic acid acts as an antidote to the DMG, allowing it to work without agitating the nervous system. In a double blind research study, high doses of vitamin B6 were shown to work better than Ritalin in controlling the hyperactivity in a controlled group of boys.³⁵

b) Essential fatty acids (EFAs)

EFAs are crucial to maintaining a healthy immune system, as well as efficient visual function. In fact, the retina has the highest concentration of fatty acids of any tissue in the body.³⁶ These substances must be ingested as the body cannot make them. As parents have consciously eliminated fats from their families' intake, some children's diets have become depleted of omega 3 and omega 6 fatty acids. Fortunately both are found in a variety of foods, including fish, nuts and seeds, and flaxseed, borage and cod-liver oils. However, these products are very fragile; when they are exposed to air, high temperatures or are over-processed, the valuable EFAs are eliminated. Furthermore, non-essential fatty acids, such as the hydrogenated vegetable oils used in margarine and in frying fast food, interfere with a child's ability to

make use of the marginal amounts of EFAs consumed.³⁷

Children with yeast overgrowth are particularly vulnerable to EFA deficiencies. The large quantities of sugar they ingest also weaken the enzymes of EFA metabolism. When vitamin and mineral balance is off, metabolism is further disturbed. Signs of EFA deficiencies are dry, scaly skin and lusterless hair, brittle nails, excessive thirst, and, in older girls, menstrual problems.¹⁰(142-147) Studies of hyperactive children reveal improvement in almost two thirds after taking evening primrose oil.³⁸ This is a particularly popular treatment in England and has also been shown to be effective in reversing some of the secondary health symptoms of these children such as asthma, allergies and eczema. Supplementing an EFA-deficient diet with omega-rich oils has been shown to have virtually no toxic or side effects.²⁹ (20)

c) Amino acids

Amino acids are sub-units of protein molecules which result when digestion is complete. When absorbed into the bloodstream, they aid in ridding the body of toxins that are by-products of normal metabolism, as well as those that come from bowel germs, impure waste and food.

Many individuals on the autistic spectrum show two types of amino acid abnormalities. One is the result of incomplete digestive breakdown. Glutamine, glycine, gamma amino butyric acid (GABA) and taurine are free-form amino acids that have an inhibitory affect on hyperkinetic movements. When they are absent or deficient, as a result of incomplete digestive breakdown, many behavioral symptoms can occur. The DAN! protocol describes this problem in depth and suggests a laboratory which can run a 24 hour urine amino acid analysis.¹¹(23-24) The amino acid taurine is also present in the eye. Diminished vision may show the need for this supplement.³⁹

The second type of abnormality is an amino acid deficiency. Tryptophan is an essential amino acid necessary to maintain protein balance. Many hyperactive and autistic individuals have the profile of low serotonin (a neuro-transmitter formed from tryptophan), low tryptophan, and low B6. This is especially true of those who have dairy sensitivities, as dairy products are a major source of tryptophan. One study on adults with autism found a

significant increase in whirling, flapping, banging and hitting when tryptophan levels were depleted.⁴⁰ Combining tryptophan with B vitamins and magnesium can sometimes have remarkable results.⁴¹

Amino acid supplements combined with other nutrients are available in many over-the-counter products. Tryptophan, however, can be obtained only by prescription.

d) Anti-fungals and probiotics

Many children on the autism spectrum have a history of ear infections. Some also have had thrush, vaginal yeast infections and other symptoms of systemic yeast-related problems. This was a discovery made quite by accident by Shaw, a researcher who learned that the lab samples he was examining with very high levels of yeast metabolites belonged to autistic brothers.⁴² His method of urinalysis is now considered essential for those on the autism spectrum.

A large majority of these children have been treated with antibiotics, invaluable tools necessary to kill infections. However, recently, physicians have become concerned about drug-resistant infections due to antibiotic over-use. *Anti-biotic* translated literally, means "against life." These powerful agents, not only eliminate infections, but also destroy the friendly bacteria in the gut. Yeasts and other fungi, which are unaffected, then become opportunists and set up colonies. These organisms interfere with the body's ability to regulate absorption of essential fatty acids, and the by-products of their metabolism are very toxic to children on the autistic spectrum of disorders.²⁵ (175-178)

In order to re-establish intestinal integrity and to mend the condition known as "leaky gut syndrome," over the counter and prescribed supplements are often recommended. These fall into two categories: *pro-biotics*, meaning literally "in support of life" and *anti-fungals*, drugs which kill the yeasts and fungi. Probiotics, including acidophilus and lactobacillus, serve to replace the good bacteria in the gut, and are available over-the-counter. Anti-fungals, needed to destroy the yeasts, include Nyastatin, Nyzoral, and Diflucan and require a doctor's prescription. These products are often used together and in conjunction with the elimination of all sugars, including fruits, from the diet.⁴³

e) Miscellaneous supplements

Herbs, digestive enzymes, and plant extracts can also be taken in combination with vitamins, minerals, anti-fungals, amino acids and probiotics in the treatment of hyperactivity and autistic-like symptoms. Echinacea (a plant antibiotic), chamomile, skullcap, certain botanical scents and pycnogenol are some that have also been shown to be beneficial.¹⁶(26-27) Pycnogenol is non-toxic, water soluble product occurring in grape seed extract and pine bark. It is increasingly being used as a non-prescription alternative to Ritalin to improve focus, memory, fine motor skills and eye contact.⁴⁴

Homeopathy

Homeopathy is a 200-year-old approach to healing that has historically been rejected by the traditional medical community. Homeopathic practitioners, who can be traditional, naturopathic or osteopathic physicians or others, use substances from nature that have the ability to cause a group of symptoms in a healthy person, but cure the same symptoms in a sick person by stimulating the body's own ability to heal itself. This approach follows the Law of Similars, where like cures like, whereas traditional or allopathic medicine uses the Law of Opposites.⁴⁵

Some physicians combine allopathic and homeopathic treatments, depending upon the patient's symptoms and history. The latter provides the most important information, as homeopathy, like other treatments mentioned, focuses on the whole child, not the diagnosis. Thus children with the same diagnosis may be given very different treatments or "remedies", as they are called, depending on what symptoms cluster together. For instance, a thin, excitable, anxious child may be given one remedy, while a devilish child who is shy but plays tricks, another, and a fidgety child who becomes so hyperactive that he starts to cry, yet another.⁴⁶ Physical, mental and emotional states are evaluated together and treated as the individual is brought into balance.

Homeopathic practitioners believe that the symptoms representing a particular imbalance develop hierarchically, with physical problems, which are least severe appearing first, followed by mental and emotional illness, which is more problematic. Disease manifests itself first on the outside and then moves to internal organs.

Thus when a baby has diaper rash or eczema and it disappears, it is thought to go deeper into the digestive and respiratory tracts. It is very common for constipation, diarrhea, bronchitis and asthma to precede the onset of hyperactivity and autistic-like symptoms in children on the autistic spectrum. A homeopathic practitioner may conceptualize all of these problems as having the same cause, and treat the patient accordingly. Healing occurs in the opposite sequence as illness, with the cognitive and behavioral symptoms clearing before the physical ones, with skin issues being the last to subside.⁴⁵

Homeopathic remedies are being combined with enzymes, and other nutritional supplements by Krantz, a pharmacist, and Ellis, a clinical nutritionist, in a program called "Homeovitics," which enhances the immune system while detoxifying the body.⁴⁷ There is a very enthusiastic group of parents in the North East who have reported significant changes in the blood chemistry, behavior and learning of their autistic children using this approach.

Immunotherapy

Some parents of children on the autism spectrum report an onset of autistic symptoms and hyperactivity following an immunization or while on a regimen of antibiotics. If, as suspected, autism and related disorders have an immunological basis, it should be of no surprise that treatments to enhance immune system function directly have been developed. Blood tests show high titers months and even years after a vaccine has been administered, indicating that the immune system is still reacting as if an invader were present. A technique called intravenous immune globulin (IVIG) therapy, pioneered by Gupta and his colleagues at the University of California, at Irvine, has resulted in positive changes in behavior and the reversal of his hyperactivity and autism in some children.⁴⁸ To find a doctor who uses this methodology, contact the National Vaccine Information Center (See Appendix).

3. Treatments that affect sensory processing

It is logical that if there are underlying physiological problems, processing of touch, movement, sound and vision will be adversely affected, the therapies previously discussed should be considered first. In many cases, however, concurrent

treatments are appropriate because of the synergy that exists in the human body. The following treatments focus on the sensory problems seen in children on the autism spectrum of disorders.

Sensory Integration Therapy

The late A. Jean Ayres, an occupational therapist, described many of the identical symptoms of children on the autistic spectrum as occurring in those who have a sensory integration dysfunction. It was her belief that the body's ability to process and interpret information coming in through touch, movement, balance and body position is essential for sustaining attention, understanding and using language and social interaction.⁴⁹

Of particular interest to the behavioral optometrist is the role of the vestibular system, which acts in tandem with several aspects of vision, most importantly eye movements. This foundational system, located in the inner ear, can be disturbed by ear infections or pre-natal situations such as mandatory bed-rest. At birth a child's vestibular system should be fully functional. If it is not, there will be a negative impact on balance, muscle tone, posture, and movement. These, in turn, will affect and be affected by vision.⁴⁹ (69-89)

If a child is suspected of having a sensory integration dysfunction, an evaluation can be conducted by a specially trained and certified occupational or physical therapist. Tests and observations study a child's response to sensory stimulation, posture, balance, coordination, and movement activities. These reactions are compared to norms established for the child's age. After carefully analyzing data and putting it in the context of the child's home and school environment, recommendations are made.

Therapy consists of guided activities that challenge and enhance the body's ability to respond appropriately to sensory input by making a successful organized response. This, in turn, heightens a child's ability to pay attention, relate, sit still, organize language, and focus. As in vision therapy, training seeks to develop and/or enhance generalizable rather than specific splinter skills. The occupational therapist is required to gain certification to perform evaluations, but not for therapy. Sensory Integration International (SII), listed in the Appendix, can locate practitioners around

the world who are knowledgeable and qualified in sensory integration techniques.

Auditory Integration Training (AIT)

Listening is to hearing what vision is to eyesight. It is the coordination of the sounds that allows the ear to send messages to the brain to be interpreted and stored. Just as efficient vision requires intactness of each eye and then coordination of the two eyes together, so does good listening require intactness of each ear and coordination of the two ears. The vestibular system, which is key to certain types of eye movements, is also key to efficient processing of sound.

Many children on the autistic spectrum hear distortions of and experience delays in processing the signals that come into their ears. This negatively affects their ability to focus on and give meaning to what they hear. The result may be an inconsistency in hearing the various frequencies of sound or lack of synchronicity of the ears. The messages sent to the brain will then be distorted, resulting in behavior that is distractible, avoiding, hyperactive, inattentive or bizarre.⁵⁰

There are several types of auditory training available today and they all require specialized electronic equipment. The individual listens to music that is specifically modified and may be filtered according to the person's needs, which have been determined by an audiogram. The modified music stimulates the vestibular system, which in turn, activates the language centers of the brain, eye movements, and the digestive system.

Both subtle and obvious changes are observed after training, which is given in "loops" consisting of from ten to fifteen days, for an hour or so at a time. One study suggests that for those with abnormally high levels of serotonin (about one-third of the people on the autism spectrum), this technique may bring these levels down.⁵¹ Parents report a reduction in temper tantrums, sound and tactile sensitivity, hyperactivity, impulsivity and distractibility. Increased eye contact, ability to follow directions, pay attention, remember, speak, socialize, move, draw, and play independently are also reported. Sometimes sleep and other activities are disturbed temporarily, but a return to normal is usually seen in a short time.⁵²

The newest type of auditory training incorporates the technology of computers with earphones. Fast ForWord (formerly called HAILO), a program based on twenty years of brain research, allegedly enhances the auditory timing mechanism of the brain, thus rapidly building language competence in children age four through twelve. This type of auditory training focuses on having a child discriminate and recognize phoneme differences, which are delivered at increasing speeds.⁵³ I know of some professionals, working with children on the autism spectrum, who recommend traditional auditory training first. Scientific Learning Corporation (see Appendix) can be contacted for a list of Fast Forword practitioners.

There is debate over whether occupational therapy and/or auditory training to stimulate the vestibular system should always precede a course of vision therapy, or if sometimes, vision therapy that includes a great deal of movement in conjunction with the use of lenses, is more appropriately tried first in some cases.

Vision Therapy

Given the complex nature of the syndromes making up the autistic spectrum, it is imperative that the optometrist work as a part of a multi-disciplinary team when treating patients with ADD, ADHD, LD, PDD and autism. In many cases, the observed vision problems can be secondary to some of the dietary, metabolic, sensory processing or immune issues the patient has. In some cases it may be wise to delay vision therapy until some of the other work is accomplished. Optometric interventions of all types can then be conducted with increased efficiency and outcomes. Thus, the optometrist who suspects that a patient is on the autistic spectrum, or who is has been so diagnosed but not fully treated, can perform a great service by referring to a DAN!-trained physician or other appropriate health-care professional. The Autism Research Institute and the Developmental Delay Registry (see Appendix) can make referrals world-wide.

Nevertheless, the role of the optometrist far transcends the referral. I believe the greatest optometric contribution to these patients lies in the ability to change sensory input through the use of lenses, prisms, occlusion and filters. These tools, unique to the practice of optometry, have

the potential to break through the inflexible world of even the most impaired child with autism and to assist the child with attention problems.⁵⁴ Rose and Torgeson, both of whom have considerable experience with children with autism, recommend starting with simple visual arousal activities. They believe that improved awareness of the peripheral visual world is necessary before using more traditional vision therapy,⁵⁵ while Kaplan, advocates the use of yoked prisms.⁵⁶ One parent described her child's glasses to me as "Ritalin for the eyes, with no bad side effects."

CONCLUSION

There are some very exciting new treatment options for children with attention, learning and behavior problems that address causes rather than treat symptoms. In addition to social, academic and language benefits, many times, long-standing health problems are also alleviated. The optometrist working with children on the autistic spectrum has a moral and professional obligation to be at least conversant about some of these new programs and how to access them in the community. By combining these therapies with optometric interventions, the patient is the ultimate beneficiary.

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Appendix Of Resources

The Apothecary Pharmacy
 Pathways Custom Compounding
 Pharmacy
 800-869-9160
 Produce vitamins and prescriptions without colors, flavors or fillers

Dr. Bernard Rimland, Director
 Autism Research Institute
 4182 Adams Avenue
 San Diego, CA 92116
 Publishes the DAN! protocol;
 Available for \$25

Developmental Delay Registry (DDR)
 6701 Fairfax Rd.
 Chevy Chase, MD 20815
 301-652-2263
 Publishes quarterly newsletter on all aspects of treatments
 Referral network world-wide

Feingold Association of the United States (FAUS)
 127 East Main St., Suite 106
 Riverhead, NY 11901
 800-321-FAUS

The Georgiana Organization
 P.O. Box 2607
 Westport, CT 06880
 203-454-1221
 Berard method of auditory integration training

Dr. William Shaw, Director
 The Great Plains Laboratory
 9335 West 75th Street
 Overland Park, KS 66204
 913-341-8949

Great Smokies Diagnostic Laboratory
 63 Zillicoa Street
 Asheville, NC 28801
 800-522-4762

National Center for Homeopathy
 801 N. Fairfax Street #306
 Alexandria, VA 22314
 703-548-7790

HomeoViticS
 3427 Exchange Ave.
 Naples, FL 34104
 800-521-7722
<http://www.hvllabs.com>

Sally Bunday
 Hyperactive Children's Support Group
 71 Whyte Lane, Chichester
 West Sussex, PO19 2LD UK
 019-03-725-182
<http://www.demon.co.uk/charities/AIA/aia.htm>

Dr. James Braly, Director
Immuno Laboratories
1620 West Oakland Park Blvd.
Fort Lauderdale, FL 33311
800-231-9197

International Chiropractic Pediatric
Association (ICPA)
1110 N. Glebe Rd., Suite 1000
Arlington, VA 22201

National Vaccine Information Center
(NVIC)
512 W. Maple Ave. #206
Vienna, VA 22180
800-909-SHOT

Nutri-Chem
1303 Richmond Rd.
Ottawa, Ontario, K2B 7Y4, Canada
613-820-9065
www.nutrichem.com
Produces customized nutritional
supplements. Has parent network and
free newsletter for professionals

Osteopathic Center for Children
4135 54th Place
San Diego, CA 92105
619-454-2200

Pain and Stress Therapy Center
5282 Medical Center Drive, Suite 160
San Antonio, TX 78229-6043
800-669-CALM
Distributes vitamins

Scientific Learning Corporation
1995 University Ave. Suite 400
Berkeley, CA 94704-1074
510-665-9700
www.fastforward.com
Produces Fast For Word

Sensory Integration International (SII)
1602 Cabrillo Ave.
Torrance, CA 90501
310-320-9986

Society for Auditory Integration Training
(SAIT)
c/o Center for the Study of Autism
9725 S.W. Beaverton Hillsdale Hwy,
Suite 230
Beaverton, OR 97005
<http://www.teleport.com/~sait/>

The Upledger Institute, Inc.
11211 Prosperity Farms Rd. D325
Palm Beach Gardens, FL 33410
407-622-4771
Trains cranio-sacral practitioners