autism & ADHD
attention-deficit hyperactivity disorder

by Desiré Dubounet
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If you do not have the money pay what you can, and if you cannot pay anything please pay the cosmos back with good deeds to others. Pass on the good karma by being good to others and helping them the way I am helping you.
Pass it on.
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The Diagnostic criteria of Autism is:

A. At least six items from the 12 following criteria, with two from (1), and at least one from (2) and (3):

1. Qualitative impairment in social interaction, as manifested by:
   a) marked impairment in the use of multiple nonverbal behaviors
   b) failure to develop peer relationships appropriate to developmental level
   c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people
   d) lack of social or emotional reciprocity

2. Qualitative impairments in communication, as manifested by:
   a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
   b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
   c) stereotyped and repetitive use of language or idiosyncratic language
   d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

3. Restricted, repetitive, and stereotyped patterns of behavior, interests, and activities:
   a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
   b) apparently inflexible adherence to specific, nonfunctional routines or rituals
   c) stereotyped and repetitive motor mannerism
   d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years.

C. The disturbance is not better accounted for by Rett’s disorder or childhood disintegrative disorder.

There are the known medical effects of ADHD Autism etc. These are measured in the brain. But these are symptoms of a deeper cause. At the decussations of the pyramids in the brain stem there is contra-lateral transfer of information. Here is there is a cross firing or short circuit then the effects of the brain will manifest. The cause is a problem in the wiring. When the wiring is in the visual pathway we get dyslexia. This is well known and produces confusion in the information transfer. Won Ton soup could be read backwards and produce Not Now soup for later. When the signal transfer is for movement regulation then body movements become one sided and irregular.

The disturbance of the motor functions can be treated with cross crawl exercise techniques. Tell the child to stand and to touch his right elbow to his left knee, by raising the knee and moving forward the elbow. Then left elbow to right knee. Dance to music for 3 to 5 min. supervise and try to stop the urge to touch right to right or left to left. Cross crawl will stimulate the brain and brain stem to develop correctly. Once or twice a day is needed and is very helpful.
(Fibers ascending to thalamus)

(Fibers descending from cerebral cortex)

Substantia nigra

Corticopontine tracts

Internal capsule

MIDBRAIN
(Cranial nerves III and IV)

Corticospinal tract

PONS
(Cranial nerves V to VII)

Pontine nuclei

MEDULLA
(Cranial nerves VIII to XII)

Spinothalamic tract

Inferior cerebellar peduncle

Olive

Pyramid

Medial lemniscus

Decussation of pyramids (caudal end of medulla)

RIGHTWARD ACCELERATION

LEFTWARD TILT
Phenylketonuria (PKU)

Phenylketonuria (PKU) is an inherited disorder in which the body cannot break down an amino acid called phenylalanine, which is a part of protein. If PKU is not treated soon after birth, phenylalanine levels rise and can cause permanent brain and nervous system damage, such as mental retardation.

Symptoms of PKU usually appear within a few months of birth, after a baby has started drinking formula or breast milk and phenylalanine has built up in his or her blood. Early symptoms may include:

- A musty odor to the skin, hair, and urine.
- Weight loss from vomiting and frequent diarrhea.
- Irritability.
- Skin problems.
- Sensitivity to light.
- Autism
- ADHD

When it is auditory, then autism results. The child cannot get a reliable language and retards into his own world to develop.

Number one what are the causes of this. First the possible inherited weakness. Since there is nerve development and nerves develop via myelination, myelination needs good fatty acids. Then diet is a possible cause. Food additives and sugar irritate the condition. Neuro-toxins most likely mercury is a culprit. And thus vaccinations which use such neuro-toxins are a likely cause.

Use of Synthetic drugs by the mother during gestation is a definite link to the cause of these irregularities mostly genetic altering morning sickness pills like bendictine. At birth the phenyl-keton-uria test is not done deeply enough and protein and amino-acid leakage from the kidney are linked. Other toxins stress during gestation, fetal alcohol syndrome, use of drugs and other toxic factors.

Years ago I was excited to see some commercials about alternative medicine treatments for diseases. The speaker talked a good show and sold me to buy his books. But there was absolutely no real advice in the books, only multilevel companies with more to buy. This made me angry and then I decided to write the best self help books on natural medicine. Editing and collecting the best in real substantiated advice.

Desiré has written two incredible books and made movies to go with them. What to do for influenza and specifically what to do when the next major virus hits. A movie and a self help book designed to really help you and your families understand what to do to protect yourself.

Also cancer is such a devastating disease, and there are ways to help yourself in the kitchen with cooking for cancer patients. Full advice from soup to nuts on exercise, meditation, cooking, and more. Coupled with a video for the science of how it works.

The health care debate is bringing a question of health and care. In this incredible new book Desiré has outlined a very thorough review of the real problems of Health Care. This book will tell you the truth the chemical companies do not want you to hear.
• Gait instability
• Dyslexia, dysphonia, dysmotor

Screening for PKU is routinely done shortly after birth, making early diagnosis and treatment possible. Early treatment, within the first few weeks of birth, may prevent permanent brain damage. Rarely, some children who receive treatment will have learning or behavior problems. Left untreated, PKU causes progressively more severe mental retardation.

People with PKU must follow a diet low in phenylalanine levels to prevent harm to their baby should they become pregnant. Babies born to women who have even moderate phenylalanine levels during pregnancy are at risk for mental retardation, autism, ADHD and other developmental problems. The doctor Nelson Protein-uria program can help.

Use one third apple juice, one third lemon juice and one third juniper tea. 10 oz a day will flush the kidneys out of toxins and help to stop protein-uria. Cranberry juice helps will flush the kidneys out of toxins and help to stop low grade infections of the kidney and to stop protein-uria. Cranberry juice helps.

Other herbs:
ALOE VERA juice

Agathosma betulina: - also called Buchu is a urinary antiseptic and possesses diuretic properties. Buchu has been used by the natives of the Western Cape of Southern Africa for many centuries. Early Dutch settlers used buchu to make a brandy tincture and Boegoebbrandewyn (buchu brandy) is still used today to treat many disorders.

Berberis vulgaris: - also called Barberry, has been used medically for thousands of years and has documented use in Ancient Egypt - where it was used by pharaohs to ward off the plague. Berberine alkaloids contained in Barberry have demonstrated antibacterial and infection-fighting properties, stimulating microphages (white blood cells) to fight off infection and improving immune functioning. Barberry is also used extensively for kidney disease, kidney stones, gallbladder problems and enlarged spleen.

Polygonum multiflorum: also known as He-shou-wu or Fo ti, is an important blood tonic prescribed for kidney and liver problems, to strengthen the blood, invigorate the liver and kidneys and revitalize the system. Studies also suggest that Fo ti has the ability to stimulate immune functioning, lower cholesterol and increase red blood cell formation.

Schizandra chinensis: also called Wu-wei-zhi, is a well known adaptogen which benefits all body systems and overall systemic health and functioning. Wu-wei-zhi has a wide variety of therapeutic benefits and is an excellent kidney tonic. Added benefits include increased energy, strengthened immune functioning and greater ability to cope with stress. Trigonella foenum-graecum: - also called Fenugreek, has proven benefits for a wide variety of problems including diabetes, high cholesterol and atherosclerosis. Traditional Chinese herbalists also prescribe Fenugreek for kidney problems.

The Essentials of PKU

For Young Adults with PKU and their Significant Others

What is PKU?

PKU stands for Phenylketonuria (PHE-NYL-KE-TON-URIA). Phenylketonuria is an inherited disorder. About one in every 15,000 infants born in the United States has PKU. People who are born with PKU are normal in every way except to stay healthy they must follow a strict diet which limits phenylalanine, a common part of most food. People with PKU have an inactive liver enzyme. (See figure 1)

Phenylalanine is only one of the many amino acids which are joined together to form proteins. Normally, when a person eats foods containing protein, their body uses the amino acids from that protein for growth and repair of body tissues. Often we eat amino acids in excess of the body’s needs. These excess amino acids are chemically changed by enzymes into other compounds or used for energy. Since individuals with PKU are missing the enzyme for normal phenylalanine break down, the excess eaten in foods accumulates in the blood and begins to damage the brain.

If blood phenylalanine levels stay too high for a long time, the damage to the developing brain is severe and irreversible. The harmful effects of PKU can be prevented if a diet low in phenylalanine is started in early infancy and maintained throughout life. The phenylalanine restricted diet is the only way to bring blood phenylalanine levels down to a safe level. At these safe levels, that is less than 10 mg/dl, the brain can function normally and the person with PKU can learn easily and have stable emotions.

What is the Diet for PKU?

The diet for PKU consists of a milk substitute or formula such as Phenyl-Free 2* and measured amounts of fruits, vegetables, bread, pasta and cereals.

Figure 1
Normally, phenylalanine is converted to tyrosine by an enzyme called phenylalanine hydroxylase. However, in individuals with PKU, this enzyme is not present and results in a damaging build-up of phenylalanine in the body.

Figure 2
The diet for PKU consists of a milk substitute or formula such as Phenyl-Free 2* and measured amounts of fruits, vegetables, bread, pasta and cereals.
Many foods must be eliminated from a low phenylalanine diet. These foods are high protein foods such as milk and dairy products, meat, fish, chicken, eggs, beans and nuts which contain large amounts of phenylalanine. Eating these foods will cause high blood phenylalanine levels. The target is an easy way to visualize the foods allowed on the diet for PKU. The phenylalanine-free formula is the center of the target diet. As the foods get farther away from the bull’s-eye they are higher in phenylalanine. The foods outside the target are not allowed on the low-phenylalanine meal plan at all.

It is not unusual for someone on a phenylalanine restricted diet to have two kinds of vegetables and a baked potato for dinner. However, if these foods were all a person on a phenylalanine restricted diet consumed, their diet would be lacking protein, vitamins and minerals. That is where the special formula comes in.

A special formula, such as Phenyl-Free 2*, contains protein, vitamins, minerals and calories with no phenylalanine. With formula, a person with PKU gets plenty of protein and doesn’t get the side effects of the high phenylalanine content of most foods. The phenylalanine-free formula is the most important part of the diet for PKU.

Another important part of the diet is low protein breads and pastas. They are nearly free of phenylalanine, allow greater freedom in food choices, and provide energy and variety in the diet.

**How long must a person with PKU follow this special diet?**

In the past, people with Phenylketonuria were sometimes advised to discontinue their phenylalanine restricted diet when they were children. It was not known then that this recommendation would have any harmful effects. Most young people with PKU who were taken “off diet” didn’t monitor their blood phe levels and weren’t given any reason to be concerned about them. These young people began to experience the same kinds of difficulties, such as a reduced attention span, poor concentration, and poor memory.

Recently, many of these same people have decided to go back “on diet” hoping to feel better. In order to go back “on diet” a person must drink a special phenylalanine-free formula and choose low-phe foods so that blood phenylalanine levels are in the safe range.

The most important thing to remember is that it is never too late to go back “on diet.” For most young adults with PKU, a phe-restricted diet not only helps them to feel better but also improves their attention span, concentration and memory. In general, young adults who have made these changes report that they think and feel better. The effort that it takes to bring down blood phenylalanine levels is well worth it for everyone, no matter how long they have been “off diet.”

**What is Maternal PKU?**

Young women with Phenylketonuria need to understand the risks of pregnancy. The baby is damaged by the effects of the mother’s high blood phe levels before it is born. All women with PKU, along with their families and partners, should talk with PKU Clinic team members to understand these risks. This information will allow them to make a knowledgeable decision about family planning. Clinic team members also have information on adoption as a family planning option.

**How is PKU monitored?**

Monthly blood tests help people with PKU ‘track’ their progress with the diet. These blood tests check for phenylalanine build-up in the blood, which is from eating too much phenylalanine. People with PKU should keep their blood phenylalanine levels in the safe range, between 1 and 10 mg/dL. Levels of 1-6 mg/dL are ideal, and especially important for infants and young children. Regular measurement of blood phenylalanine levels can be done in two ways: the first method is a blood draw in a hospital or clinic which directly measures phenylalanine in the blood and the second method involves collection of a blood sample on a filter paper at home to be mailed to the laboratory for analysis (the Guthrie Test).

**Figure 3**

As the amount of phenylalanine eaten is increased, so is the blood phenylalanine level. Mailing in blood tests is a great way for people with PKU to keep in touch with how they are doing on food choices during the month. It is also important to regularly visit the PKU Clinic and talk with the PKU team. During these visits, everyone on the team works together to give the best possible care and guidance for people with PKU. The visit should include a blood draw, a neurological exam and a chance to discuss ways to more effectively manage the low-phenylalanine food pattern.

**Food records**

Often the nutritionist will request a diet record. A diet record is a 3-day diary of all foods and beverages eaten and the amounts consumed. It is a good idea not to change eating patterns just to make the diet record look good. It should show a normal day’s intake. Here’s an example for one day:

**Monday**

**Breakfast:**
- 1 cup puffed rice
- 1/4 cup Rich’s Coffee Rich
- 1 peach (80 gms)
- 8 oz Phenyl-Free 2* or other phenylalanine-free formula

**Lunch:**
- 2 cups Vegetarian Vegetable soup
- 2 low protein crackers
- 1 apple (100 gms)
- 12 oz Coke

**Snack:**
- 8 oz Phenyl-Free 2* or other phenylalanine-free formula

**Dinner:**
- 8 oz Phenyl-Free 2* or other phenylalanine-free formula
- 1 cup cauliflower
- 1 cup broccoli
- 1 baked potato with 2 Tbsp Nucoa margarine
- 12 oz cranberry juice

**Snack:**
- 8 oz Phenyl-Free 2* or other phenylalanine-free formula
- 1 cup fruit ice

**How I make my formula:**
- 200 grams Phenyl-Free 2* powder
- add water to make 32 oz

**Friends have a special role**

Every person is unique and so food patterns are designed for each individual’s taste, body size, nutritional needs, personal preferences and cooking skills. Just as a person without PKU chooses foods according to mood, environment and availability, so does the
person with PKU. This person will not be able to make perfect choices everyday. There will be times when an understanding friend can provide the support needed to chose low phenylalanine foods.

After all, being a true friend means that you accept your friend as an individual and support him or her no matter what. Everyday, people with PKU are faced with the challenge of correctly choosing foods within these limitations to meet their dietary needs. The more support they receive from family and friends, the easier their task becomes.

*Phenyl-Free 2 is a registered trademark of Mead Johnson Co.

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**Information on Tyrosine Food Sources**

There is a wide variety of tyrosine foods that are good sources of the amino acid called tyrosine. Now that we have mentioned it, you might probably know that tyrosine is one of the important amino acids that are used in protein synthesis.

**What is tyrosine?**

As mentioned, tyrosine is an amino acid that has an important role in the structure of almost all the protein found in your body. It is also the precursor of other substances, such as epinephrine, norepinephrine and dopamine. The function of tyrosine amino acid is closely-knit with neurotransmitters and hormones in the body and is essential for normal mental functions. It is also used to create melanin, which is the dark pigmentation that helps shield your skin from the harmful rays of the sun.

**Who do we need tyrosine foods?**

Tyrosine is technically a non-essential amino acid, since the body is able to produce it through another amino acid called phenylalanine. Incidentally though, phenylalanine is considered to be an essential amino acid so they have to be taken in through food sources. Following this line of reasoning, you can conclude that adequate amounts of tyrosine are best taken through foods rich in tyrosine amino acids.

**Other Tyrosine Benefits**

Aside from the fact that it is important to normalize body and brain functions, tyrosine has been seen to provide various health benefits. Studies have revealed that tyrosine can help fight the symptoms of Parkinson’s disease, to alleviate emotional and environmental stress, and to combat depression. Those that take tyrosine supplements claim that it tyrosine helps calm their bodies, increase their energy levels and enhance their libido. Supplements have also been used in the treatment of conditions such as Alzheimer’s disease, schizophrenia, ADD, ADHD and dementia.

**tyrosine (tiˑ·r·sēn)**

An amino acid involved in the synthesis of neurotransmitters; has other functions. Has been used to treat sleep disorders, enhance cognitive function, and alleviate symptoms of ADD. No known precautions. Also called L-tyrosine.

**Tyrosine Deficiency**

Even if tyrosine is non-essential and that tyrosine is largely available through tyrosine foods, some people have increased needs of tyrosine due to one or several factors, while other suffer from tyrosine deficiency. For example, people going through depression reportedly have low tyrosine levels, as with those who suffer from phenylketonuria (marked by an inability to properly utilize phenylalanine). If you have extremely low levels of tyrosine, you will suffer from a variety of conditions, such as muscle weakness, muscle loss, mood disorders, low protein level and liver damage.

If you are one of those who have increased tyrosine level need or suffer from deficiency of the amino acid, taking in tyrosine through natural tyrosine foods is not enough. You would need actual tyrosine supplementation through tyrosine tablets or tyrosine powder forms. They are now being sold as individual supplements and sometimes in combination with other amino acids.

**Brain Blood Circulation**

My son Daniel was severely autistic and a woman in England told me that there was some rusty crusty areas of the brain related to his problem. Sometimes there is an area that does not get proper blood flow as in a stroke. There is a brain herbal formula I designed to help with strokes. Convallaria is an herb (lilly of the valley) that is poisonous in concentration but used a 4x can be helpful in restoring blood to these areas. So I use a 4x of convallarianna tea, ginko tea strong, some

**Foods High in Tyrosine**

Fortunately, there are many natural food sources of tyrosine. It is found in most animal and vegetable sources. Foods high in tyrosine include the following:

- Meat sources including fish, chicken, and pork
- Whole unprocessed brown grains, wheat, and oats
- Dairy products such as milk, cheese and yogurt
- Fruits such as avocados, berries and bananas
- Legumes, beans and nuts such as almond, lima beans, sesame seeds and pumpkin seeds
- Bean and grain sprouts

**Chemical structure of tyrosine**

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The SCIO can undo the damage by regulating and balancing the Body Electric’s Regulatory Processes + increasing VARHOP

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**Now for the Ear**

To focus on the problem in the auditory area and correct the hearing of words, I have developed an interesting binaural sound program. It is meant to focus on the area of the decussation and repair it.

This binaural stimulation has been successful on my own son Daniel and many others. The sound tapes are easily available with the instructions for use. See Appendix

Th is book was written with many types of therapies in mind to help you to deal with these problems.
Electrons are so highly charged that they never touch but instead repel when they approach another. The electrons, protons, and neutrons are very small and they are held apart from each other by fields. If we considere the solid matter of the electrons, protons and neutrons together the human body would be so small it would make a microscope to see it. If the proton is the size of a golf ball, the electron is smaller than the size of the point of a pin and it is over a mile away. Between the electron and proton thus is electro-magnetic-static fields, held by Quantic forces. So our bodies are more than 99.99999999999999999999999 fields empty of matter. These Quantic electro-magnetic-static fields are what we are. Nothing ever really touches it is all field interaction.

No one has yet to see the true nature of our existence. No one can see the electrons, protons, or the fields they make. So we are only able to see a macro form of it. Our brains are trapped inside our skull and thus we cannot directly perceive anything. We are thus stuck with an indirect perception. A perception that comes thru the brain and is effected by our brain state. We project our own feelings, memories, psychic mental states onto our perceptions. It is difficult not to. So as humans developed we have made many assumptions of how the universe works, what is the nature of our bodies and lives, and our belief in a power greater than our own. And with a sense of history and knowing that we must project, and twist ideas, we should always be humble and recognize that we can never know. We are stuck makign good guesses, better and better guesses, but always guesses. This book is about making a better guess. (REF my Perceopt book 1 + 2) As Albert Szent-Györgyi the Nobel Prize winning researcher once said “the cell is an electrical operation, life is electrical”. I had the pleasure of working a summer with Albert Szent-Györgyi in New Hampshire. His inspiration and levity were astounding. He laughed when he said He won the Nobel Prize for discovering Vitamin C, but it wasn’t Vitamin C at all.

In 9th grade we are taught about light. Light is made of photons. Photons are electromagentic radiation, particles in wave formations that can transfer energy. Quantum Electro-Dynamics QED tells us of how when a electron absorbs a photon the electron goes to a higher quantum energy state. When the electron releases a photon it goes to a lower state. QED tells us of virtual photons and just how all electron, proton, neutron movement is connected to the photon.

Voltammetry is the science of understanding how a substance’s electro-magnetic field reacts with it’s environment. A hormone has electrons and protons and how they are placed reacts with it’s environment. A hormone has electrons and protons and how they are placed in a 3 dimensional space will determine how it exchanges electron-magnetic action and this is measured by measuring the 3 dimensional effect of it voltammetric field. The amount of charged particles is the amperage, the pressure or potential of the charged particles is the volts. Basic 7th grade physics. Every compound having it’s own individual and distinct voltammetric signature field. REF Voltammetry

The single cell systems such as bacteria set up a boundary layer such as a cell membrane to separate the thermodynamic world from the quantic interior. Entropy and thermodynamics dictate process in the non-living exterior versus the Quantic organized non random entropy interior. Metabolism and reproduction guided by a organized accounting of energy intake and outgo. All is Geared for metabolism and reproduction. Quantic Electromagnetic fields in cyclic organized fashion that is mostly dependent on the Quantic actions of DNA. DNA can only be described in the Quantic electromagnetic actions of the fields of it voltammetric structure. Single celled organisms develop or evolve if you will allow us to say into multi celled organisms. This needs more complex DNA structures and the number of chromosomes needed grows. DNA acts as the chief accountant as it sends off RNA and messenger RNA to accomplish the goals of life. Life develops with tremendous diversification over 100,000,000 organisms have evolved with various and diverse functions. But all are Quantic electromagnetic exchange devices taking in energy, excreting waste products, and trying to reproduce. Everything having it’s own set of field intricacies, and a single reactive ever changing overall field signature. The Quantic Electro-magnetic-static field of an organism is reacting towards nutrition and away from toxins. To maximize metabolism. It reacts to mating signals and reproductive gesticulations to maximize reproduction.

Everything is a wash of field interactions and electromagnetic radiation photons. The cells of biology use this electromagnetic radiation for communication. Information for reproduction or Mitogenic radiation is in the visible, metabolism radiation is in the Infrared. Biology does not justsend heat out.
The Human Body Electric

There are over one hundred trillion cells in the human body and all are sending signals to the brain via enervation and photon exchange. Making some ten to the 16 bits of data per sec. Or less. 1,000,000,000,000,000 bits of data.

The word area of the brain has developed as a small part of the human brain. About the size of a golf ball this small Broca area for words. Words coming in and words going out. As a waste product it is a communication network for cellular info exchange.

The rest of the Brain is for life, metabolism and reproduction. Life is an unconscious process. Life is non-verbal. We do not have to think words to live. Words are for helping us function in social ways.

We have a reticular formation in the base of our brains that act as a filter to screen out unneeded data from our word area. The word area has the ability to assay about one million 1,000,000 bits of data at a time. More and the word area goes into overload. Below one thousand sensory bits and the system goes into sensory deprivation mode. It invents sensory data.

This means that ten to the sixteenth bits of data minus the ten to the 6 bits of data for the word area and the word are are of the brain gets one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of the data sent to the brain. The unconscious non-verbal body electric gets all of this data and much more.

The spiritual cultures of the world know this and all exercises in spiritual development revolve around diminishing the words in the brain and coming aware more of the unconscious process. Mantras, meditation, stillness, yoga, kundalini, and many others all say we must control and diminish to effects of the verbal word mind to get in touch with our body energetic. The true self is the body electric.

Much of the mistake of modern science and modern societies is to over value the words and the verbal process. Our society is presently over valuing the paper pushers and letting their need for words be more important than people. We need paper pushers and we need to have quality systems but there should be a requirement to try to minimize the over wordy and clarify the process of our society for everyone to understand not just the small minded paper pushers. This is especially true for biology and medicine.

The very process of life is an innate unconscious non-verbal Quantic electromagnet field interaction. Words have little to do with it. But so-called modern medicine has overvalued the words. They wait for the patient to verbally notice something is wrong, go to the doctor office and announce what is wrong, answer the doctors’ verbal questions, and receive verbal instruction. And yet this verbal exercise of medicine is only aware of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of one percent of the data. The body Now as we learned in 5th grade everything is made mostly of electrons and protons. Photons are involved in all exchange of energy states. Now in some materials the electrons are tightly bound and are unwilling to allow electron exchange. In concrete the atoms are bound tightly and the electrons are not very conductive. In a metal like copper the electrons are quite willing to allow electro energy exchange and transport of electrons. So copper is a good conductor.

The organization of atoms and electrons determines the nature of the substance. Atoms seek to have a balanced outer level of electrons as per quantum law. This is the nature of atoms and it is calculated in the Mendeleev table of elements. Atoms seek to find the balance of the noble elements. This is the lesson from 10th grade chemistry. It is a simple lesson that tells us just how all atoms combine to make molecules. This lesson is based in Quantum theory. Those to say that quantum theory is not relevant to biology are expressing a rather concerning ignorance.

Molecules can be very very complex. But
all of them are made of electrons, protons, neutrons etc held by Quantic forces. These molecules all have a structure of their outer electrons that can be assayed by the voltammetric signature. Voltammetry is the science of electrodes checking the individual style of electron and proton interaction. This is how every substance reacts to another, the outer electrons never touch but the field interaction as determined by voltammetry is a definition of how they work.

Every atom or molecule can be balanced, positive charge, negative charge, or combination of both. This depends on the amount of protons and electrons. This is Basic grade school science.

The charged particles that travel make a current flow. The amount of charged particles in the amperage, the pressure or potential of the flow is the voltage, the resistance to the flow is the resistance. All organisms use this electrical flow of charged particles for each and every biological process.

The electron is the smallest charged particle to move, and most of electricity is of the traveling electron. But protons and ions range from the small to very large.

The outer electrons of a plant are taken to higher energy states thru the QED phenomena known as photosynthesis. These electrons are most often stored in carbohydrates and natural sugars. The body use them for energy, making ATP from the electrons.

Energy transfer in the body takes place in many voltammetric ways. Water has free protons and free electrons and thus it is essential for life. Water does not conduct electricity, unless there are some mineral salts or electrolytes in the water. But as in the salt water the body has lots of water and electrolytes. Thus the body electric can thrive. REF

Fish like the shark swim and thus live in an electrolyte conductive medium. They develop electrical sensing systems, and can detect foods by their voltammetric signatures. In other land creatures like humans this electro sense is transferred to the skin and nose. But still voltammetric sensing of items are the basis for life.

We have the sense of sight for photon sensing, hearing for sound vibration detection, feeling for movement, pressure, heat, cold, balance, and the alkaline acid balance of chemicals. Smell and taste are voltammetric shape receptors sensors. (REF 2004 Nobel prize + electro sense).

The largest gene family of our DNA is dedicated to the smell, over 3% in humans, 7% in some animals. All of our senses are electrical in action and transfer mechanism. Some of our sensory system is directed to our verbal or conscious mind and most to our non-verbal unconscious.

In the human body there is massive transfer of electrical signals. The flow of food entering the colon during digestion is based on static electrical attraction. Water facilitates the entire body electric. The body heat is photonic and also contributes to information transfer. If we look at the body human with today’s modern science of QED and electronic physics, a whole new science develops a world different than the synthetic drug and surgery medicine we have today.

Today’s so called modern medicine is based on a 200 year old reductionism 17th century Newtonian antiquated physics. A true new modern medicine of the body electric opens the door to a more affordable, sophisticated, safer, and more efficient modern medicine. (REF Body Electric, Science over Convention)

There is resistance to the flow of electricity. Louis Ampere discovered amperage, Volta discovered Volts, and Dr. Ohm put a law together to describe the relationship in terms of resistance. Resistance is in Ohms and Ohms law states that voltage equals amperage times resistance. This is the first week of electronics class usually taught in 9th grade physics.

The right hand rule describes the fields around a flowing current. And it says that as current flows like your outstretched right thumb, a magnetic field is made at 90 degrees like your outstretched forefinger, and a static field is made at 90 degrees like your outstretched middle finger. Thus the fields of electricity are described. This is the second week of electronics class usually taught in 10th grade physics.

So all electrical action or flow of electricity generates a three dimensional field, at least. So we called the process of measuring this field the trivector. This is a type of 3-dimensional voltammetry.

Voltammetry is the science of understanding how a substance’s electro-magnetic field reacts with it’s environment. A hormone has electrons and protons and how they are placed in a 3 dimensional space will determine how it exchanges electron-magnetic action and this is measured by measuring the 3 dimensional effect of it voltammetric field. The amount of charged particles is the amperage, the pressure or potential of the charged particles is the volts. Basic 7th grade physics. Every compound having it’s own individual and distinct voltammetric signature field. REF Voltammetry

Volts times amps is a power index or what is known as Watts. Once we measure simple variables we can easily calculate a great variety of electrical forces. We can thus calculate volts, amps, ohms, reactance, susceptance, watts, capacitance, inductance, impedance, and other virtual mathematical calculations.

Knowing that reductionism has failed as a way to analyze the human body we can make more global measures of these energies of a human, compare them to norms, and then using safe micro-current stimulation change them.

We can detect and affect the body electric is safe and effective ways. The SCIO system is designed and registered to do just this. To detect and affect, EEG, ECG, EMG, GSR, electro-osmosis, trauma tissue, wounds, pain, charge stability, acid alkaline balance, voltammetric reactance of substances, oxygenation, hydration, redox potentials, electro-acupuncture, bio-resonance, super-learning, and other bio-electric functions. All from simple basic science taught in our schools today. REF clinical evaluation

Life must keep Potassium inside the cell and Sodium outside of the cell. The natural thermodynamic balance is for them to gravitate to be equal. So potassium has a natural pull to go out and sodium to go into a cell. Because the concentration gradient for potassium is directed out of the cell, while the concentration gradient for sodium is directed into the cell, there is a need for a sodium pump to stabilize the life of the cell. This takes the energy of ATP to operate the sodium pump. The sodium-potassium pump transports 2 potassium ions inside and 3 sodium ions outside at the cost of 1 ATP molecule. There should be twice as much potassium as sodium in the healthy human body.

Membrane potentials are defined relative to the exterior of the cell; thus, a potential of −70 mV implies that the i  nterior of the cell is more negative than the exterior. Life is electrical.

Electrons never touch, so atoms never touch, molecules never touch. Not much ever touches anything. It is all an interaction of their fields. Research has shown that
are) they crave electrons. The SCIO can supply electrons and electro-stimulation that will increase osmosis, increase membrane transport of nutrients in and toxins out, increasing hydration and oxidation. If there is an alkaline terrain the SCIO can ground out excess electrons and help to balance the body electric while still increasing osmosis.

Slight electro-stimulation is shown to not only increase osmosis, but to have pain reducing qualities (MENS), relaxation effects, mood stabilization (CES), and charge stability. When you charge your car battery you use a trickle charger. It supplies a similar charge to the battery over a long period to tickle and trickle the needed electrons into the battery.

Factors that influence the body voltage and membrane potential are fatty acids in the cell membrane, minerals, especially salts, hydration water, oxygenation, stress, toxins and life style.

The SCIO has been proven in tests to increase the electrical potential of the body. Increased cellular membrane potential makes osmosis increase, which increases detoxification, nutrient transfer and absorption, hydration, oxidation, and all cellular functions in general.

When we apply even a weak current or electro-potential across a cell, membranes become more osmotic. Osmosis increases with small electro-potential stimulation. The membranes shown above have different electro-potentials across them. The main factors of membrane potential are membrane consistency which is based on the quantity and quality of the fatty acids and minerals. Calcium is the best universal membranous mineral. So lifestyle, nutrition, and exercise are the first considerations and the SCIO approaches them first in the SOC inventory.

The second factors of membrane potential are the existence of the free charges in the body. If the body is acid (as over 80% of our patients are) they crave electrons. The SCIO can supply electrons and electro-stimulation that will increase osmosis, increase membrane transport of nutrients in and toxins out, increasing hydration and oxidation. If there is an alkaline terrain the SCIO can ground out excess electrons and help to balance the body electric while still increasing osmosis.

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As we have said there should be twice as much potassium as sodium in the healthy human body. But people like salt and producers put more salt into foods to sell and satisfy customers. Potassium occurs mostly in fruit and vegetables. Potassium makes foods turn Orange. So oranges, pumpkin, paprika, squash etc have the most. Most people get too much sodium and too little potassium. This puts pressure on the potassium-sodium pump. This wastes ATP needed for other cellular functions and stress the body electric. The excess sodium makes the body go acid with excess positive charge. This drives the charge stability of the body to the acid state and is reflected in the measurements made from the SCIO. There are many other factors that can upset this electrical balance.

The electro-potential of the cell membrane must be kept inside some strict limits to assure proper electrical activity for life. The cell is an electrical dynamo needing energy for activity. This energy comes from hot electrons (high quantum state energy of electrons in food). The food has gotten it’s energy from the sun’s visible light photons energizing the electrons to higher quantum states. The quantum energy is broken down in Krebs cycle to make ATP. Photons of heat are released. The cells will have electrical activity that is of a tight range and thus electro-medicine will need to decipher the code of the types of variations in the body electric that hallmark disease states. The cell must fight thermodynamics to live.

STUDIES
POTASSIUM AND SODIUM

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STUDIES
POTASSIUM AND SODIUM
education and possible correction of life style issues. It is important to point out the value and importance of correcting these issues for health. Correlations between whole-body impedance measurements and various bio-conductor volumes, such as total body water and fat-free mass, are experimentally well established; we can measure many different factors of the body electric. First there is skin electro-potential.

Each of these small little batteries we call cells blend in harmony to make the multi-cellular organism we call the human. The hundred trillion cells in the human body act both in series and in parallel to make the electro-potentials of the human body. Most of these cells are surrounded by fluid (interstitial, lymph, blood etc.). These fluids are mostly water with lots of free protons, electrons and minerals which further enhance the electrical factors. The normal cell has a resting voltage potential across the membrane of 70 millivolts (70mv). The brain cell will fire at peak voltage of +30mv so as to create a difference of 100 millivolts. Thus the body has a measureable voltage and amperage while living. This electro-potential is oscillating and or pulsing. Cells charge and discharge electricity at varying speeds. Global measures reflect trends of the cells in the area to be measured. There are norms of these measures.

The amperage and voltage coming off of the body’s skin is of a range of zero to 5 millivolts and 1.5 volts. Zero is obvious as we all have seen the flat line in a movie telling us the person is dead. Normal people put off micro-amperage and milli-volts, the extreme can be seen at over a volt. The criteria of these potentials are derived from their location and oscillation. Thus we can calculate the base body voltage, amperage and resistance from our readings.

If we measure on the scalp or the forehead as in the case of the SCIO, we can measure the transcutaneous correlate of the activity of the heart cells firing in the brain below the point of measure. This is called EEG or electroencephalography. We can ascertain the brain wave from the oscillation pattern. The pattern or rhythm of the brain wave is from 4 hertz as delta waves, 4-8 Hz for theta, 8 to 20 for alpha, and 20 to 100 for beta waves. If we measure the electro potential of the skin and filter out these waves we can get the EEG.

If we measure on the forehead, wrists and ankles as in the case of the SCIO, we can measure the transcutaneous correlate of the activity of muscle cell activity between the points of measure. This is called EMG or electromyography. We can ascertain the muscle activity from the oscillation pattern. The pattern or rhythm of the muscle waves is from 2 to 20 normally with variant spindles up to 1000 Hz. If we measure the electro potential of the skin and filter in these waves we can get the EMG.

If we measure on the wrists and leg left as in the case of the SCIO, we can measure the transcutaneous correlate of the activity of heart cells between the points of measure. This is called ECG or electrocardiography. We can ascertain the Heart wave from the oscillation pattern. The pattern or rhythm of the heart wave is from zero to 2 Hz. If we measure the electro potential of the skin and filter out these waves we can get the ECG. The heart signal is the largest in potential and smallest in time measured in biofeedback. To measure skin resistance, we must apply a known voltammetric signal as an input and then see how much of it is resisted by the body, most applicable by the skin. The measure the galvanic skin resistance or impedance we need to be able to input a voltammetric signal into the electrode points. This is a variant signal in the SCIO of variant wave forms, and wave potentials. The measured output of resistance is usually non hertzian. Pulsations in resistance reactivity are fractal and non repeating.

The voltammetric signal of the SCIO is of a micro-current nature. The applied signal strength is derived from the base signal strength of the patient body natural. We are of the philosophy that signals exceeding twice the body norm will be considered invasive and the body will react adversely to such signals. We wish to just tickle the body with electro-stimulus near the natural. Thus the upper limits of the SCIO body stimulation output will be 5 volts, and 50 micro-amps. All of this is under the regulatory safety criteria specified.

Thus as seen in the EPFX FDA 1989 registration the SCIO is registered to measure volts and amperages at 12 points of forehead, wrist and ankles. Input a voltammetric signal to these points, and then measure the reaction of resistance at these points. The SCIO then can acts as a frequency generator sending out voltammetric waveforms and a frequency counter measuring frequency response. From these simple criteria a host of electrophysiological data can spin out to assist the SCIO in correcting aberrant electrophysiological functioning. Electro-stimulation is helpful in osmotic stimulation, transcutaneous electro-nerval-stimulation for pain control and injury or wound healing, redog stimulation, and others. The SCIO uses a cybernetic loop of analysis to use this electro stimulation to adjust electrophysics of the patient.
Smooth muscle intracellular pH: measurement, regulation, and function

Smooth muscle performs many functions that are essential for the normal working of the human body. Changes in pH are thought to affect many aspects of smooth muscle. Despite this, until recently little was known about either intracellular pH (pHi) values or pH regulation in smooth muscle. Recent work measuring pH with either microelectrodes or nuclear magnetic resonance spectroscopy is now providing some of this much needed information for smooth muscles. From these studies, it can be concluded tentatively that pH is the same in different smooth muscles, approximately 7.06 (37 degrees C). This value is very close to those obtained in cardiac and skeletal muscle. It is clear that H+ is not in equilibrium across the smooth muscle membrane; i.e., pH is regulated. Preliminary results in smooth muscle suggest that certain aspects of this regulation are different from that described for other muscle types. Changes in pH have been found to produce marked effects on contraction in smooth muscle. Of particular interest is the fact that, unlike striated muscles, some smooth muscles can produce more force during an intracellular acidification.

VARHOPE and Stress

The above diagram shows a key little known fact of biology. The factors of the wave formations of people differ from person to person. The values shown are not perfect. The height of the curve is the voltage. We take approximately 1000 readings of voltage in a second. The non-aberrant maximum reading is then the correlate of the voltage reading of the SCIO. The area under the curve is the Amperage. After each second we calculate the volume of area under the graph or average and this is the correlate of the amperage reading of the SCIO. Resistance is measured in ohms as we calculate the applied current to received current. Using ohms law we can know calculate amperage more carefully. Each second there is a changing amperage, resistance and voltage measure that reveals trends of the patient’s electrophysiology. Brain wave and heart system amplitude are widely used in electrophysiology. It is surprising that someone would not know of this approach.

Proton pressure or the charge stability of the system affects the polarity and the resting potential. The slight changes in these electrical profiles can be measured. Thus there are definitely electrical values of each patient at multiple globally placed electrodes that make up a VARHOPE profile. These factors are most often controlled by life style behaviors and stress. Slight regulatory balancing from the guided electro-stimulation of the SCIO can also make changes.

Brain wave readings of amplitude can be assayed for peak voltage if we reduce aberrant noise. Averages give us a more current (amperage) correlate of the systems electrophysiology.

In conclusion

Lies, rumors, and innuendos have led to slander and liable as well as collusion and prejudice against me and the companies I consult for. This disturbing and illegal prejudice is being investigated and pursued. I would hope that a resolution and honest discussion could ensue to allow all to see that the SCIO device is safe, effective and fully compliant with worldwide regulations.

List of just some articles that refer to voltage amplitude.

Michael Linden, Thomas Habib and Vesna Radojevic
Mission Psychological Consultants, 30270 Rancho Viejo Road, Suite C, 92675 San Juan Capistrano, California

Abstract

Eighteen children with ADD/ADHD, some of whom were also LD, ranging in ages from 5 through 15 were randomly assigned to one of the SCIO. The area under the curve is the Amperage. After each second we calculate the volume of area under the graph or average and this is the correlate of the amperage reading of the SCIO. Resistance is measured in ohms as we calculate the applied current to received current. Using ohms law we can know calculate amperage more carefully. Each second there is a changing amperage, resistance and voltage measure that reveals trends of the patient’s electrophysiology. Brain wave and heart system amplitude are widely used in electrophysiology. It is surprising that someone would not know of this approach.

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Brain wave readings of amplitude can
two conditions. The experimental condition consisted of 40 45-minute sessions of training in enhancing beta activity and suppressing theta activity, spaced over 6 months. The control condition, a waiting list group, received no EEG biofeedback. No other psychological treatment or medication was administered to any subjects. All subjects were measured at pretreatment and at posttreatment on an IQ test and parent behavior rating scales for inattention, hyperactivity, and aggressive/defiant (oppositional) behaviors. At posttreatment the experimental group demonstrated a significant increase (mean of 9 points) on the K-Bit IQ Composite as compared to the control group (p<.05). The experimental group also significantly reduced inattentive behaviors as rated by parents (p<.05). The significant improvements in intellectual functioning and attentive behaviors might be explained as a result of the attentional enhancement affected by EEG biofeedback training. Further research utilizing improved data collection and analysis, more stringent control groups, and larger sample sizes are needed to support and replicate these findings. Page 3. EEG biofeedback for ADD 37 Research efforts into new treatment options are vital considering the extent and intractability of these disorders. ... This finding of underarousal correlates with low amplitude in EEG beta frequencies found in this population. Descriptor Key Words EEG biofeedback - attention deficit disorder - attention deficit hyperactivity disorder - intelligence - learning disabilities

This research was supported by an equipment grant by Autogenic Systems. Portions of this paper were presented at the annual convention of the Association of Applied Psychophysiology and Biofeedback, March, 1993 in Los Angeles and at the annual meeting of the Biofeedback Society of California, November, 1992 in Monterey, California. The authors gratefully acknowledge Todd Fischer and Paul Clopton for their valuable assistance in statistical analysis for this article. Human EEG gamma oscillations in neuropsychiatric disorders. Clinical Neurophysiology, Volume 116, Issue 12, Pages 2719-2733 C.Herrmann, T.Demiralp

Discourse on the development of EEG diagnostics and biofeedback for attention-deficit/hyperactivity disorders

Journal Applied Psychophysiology and Biofeedback
Publisher Springer Netherlands
ISSN 1090-0586 (Print) 1573-3270 (Online)
Issue Volume 16, Number 3 / September, 1991
Category Research Recognition Award Paper
DOI 10.1007/BF01000016
Pages 201-225
Subject Collection Behavioral Science
SpringerLink Date Friday, January 21, 2005

Abstract Due to their small amplitude, the importance of high-frequency EEG oscillations with respect to cognitive functions and disorders is often underestimated as compared to slower oscillations. This article reviews the literature on the alterations of gamma oscillations (about 30–80Hz) during the course of neuropsychiatric disorders and relates them to a model for the functional role of these oscillations for memory matching. The synchronous firing of neurons in the gamma-band has been proposed to bind multiple features of an object, which are coded in a distributed manner in the brain, and is modulated by cognitive processes such as attention and memory. In certain neuropsychiatric disorders the gamma activity shows significant changes. In schizophrenic patients, negative symptoms correlate with a decrease of gamma responses, whereas a significant increase in gamma amplitudes is observed during positive symptoms such as hallucinations. A reduction is also observed in Alzheimer’s Disease (AD), whereas an increase is found in epileptic patients, probably reflecting both cortical excitation and perceptual distortions such as déjà vu phenomena frequently observed in epilepsy. ADHD patients also exhibit increased gamma amplitudes. A hypothesis of a gamma axis of these disorders mainly based on the significance of gamma oscillations for memory matching is formulated.

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Abstract This article presents a review of work that my colleagues and I have been doing during the past 15 years developing a rationale for the diagnosis of attention-deficit/hyperactivity disorder (ADHD) and treatment of ADHD employing EEG biofeedback techniques. The article first briefly reviews the history of research and theory for understanding ADHD and then deals with the development of EEG and event-related potential (ERP) assessment paradigms and treatment protocols for this disorder, including our work and that of others who have replicated our results. Illustrative material from our current research and child case studies is included. Suggestions for future experimental and clinical work in this area are presented and theoretical issues involving the understanding of the neuropsychological and neurological basis of ADHD are discussed. ... This disorder is primarily found in boys (James and Taylor, 1990), with the ratio of boys ... (1992), in a study of children with ADHD, found an increase in absolute amplitude in the ... The ADHD children were found to have EEG frequency distributions that resembled profiles typical of ... We feel that in the absence of known etiology or pathogenesis, as in the more common psychiatric disorders, marked differences in response to adequate trials of the same ... The mean resting EEG amplitude and the range of the mean resting EEG amplitudes were also computed ... Event-related EEG/MEG synchronization and desynchronization: basic principles G Pfurtscheller, F Lopes da Silva - Clinical Neurophysiology, 1999 - Elsevier ... In addition it was also shown that visual stimuli can reduce the amplitude of the ongoing EEG amplitude (Vijanet al., 1991), thus demonstrating
that the model assuming that an ERP can be represented by a signal added to uncorrelated noise does not hold in general ...

_Brain and human pain: topographic EEG amplitude and coherence mapping_  
ACN Chen, P Rappelsberger - Brain Topography, 1994 - Springer  
... awake states, sensory ac- tivation, cognitive processing, learning, stress and emotionality, mental disorders, effects of ... and pain, the tasks of this study were: (a) to employ both amplitude and coherence analysis in pain study, (b) to expand the EEG recording channels ...

... CT scan and sensorimotor EEG rhythms in patients with cerebrovascular disorders  
... Fifty subjects with cerebrovascular disorders and motor deficits, all able to perform a voluntary ...

From the mu rhythm, the hemispheric asymmetry in amplitude and ERD during movement (ERD) and the inhibition of theta activity in the case of Attention Deficit Disorders or the ...

Sleep bruxism: an oromotor activity secondary to micro- arousal  
T Kato, P Rompré, JY Montplaisir, BJ - Journal of Dental ..., 2001 - jdr.sagepub.com  
... frequent and the burst amplitudes are higher in SB patients than in normals ...

... abrupt change in the frequency of cortical EEG that is occasionally ... snoring, apnea, periodic leg movement syndrome, or insomnia) or medical disorders (eg, psychiatric, neurological, or movement ...

_EEG and human psychopharmacology_  
M Fink - Annual review of pharmacology, 1969 - Annual Reviews  
... In some rigorous EEG quantitative studies, threshold drug effects were ob served when a simple reaction-time task was periodically introduced with the EEG frequency and amplitude changes measured immediately after correct performance of the task (46, 47, 50) ...

... EEG changes with benzodiazepine administration in generalized anxiety disorder  
MS Buchbaum, E Hazlett, N Sicotte, M Stein, J Wu, ... - Biological ..., 1985 - Elsevier  
... Day 0 predrug minus day 0 Benzodiazepine EEG in Anxiety Disorder BIOL PSYCHIATRY 835 1985;20:832-842 postdrug (2 hr) and day 0 predrug minus day 14 group means and t-tests for the ... 1985 ;20:832-842 Figure 1. Change in EEG amplitude with drug administration. ...

The application of EEG sleep for the differential diagnosis of affective disorders  
DJ Kupfer, FG Foster, P Cable, RJ - American Journal of ... 1978 - Am Psychiatric Assoc  
... Page2. EEGSLEEPANDAFFECTIVEDISORDERS  
Am J Psychiatry 135:1, January 1978 70 ... schizo-affective disorder. All EEG sleep records were scored independently and without knowledge of the patient’s clinical diag- nosis. The sleep values for each of the 95 patients rep-...

_A cross-national EEG study of children with emotional and behavioral problems: A_  
M Matsuura, Y Okubo, M Toru, T Kojima, Y He, Y, ... - Biological ..., 1993 - Elsevier  
... 8.3 (I.0) 41 (36, 5) 8.6 (1.0) 26 (17, 9) 8.6 (1.6) 87 (55, 32) 8.1 (1.5) 29 (19, 9) 8.0 (1.9) aADHD: attention deficit disorder with hyperactivity. amplitude theta with 30 p,V or more, and consec utive alpha with three or more waves). Calculation of Hypothetical EEG Maturation Material ...

Indi...
Positive parenting
Authors of a review published last year in Clinical Pediatrics wrote that parents of kids with ADHD are often more controlling and disapproving of their children, are more likely to reprimand, and are less supportive than parents of kids without the disorder. Training programs can teach parents how to reward good behavior by, for example, awarding points or privileges to kids for focusing on their homework. Considerable scientific evidence indicates that receiving training in key parenting skills helps parents manage their kids’ behavioral problems, although studies showing the long-term benefits of the treatment are lacking. “Absolutely essential to any treatment program for ADD should be positive relationships,” both at home and at school, says Edward Hallowell, psychiatrist and author of Superparenting for ADD. U.S. News contributor Nancy Shute interviewed him recently.

Treatment programs
Along with parent training sessions, summer programs for kids were examined in the MTA study. As behavioral therapeutic interventions, summer programs and parent training initially were found to be less effective than medication in children with ADHD. But these behavioral therapies are recommended by the American Academy of Pediatrics as acceptable treatments for ADHD. Summer treatment programs, pioneered by William Pelham, a research psychologist at the State University of New York-Buffalo, are offered at several university medical centers and aim to teach kids social skills and improve academic performance. Shute covered such programs in detail, as well as those that deal with parent retraining, earlier this year.

Neuro feedback
Also called EEG SCIO biofeedback, this treatment tries to train patients to control brain waves typically associated with focus and attention. Unlike medication, which must be taken for years, SCIO neurofeedback is said to work permanently after the training sessions are completed. It seems to be safe. Numerous studies of the technique “all have some flaws, but it looks like a promising treatment,” says Eugene Arnold, professor emeritus of psychiatry at Ohio State University and lead researcher of a current federally funded clinical trial of neurofeedback on a group of children with ADHD. He notes, however, that this approach is difficult, labor intensive, and expensive—as much as $5,000, a cost that health insurance is unlikely to cover until there is clear evidence that SCIO neurofeedback works. Such evidence, Arnold says, is accumulating.

Interactive Metronome training
Many kids with ADHD can’t form and execute a plan one step at a time, as other kids do. Interactive metronome training, which employs a computerized tool, was developed to help kids with ADHD improve their motor skills and ability to plan. Users tap their hands or feet in time to a beat they hear through headphones, and the technology records their accuracy. In a study that included 56 boys with ADHD, the training seemed to focus attention and improve motor control, reading, and other skills in the patients, compared with those who either got no treatment or played video games.

In general, rhythmic activities can improve attention in certain children, according to Stanley Greenspan, clinical professor of psychiatry and pediatrics at George Washington University Medical School and coauthor of Overcoming ADHD: Helping Your Child Become Calm, Engaged, and Focused—Without a Pill, a book coming out next month. But such activities are only one part of a comprehensive program described in the book, Greenspan says, which aims to help all areas of development that influence attention. Here’s a tip from the book: Try playing “Simon says,” getting your child to mimic your gradually more elaborate two- and three-step actions.

Meditation
A pilot study that appeared in a 2008 issue of Current Issues in Education suggests that transcendental meditation may help improve attention and behavior in kids with ADHD. The results can’t be generalized to all forms of meditation since each technique works differently, says Sarina Grosswald, a medical education consultant and lead author of the study. TM affects the brain by reducing stress and anxiety, which allows the prefrontal cortex—the part responsible for attention and focus—to function more efficiently, Grosswald says. Research at the University of California-Los Angeles supporting mindfulness meditation appeared last year in the Journal of Attention Disorders.

Neither meditation study compared the results with a group not practicing meditation.

A natural environment
In a 2004 study in the American Journal of Public Health, researchers found that kids with ADHD showed improved symptoms after playing outside in a natural environment. A similar 2008 study out of the University of Illinois showed that attention improved in kids who took a 20-minute stroll in the park more than in kids who walked outside in a downtown or residential area without much greenery.

These studies suggest that children with ADHD get some benefit from being in nature.

Better sleep
A study that appeared in March in the journal Sleep concluded that kids with ADHD slept for less time on average than their healthy counterparts, suggesting that sleep problems may be associated with ADHD. “Up to 25 percent of children who have been diagnosed with ADHD may not have ADHD, [but rather] they may have sleep-disordered breathing,” says Julie Wei, associate professor of otolaryngology at the University of Kansas School of Medicine.

A few years ago, Wei and a team of researchers assessed the behavior of 71 patients (the majority of whom did not have ADHD) after their tonsils and adenoids (lymph tissue behind the nose) were removed. Six months after surgery, the group showed significant improvement in four measures of behavior: inattention, hyperactivity, oppositional behavior, and a measure called the ADHD index.

While the ADHD index eventually returned to presurgery levels, hyperactivity, inattention, and oppositional behavior stayed down for at least 2½ years, Wei’s team found. Wei tells parents to pay attention to their kids’ sleep, especially if a child snores habitually, which may be a sign of sleep-disordered breathing.

Diet
The Feingold diet, in which patients abstain from food additives and naturally occurring salicylates, has been hyped since the ’70s, even though subsequent research hasn’t been very successful at replicating initial findings that the diet eased ADHD symptoms. And sugar has caught blame for causing hyperactivity.

“The scientific literature is confusing,” says Greenspan. The problem is that all children are different, and the research has not created
subgroups that would tell us which children are sensitive to dyes or additives in food, according to Greenspan. For that reason, parents have to be very good detectives, he says.

If you’re concerned that sugary juices, for example, are worsening problems, try removing them from your kid’s diet for two weeks and watch the effect, Greenspan recommends. Some experts also advise children to take omega-3 supplements if they’re not getting adequate amounts in their diet. Omega-3s, found in fatty fish and other foods, may improve brain function and focus.

**Exercise**

There’s increasing evidence that physical activity is good for the brain as well as the heart, Arnold says. U.S. News has reported on research that linked aerobic exercise to kids’ achievement in math and reading. Arnold’s team is working on a pilot study to find out whether exercises that train the cerebellum, such as running in place or navigating around cones, are more beneficial for children with reading problems and ADHD than an exercise program that involves aerobics. Hallowell puts exercise No. 2 on his list of so-called alternative treatments for ADHD, behind creating a positive, loving environment at home and above getting enough sleep.

**5 Foods to Feed Your Child With ADHD—and 5 to Avoid**

Nutrition choices that may help or worsen symptoms of ADHD.

**CHOOSE: Essential fatty acids (EFAs)**

Here is one fat you want your child to have: DHA, an omega-3 fatty acid, is the key to unlocking an ADHD child’s brain. Studies have found that children with learning disorders, including attention deficit and hyperactivity disorders, often have an EFA deficiency. The right kinds of fat are needed to help the brain fire information efficiently from synapse to synapse. An ADHD child experiences a miscommunication between brain cells, says clinical nutritionist Marcia Zimmerman.

A message is fired, but not received, “so then it gets sucked back up into the neuron that sent it in the first place,” says Zimmerman. The EFAs help the brain cells receive the messages sent between synapses, thus eliminating the chatter and preventing the sending neuron from scooping up its own message. Fish, flax seeds and nuts are great sources of EFAs. The specific EFA to look for is the omega-3 essential fatty acid DHA that’s found in fish and some algea. Fish oil supplements are an efficient way to help your child get the amount he needs. DHA omega-3 eggs and other foods with DHA added to them are also good sources. EFAs from flax seed and other sources can work too, but the body needs to convert it into the form most advantageous for one’s body, so they’re a less efficient source.

**CHOOSE: Vitamin B complex**

The B vitamins have been linked to improved neural activity and are great at reducing stress, both useful for children with ADHD. While most B vitamins are safe, two do have potential side effects, so consult with a medical provider before selecting a supplement for your child. Vitamin B3, also commonly known as niacin, can cause skin flushing and, in a time-released form, has been associated with liver damage. High doses of vitamin B6 can cause numbness and tingling.

Good food sources of the B vitamins are nutritional yeast, liver, whole-grain cereals and breads, rice, nuts, milk, eggs, meats, fish, fruits, leafy green vegetables and soy.

**CHOOSE: Protein**

If you’ve ever traded your afternoon caffeine fix for a couple bites of salmon, then you already know: Protein evenly sustains your energy. The same holds true for children with ADHD—eating small portions of protein throughout the day evens out their energy, too. “I have always told parents they need to plan a protein lunch,” says clinical nutritionist Marcia Zimmerman. “Make sure the child gets protein for breakfast, too.”

Serving a protein meal doesn’t mean you have to cook. Offer your child string cheese wrapped in whole grain bread. Feed him an egg, or low-fat plain yogurt blended with a banana for sweetness.

Zimmerman suggests mixing protein powder into a smoothie that you serve your child for breakfast, and offering a protein-rich smoothie as a snack when your child returns from school. Throughout the day, offer nuts and seeds, brown rice cakes spread with hummus, or any nut butters such as cashew butter.

**CHOOSE: Calcium and magnesium**

Give your child a tall glass of milk or lots of green veggies. While calcium is known for helping build strong bones, Zimmerman says it also supports cell membranes and aids the nervous system, especially in impulse transmission, which could improve a child’s behavior. Magnesium also has a calming effect on the nervous system, helping to maintain normal muscle and nerve function, and is involved in energy metabolism and protein synthesis. Children diagnosed with ADD and ADHD have responded positively to supplementation from calcium and magnesium, both of which are found naturally in many foods.

Milk and milk products are a main source of calcium. Green vegetables such as broccoli, kale, and collard greens, and whole grains and cereals are additional sources. Green veggies such as spinach are a great source of magnesium, as are beans and peas, nuts, seeds and whole grains.

**CHOOSE: Trace minerals**

Trace minerals are micronutrients that are needed by the body every day, but in small amounts. Trace minerals that would help an ADHD child include zinc and iron. Studies have shown that children with ADHD have low levels of zinc in their bodies compared to children without ADHD. Iron helps regulate the neurotransmitter dopamine and may help children with ADHD, though studies have been inconclusive. Trace minerals are found in fruits, vegetables, and animal products, but many nutritionists recommend supplementing with a sugar-free multivitamin.
AVOID: Sugar
Sugar is an ADHD child’s downfall because it robs the body of vitamins, minerals, and enzymes and increases hyperactivity by preventing blood sugar levels from remaining stable.

It doesn’t matter if you use refined white sugar or rich dark molasses—all sugars are created equal when it comes to their negative effect on the ADHD child. There may be slight nutritional benefits to some sugars: Sucanat, for example, is pressed cane juice that leaves the fiber behind, so you get the minerals from the plant. Also, honey offers pollen that helps with allergies, molasses contains trace minerals and iron, and agave metabolizes more slowly.

Still, you should curb your child’s sugar intake and get savvy to hidden sugars in foods such as breakfast cereals, energy bars, sweetened drinks, soy milk and other foods. For example, did you know that a serving of flavored yogurt might contain as much sugar as a serving of ice cream? When looking at a label, along with the obvious “sugar” tag, avoid all artificial sweeteners and foods that contain corn syrup, high fructose corn syrup, sucrose, dextrose and fructose.

AVOID: Additives
Blue bubblegum, pink and yellow cake decorations, goldfish crackers dyed the color of the rainbow—all are a visual delight for any child. The U.S. Food and Drug Administration has approved several hundred food additives designed to improve flavor, taste, and appearance, but this doesn’t mean they are healthy for your ADHD child, Zimmerman cautions. Steer clear of all artificial dyes and flavors.

Zimmerman specifically mentions food coloring, such as red and yellow, and monosodium glutamate, also known as MSG. And don’t assume, just because several years ago you read a lot about it in the media, that unsafe dyes are off the shelves. When possible, go natural with your food products.

AVOID: Hydrogenated oils
Bad fats aren’t just the nemesis for weight loss; they also inhibit healthy nerve function. “The wrong kinds of fat don’t feed the brain, instead they interfere with the brain,” Zimmerman says. “The membranes of the brain have to be very fluid and if you are putting those saturated fats in there, cut back.”

The wrong kinds of fats are the trans fats and saturated fats, generally the ones that are hard at room temperature. Manufacturers have become savvy to trans fats, so you’ll rarely find those on a label, but you’ll still find saturated fats. Healthier oils include flaxseed, canola and olive oils.

Another tip to avoid hydrogenated oils: Stick to the grocery store’s perimeter when you shop. “I always tell parents to stay out of the middle of the store” where foods are more processed and likely to contain unhealthy fats, Zimmerman says.

AVOID: Caffeine
Caffeine pulls minerals out of the bone, when your body lacks the natural level of minerals it needs to function. Coffee, tea and other caffeinated drinks are acidic and lower the natural pH of the body, says Zimmerman, making it work harder to find a natural balance.

This means that an ADHD child who’s consuming too much caffeine—sometimes found in chocolates, desserts, and carbonated beverages—may be losing the minerals he needs to assist his nerve function.

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ADD / ADHD in Children

**Signs and Symptoms of Attention Deficit Disorder in Kids**

It's normal for children to occasionally forget their homework, daydream during class, act without thinking, or get fidgety at the dinner table. But inattention, impulsivity, and hyperactivity are also signs of attention deficit disorder (ADD/ADHD). ADD/ADHD can lead to problems at home and school, and affect your child's ability to learn and get along with others. It's important for you to be able to spot the signs and symptoms, and get help if you see them in your child.

**What is ADD / ADHD?**

We all know kids who can't sit still, who never seem to listen, who don't follow instructions no matter how clearly you present them, or who blurt out inappropriate comments at inappropriate times. Sometimes these children are labeled as troublemakers, or criticized for being lazy and undisciplined. However, they may have ADD/ADHD.

Attention deficit hyperactivity disorder (ADHD) is a disorder that appears in early childhood. You may know it by the name attention deficit disorder, or ADD. ADD/ADHD makes it difficult for people to inhibit their spontaneous responses—responses that can involve everything from movement to speech and attentiveness.

The signs and symptoms of ADD/ADHD typically appear before the age of seven. However, it can be difficult to distinguish between attention deficit disorder and normal "kid behavior." If you spot just a few signs, or the symptoms appear only in some situations, it's probably not ADD/ADHD. On the other hand, if your child shows a number of ADD/ADHD signs and symptoms that are present across all situations—at home, at school, and at play—it's time to take a closer look. Once you understand the issues your child is struggling with, such as forgetfulness or difficulty paying attention in school, you can work together to find creative solutions and capitalize on strengths. The bottom line: you don't have to wait for a diagnosis or rely on a medical professional to help your child.

**Myths about Attention Deficit Disorder**

**Myth #1:** All kids with ADD/ADHD are hyperactive.

Some children with ADD/ADHD are hyperactive, but many others with attention problems are not. Children with ADD/ADHD who are inattentive, but not overly active, may appear to be spacey and unmotivated.

**Myth #2:** Kids with ADD/ADHD can never pay attention.

Children with ADD/ADHD are often able to concentrate on activities they enjoy. But no matter how hard they try, they have trouble maintaining focus when the task at hand is boring or repetitive.

**Myth #3:** Kids with ADD/ADHD choose to be difficult and could behave better if they wanted to.

Children with ADD/ADHD may do their best to be good, but still be unable to sit still, stay quiet, or pay attention. They may appear disobedient, but that doesn't mean they're acting out on purpose.

**Myth #4:** Kids will eventually grow out of ADD/ADHD.

ADD/ADHD often continues into adulthood, so don't wait for your child to outgrow the problem. Treatment can help your child learn to manage and minimize the symptoms.

**Myth #5:** Medication is the best treatment option for ADD/ADHD.

Medication is often prescribed for Attention Deficit Disorder, but it might not be the best option for your child. Effective treatment for ADD/ADHD also includes education, behavior therapy, support at home and school, exercise, and proper nutrition.

**Signs and symptoms of ADD/ADHD**

When many people think of attention deficit disorder, they picture an out-of-control kid in constant motion, bouncing off the walls and disrupting everyone around. But this is not the only possible picture. Some children with ADD/ADHD are hyperactive, while others sit quietly—with their attention miles away. Some put too much focus on a task and can't sit quietly—with their attention miles away. Some put too much focus on a task and can't sit quietly—with their attention miles away. Others are only mildly inattentive, but overly impulsive. Others are only mildly inattentive, but overly impulsive.

The three primary characteristics of ADD/ADHD are inattention, hyperactivity, and impulsivity. The signs and symptoms a child with attention deficit disorder has depends on which characteristics predominate. Children with ADD/ADHD may be:

Which one of these children may have ADD/ADHD?

A. The hyperactive boy who talks nonstop and can’t sit still.
B. The quiet dreamer who sits at her desk and stares off into space.
C. Both A and B

Some snackers forgo sugar in favor of salt, but sodium is another nutrient to avoid in excess. Many of us know that sodium can cause high blood pressure, but too much can also interfere with your child's internal equilibrium. ADHD, says Zimmerman. Similar to caffeine, salt can lead to a depletion of the minerals needed to keep the neurons firing in a healthy manner. Saying sodium "interferes with a child’s mineral balance," Zimmerman suggests trading tortilla chips, pretzels and other snacks high in salt for potassium-rich fruits and vegetables. Processed foods tend to be high in sodium, so watch for it on the labels.

You Must Skip Cola (Even Diet)

Scientists in Boston found that drinking one or more regular or diet colas every day doubles your risk of metabolic syndrome—a cluster of conditions, including high blood pressure, elevated insulin levels, and excess fat around the waist, that increase your chance of heart disease and diabetes. Controlling blood pressure and cholesterol levels, preventing diabetes, and not smoking can add 6 to 9 1/2 healthy years to your life.

One culprit could be the additive that gives cola its caramel color, which upped the risk of metabolic syndrome in animal studies. Scientists also speculate that soda drinkers regularly expose their tastebuds to natural or artificial sweeteners, conditioning themselves to prefer and crave sweeter foods, which may lead to weight gain, says Vasan S. Ramachandran, MD, a professor of medicine at Boston University School of Medicine and the study’s lead researcher.

Better choices

Switch to tea if you need a caffeine hit. If it’s fizzy you’re after, try sparkling water with a splash of juice.

Avoid: Salt

Some snackers forgo sugar in favor of salt, but sodium is another nutrient to avoid in excess. Many of us know that sodium can cause high blood pressure, but too much can also interfere with your child’s internal equilibrium when it comes to ADHD, says Zimmerman. Similar to caffeine, salt can lead to a depletion of the minerals needed to keep the neurons firing in a healthy manner. Saying sodium “interferes with a child’s mineral balance,” Zimmerman suggests trading tortilla chips, pretzels and other snacks high in salt for potassium-rich fruits and vegetables. Processed foods tend to be high in sodium, so watch for it on the labels.

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The correct answer is “C.”

- Inattentive, but not hyperactive or impulsive.
- Hyperactive and impulsive, but able to pay attention.
- Inattentive, hyperactive, and impulsive (the most common form of ADHD).

Children who only have inattentive symptoms of ADD/ADHD are often overlooked, since they’re not disruptive. However, the symptoms of inattention have consequences: getting in hot water with parents and teachers for not following directions; underperforming in school; or clashing with other kids over not playing by the rules.

Inattentive signs and symptoms of ADD/ADHD

Symptoms of inattention in children:
- Doesn’t pay attention to details or makes careless mistakes
- Has trouble staying focused; is easily distracted
- Appears not to listen when spoken to
- Has difficulty remembering things and following instructions
- Has trouble staying organized, planning ahead, and finishing projects
- Frequently loses or misplaces homework, books, toys, or other items

Children with ADD/ADHD can pay attention when they’re doing things they enjoy or hearing about topics they enjoy. But when the task is repetitive or boring, they quickly tune out.

Not paying close enough attention is another common problem. Children with ADD/ADHD often bounce from task to task without completing any of them, or skip necessary steps in procedures. Organizing their schoolwork and their time is harder for them than it is for most children. Kids with ADD/ADHD also have trouble concentrating if there are things going on around them; they usually need a calm, quiet environment in order to sustain attention.

Hyperactive signs and symptoms of ADD/ADHD

Symptoms of hyperactivity in children:
- Constantly fidgets and squirms
- Often leaves his or her seat in situations where sitting quietly is expected
- Moves around constantly, often running or climbing inappropriately
- Talks excessively, has difficulty playing quietly
- Is always “on the go,” as if driven by a motor

The most obvious sign of ADD/ADHD is hyperactivity. While many children are naturally quite active, kids with hyperactive symptoms of attention deficit disorder are always moving. They may try to do several things at once, bouncing around from one activity to the next. Even when forced to sit still – which can be very difficult for them – their foot is tapping, their leg is shaking, or their fingers are drumming.

Impulsivity signs and symptoms of ADD/ADHD

Symptoms of impulsivity in children:
- Blurs out answers without waiting to be called on hear the whole question
- Has difficulty waiting for his or her turn
- Often interrupts others
- Intrudes on other people’s conversations or games
- Inability to keep powerful emotions in check, resulting in angry outbursts or temper tantrums

The impulsivity of children with ADD/ADHD can cause problems with self-control. Because they censor themselves less than other kids do, they’ll interrupt conversations, invade other people’s space, ask irrelevant questions in class, make tactless observations, and ask overly personal questions.

Children with impulsive signs and symptoms of ADD/ADHD also tend to be moody and to overreact emotionally. As a result, others may start to view the child as disrespectful, weird, or needy.

Positive effects of ADD & ADHD in children

In addition to the challenges, there are also positive traits associated with people who have attention deficit disorder:
- Creativity – Children who have ADD/ADHD can be marvelously creative and imaginative. The child who daydreams and has ten different thoughts at once can become a master problem-solver, a fountain of ideas, or an inventive artist. Children with ADD may be easily distracted, but sometimes they notice what others don’t see.
- Flexibility – Because children with ADD/ADHD are motivated, they work or play hard and strive to succeed. It actually may be difficult to distract them from a task that interests them, especially if the activity is interactive or hands-on.
- Enthusiasm and spontaneity – Children with ADD/ADHD are rarely boring! They’re interested in a lot of different things and have lively personalities. In short, if they’re not exasperating you (and sometimes even when they are), they’re a lot of fun to be with.

Energy and drive – When kids with ADD/ADHD are motivated, they work or play hard and strive to succeed. It actually may be difficult to distract them from a task that interests them, especially if the activity is interactive or hands-on.

Keep in mind, too, that ADD/ADHD has nothing to do with intelligence or talent. Many children with ADD/ADHD are intellectually or artistically gifted.

Helping a child with ADD / ADHD

Whether or not your child’s symptoms of inattention and hyperactivity are due to ADD/ADHD, they can cause many problems if left untreated. Children who can’t focus and control themselves may struggle in school, get into frequent trouble, and find it hard to get along with others or make friends. These frustrations and difficulties can lead to low self-esteem – as well as friction and stress for the whole family.

But treatment can make a dramatic difference in your child’s symptoms. With the right support, your child can get on track for success in all areas of life.

Parenting tips for children with ADD / ADHD

If your child is hyperactive, inattentive, or
impulsive, it may take a lot of energy to get him or her to listen, finish a task, or sit still. The constant monitoring can be frustrating and exhausting. Sometimes you may feel like your child is running the show. But there are steps you can take to regain control of the situation, while simultaneously helping your child make the most of his or her abilities.

While attention deficit disorder is not caused by bad parenting, there are effective parenting strategies that can go a long way to correct problem behaviors. Children with ADD/ADHD need structure, consistency, clear communication, and rewards and consequences for their behavior. They also need lots of love, support, and encouragement. There are many things parents can do to reduce the signs and symptoms of ADD/ADHD without sacrificing the natural energy, playfulness, and sense of wonder unique in every child.

Read Parenting a child with ADD / ADHD

School tips for children with ADD / ADHD

Think of what the school setting requires children to do: Sit still. Listen quietly. Pay attention. Follow instructions. Concentrate. These are the very things kids with ADD/ADHD have a hard time doing—not because they aren’t willing, but because their brains won’t let them.

But that doesn’t mean kids with ADD/ADHD can’t succeed at school. There are many things both parents and teachers can do to help children with ADD/ADHD thrive in the classroom. It starts with evaluating each child’s individual weaknesses and strengths, then coming up with creative strategies for helping the child focus, stay on task, and learn to his or her full capability.

Read ADD/ADHD and School

Treatment for ADD / ADHD

If your child struggles with ADD/ADHD-like symptoms, don’t wait to seek professional help. You can treat your child’s symptoms of hyperactivity, inattention, and impulsivity without having a diagnosis of attention deficit disorder.

Options to start with include getting your child into therapy, implementing a better diet and exercise plan, and modifying the home environment to minimize distractions.

If you do receive a diagnosis of ADD/ADHD, you can then work with your child’s doctor, therapist, and school to make a personalized treatment plan that meets his or her specific needs. Effective treatment for childhood ADD/ADHD involves behavioral therapy, parent education and training, social support, and assistance at school.

Medication may also be used in extreme conditions only and only as a LAST resort never the first or second resort, however, medication should never be the sole attention deficit disorder treatment.

Autism Spectrum Disorders (ASDs) should be diagnosed by a medical professional with support from physical, occupational and speech therapists. Ideally, everyone involved with a diagnosis should have significant experience with ASDs, their diagnosis and their treatment.

What does it mean to have an ASD? The new Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) which defines all known medical disorders for the purposes of diagnosis, describes six characteristics of ASDs.

To qualify for a diagnosis, a person must have a total of six or more items from (1), (2), and (3), with at least two from (1) and one each from (2) and (3):

1. Qualitative impairment in social interaction, manifest by at least two of the following:
   A. Marked impairment in the use of multiple nonverbal behaviors, such as eye-to-eye gaze, facial expression, body postures and gestures, to regulate social interaction
   B. Failure to develop peer relationships appropriate to developmental level
   C. Lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by lack of showing, bringing, or pointing out objects of interest)
   D. Lack of social or emotional reciprocity

2. Qualitative impairment in communication, as manifest by at least one of the following:
   A. Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
   B. In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
   C. Stereotyped and repetitive use of language, or idiosyncratic language
   D. Lack of varied, spontaneous make-believe, or social imaginative play appropriate to developmental level

3. Restrictive repetitive and stereotypic patterns of behavior, interests, and activities, as manifested by at least one of the following:
   A. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
   B. Apparently inflexible adherence to specific nonfunctional routines or rituals

C. Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)

D. Persistent preoccupation with parts of objects.

4. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years:
   1. Social interaction
   2. Language as used in social communication
   3. Symbolic or imaginative play

The disturbance is not better accounted for by Retts Disorder or childhood disintegrative disorder.
its popularity waned with the introduction of effective anticonvulsant drugs. In the mid 1990s, Hollywood producer Jim Abrahams, whose son’s severe epilepsy was effectively controlled by the diet, created the Charlie Foundation to promote it. Publicity included an appearance on NBC’s Dateline programme and ...First Do No Harm (1997), a made-for-television film starring Meryl Streep. The foundation sponsored a multicentre research study, the results of which—published in 1996—marked the beginning of renewed scientific interest in the diet.

In 2008, a randomised controlled trial showed a clear benefit for treating refractory epilepsy in children with the ketogenic diet. This strengthened the conclusions drawn from the many earlier uncontrolled trials of the diet’s efficacy and safety, which already provided sufficient evidence to recommend clinical use. In children with refractory epilepsy, the ketogenic diet is more likely to be effective than an anticonvulsant drug. There is some evidence that adults with epilepsy may benefit from the diet, and that a less strict regime, such as a modified Atkins diet, is similarly effective. The ketogenic diet has also been proposed as a treatment for a number of neurological conditions other than epilepsy; as of 2008, research in this area has yet to produce sufficient positive data to warrant clinical use.

The ketogenic diet

The ketogenic diet is a high-fat, adequate-protein, low-carbohydrate diet primarily used to treat difficult-to-control (refractory) epilepsy in children. The diet mimics aspects of starvation by forcing the body to burn fats rather than carbohydrates. Normally, the carbohydrates contained in food are converted into glucose, which is then transported around the body and is particularly important in fuelling brain function. However, if there is very little carbohydrate in the diet, the liver converts fat into fatty acids and ketone bodies. The ketone bodies pass into the brain and replace glucose as an energy source. Elevated levels of ketone bodies in the blood, a state known as ketosis, lead to a reduction in the frequency of epileptic seizures.

The diet provides just enough protein for body growth and repair, and sufficient calories to maintain the correct weight for age and height. The “classic” ketogenic diet contains a 4:1 ratio by weight of fat to combined protein and carbohydrate. This is achieved by excluding foods high in carbohydrates (starchy fruits and vegetables, bread, pasta, grains and sugar) while increasing the consumption of foods high in fat (cream and butter).

Most dietary fat is made of molecules called long-chain triglycerides (LCT). However, medium-chain triglycerides (MCT)—made from fatty acids with shorter carbon chains than MCTs—are more ketogenic. A variant of the diet known as the MCT ketogenic diet uses a form of coconut oil, which is rich in MCTs, to provide around half the calories. As less overall fat is needed in this variant of the diet, a greater proportion of carbohydrates and protein can be consumed, allowing a greater variety of food choices.

Developed in the 1920s, the ketogenic diet was widely used into the next decade, but its popularity waned with the introduction of effective anticonvulsant drugs. In the mid 1990s, Hollywood producer Jim Abrahams, whose son’s severe epilepsy was effectively controlled by the diet, created the Charlie Foundation to promote it. Publicity included an appearance on NBC’s Dateline programme and ...First Do No Harm (1997), a made-for-television film starring Meryl Streep. The foundation sponsored a multicentre research study, the results of which—published in 1996—marked the beginning of renewed scientific interest in the diet.

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Epilepsy

Epilepsy, the second most common neurological disorder after stroke, is diagnosed in a person having recurrent unprovoked seizures. Epileptic seizures occur when cortical neurons fire excessively, hypersynchronously, or both, leading to temporary disruption of normal brain function. This might affect, for example, the muscles, the senses, consciousness, or a combination. A seizure might be focal, confined to one
part of the brain, or generalised, spread widely throughout the brain and leading to a loss of consciousness. Epilepsy can occur for a variety of reasons; some forms have been classified into epileptic syndromes, most of which begin in childhood. Epilepsy is considered refractory to treatment when two or three anticonvulsant drugs have failed to control it. About 60% of patients will achieve control of their epilepsy with the first drug they use; about 30% do not achieve control with drugs, some of whom may be candidates for epilepsy surgery.

**History**

The ketogenic diet is a mainstream therapy that was developed to reproduce the success and remove the limitations of the non-mainstream use of fasting to treat epilepsy. Although popular for a while, it was discarded when anticonvulsant drugs became available. Most individuals with epilepsy can successfully control their seizures with medication. However, 20–30% fail to achieve such control despite trying a number of different drugs. For this group, and for children in particular, the diet has once again found a role in epilepsy management.

**Fasting**

A news report of Dr Hugh Conklin’s “water diet” treatment from 1922

The ancient Greek physicians treated diseases, including epilepsy, by altering their patient’s diet. An early treatise concerning epilepsy, On the Sacred Disease, can be found in the Hippocratic Corpus and dates from around 400 BC. Its author argued against the prevailing view that epilepsy was supernatural in origin and cure, and proposed that dietary therapy had a rational and physical basis.

In the same collection, the author of Epidemics describes the case of a man whose epilepsy is cured as quickly as it had appeared, through complete abstinence of food and drink. The royal physician, Erasistratus, declared, “One inclining to epilepsy should be made to fast without mercy and be put on short rations.” Galen believed an “attenuating diet” might afford a cure in mild cases and be helpful in others.

Hippocrates’ work lead to the development of the keto-genic acid and the movie with Meryl Streep in it called First do no Harm. We welcome you to watch this movie in your wellness course.

The first modern study of fasting as a treatment for epilepsy was in France in 1911. Twenty patients, of all ages, were “detoxified” by consuming a low-calorie vegetarian diet, combined with periods of fasting and purging. A couple of patients benefited enormously, but most failed to maintain compliance with the imposed restrictions. The diet improved the patients’ mental capabilities, in contrast to their medication, potassium bromide, which dulled the mind.

Around this time, the American exponent of physical culture, Bernarr Macfadden, popularised the use of fasting to restore health.

His disciple, the osteopathic physician Hugh Conklin, of Battle Creek, Michigan, began to treat his epilepsy patients by recommending fasting. Conklin conjectured that epileptic seizures were caused when a toxin, secreted from the Peyer’s patches in the intestines, was discharged into the bloodstream.

He recommended a fast lasting 18 to 25 days to allow this toxin to dissipate. Conklin probably treated hundreds of epilepsy patients with his “water diet” and boasted of a 90% cure rate in children, falling to 50% in adults. Later analysis of Conklin’s case records showed 20% of his patients achieved freedom from seizures and 50% had some improvement.

Conklin’s fasting therapy was adopted by neurologists in mainstream practice. In 1916, a Dr. McMurray wrote to the New York Medical Journal claiming to have successfully treated epilepsy patients, since 1912, with a fast followed by a starch- and sugar-free diet. In 1921, prominent endocrinologist H. Rawlie Geyelin reported his experiences to
the 1920s, established the techniques for induction and maintenance of the diet. Peterman documented positive side effects (improved alertness, behaviour and sleep), and negative side effects (nausea and vomiting due to excess ketosis).

The diet proved to be very successful in children; Peterman reported in 1925 that 95% of 37 young patients they studied had improved seizure control on the diet and 60% became seizure-free.

By 1930, the diet had also been studied in 100 teenagers and adults. Clifford Barborka, also from the Mayo Clinic, reported that 56% of those older patients improved on the diet and 12% became seizure-free.

Although the adult results are similar to modern studies of children, they compared less well to contemporary studies. Barborka concluded that adults were least likely to benefit from the diet and the use of the ketogenic diet in adults was not studied again until 1999.

Anticonvulsants and decline

During the 1920s and 1930s, when the only anticonvulsant drugs were the sedative bromides (discovered 1857) and phenobarbital (1912), the ketogenic diet was widely used and studied. This changed in 1938 when H. Houston Merritt and Tracy Putnam discovered phenytoin (Dilantin), and the focus of research shifted to discovering new drugs.

With the introduction of sodium valproate in the 1970s, drugs were available to neurologists that were effective across a broad range of epileptic syndromes and seizure types. The use of the ketogenic diet, by this time restricted to difficult cases such as Lennox-Gastaut syndrome, declined further.
accepted by the children. The MCT diet, but meals were easier to prepare and better tolerated, which led one patient to abandon the diet, Gastrointestinal side effects were a problem, that were similar to the classic ketogenic diet.

Intractable seizures. Most children improved in both seizure control and alertness, results that were hard to compare to modern trials. One reason is that these older trials suffered from selection bias, as they excluded patients who would generate better results.

In an attempt to control for this bias, modern study design prefers a prospective cohort (the patients in the study are chosen before therapy begins) and that results are presented for all patients irrespective of whether they started or completed the treatment (known as intent-to-treat analysis). Another difference between older and newer studies is that the type of patients treated with the ketogenic diet has changed over time. When first developed and used, the ketogenic diet was not a treatment of last resort; in contrast, the children in modern studies have already tried and failed a number of anticonvulsant drugs, so may be assumed to have more difficult-to-treat epilepsy. Early and modern studies also differ because the treatment protocol has changed.

In older protocols, the diet was initiated with a prolonged fast, designed to lose 5–10% body weight, this heavily restricted the calorie intake. Concerns over child health and growth led to a relaxation of the diet’s restrictions Fluid restriction was once a feature of the diet but led to increased risk of constipation and kidney stones; it is no longer considered beneficial.

Medium-chain triglyceride (MCT) oil emulsion

In the 1960s, it was discovered that medium-chain triglycerides (MCTs) are much more ketogenic than normal dietary fats (which are mostly long-chain triglycerides). This is because MCTs are absorbed rapidly and contain many calories. The classic ketogenic diet’s severe carbohydrate restrictions made it difficult for parents to produce palatable meals that their children would tolerate. In 1971, Peter Huttenlocher devised a ketogenic diet where about 60% of the calories came from the MCT oil, and this allowed more protein and up to three times as many carbohydrates as the classic ketogenic diet.

The oil was mixed with at least twice its volume of skimmed milk, chilled, and sipped during the meal or incorporated into food. He tested it on twelve children and adolescents with intractable seizures. Most children improved in both seizure control and alertness, results that were similar to the classic ketogenic diet. Gastrointestinal side effects were a problem, which led one patient to abandon the diet, but meals were easier to prepare and better accepted by the children. The MCT diet replaced the classic ketogenic diet in many hospitals, though some devised diets that were a combination of the two.

Revival

The ketogenic diet achieved national media exposure in the US in October 1994, when NBC’s Dateline television programme reported the case of Charlie Abrahams, son of Hollywood producer Jim Abrahams. The two-year-old suffered from epilepsy that had remained uncontrolled by mainstream and alternative therapies. Abrahams discovered a reference to the ketogenic diet in an epilepsy guide for parents and brought Charlie to the Johns Hopkins Hospital, which was one of the few institutions still offering the therapy. Under the diet, Charlie’s epilepsy was rapidly controlled and his developmental progress resumed.

This inspired Abrahams to create the Charlie Foundation to promote the diet and fund research. A multicentre prospective study began in 1994 and the results were presented to the American Epilepsy Society in 1996. There followed an explosion of scientific interest in the diet. In 1997, Abrahams produced a TV movie, ...First Do No Harm, starring Meryl Streep, in which a young boy’s intractable epilepsy is successfully treated by the ketogenic diet.

As of 2007, the ketogenic diet is available from around 75 centres in 45 countries. Less restrictive variants, such as the modified Atkins diet, have come into use, particularly among older children and adults. The ketogenic diet is also under investigation for the treatment of a wide variety of disorders other than epilepsy.

Efficacy

Trial design

Early studies reported high success rates: in one study in 1925, 60% of patients became seizure free, and another 35% halved their seizure frequency.

These studies generally examined a cohort of patients recently treated by the physician (known as retrospective studies), and selected patients who had successfully maintained the dietary restrictions. However, these studies are hard to compare to modern trials. One reason is that these older trials suffered from selection bias, as they excluded patients who were unable to start or maintain the diet and thereby selected from patients who would generate better results.

In an attempt to control for this bias, modern study design prefers a prospective cohort (the patients in the study are chosen before therapy begins) and that results are presented for all patients irrespective of whether they started or completed the treatment (known as intent-to-treat analysis).

Another difference between older and newer studies is that the type of patients treated with the ketogenic diet has changed over time. When first developed and used, the ketogenic diet was not a treatment of last resort; in contrast, the children in modern studies have already tried and failed a number of anticonvulsant drugs, so may be assumed to have more difficult-to-treat epilepsy. Early and modern studies also differ because the treatment protocol has changed.

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Outcomes

Children with refractory epilepsy are more likely to find the ketogenic diet to be effective than an anticonvulsant drug. For patients who benefit, half achieve a seizure reduction within five days (if the diet starts with an initial fast of one to two days), three-quarters achieve a reduction within a fortnight and 90% achieve a reduction within 23 days. If the diet does not begin with a fast, the time for half of the patients to achieve an improvement is longer (two weeks) but the long-term seizure reduction rates are unaffected. Since fasting increases the risk of acidosis and hypoglycaemia, its use is justified only where there is some medical urgency. If no improvement is seen within two months, it is likely that the diet has failed.

The biggest modern study with an intent-to-treat prospective design was published in 1998 by a team from the Johns Hopkins Hospital, and followed-up by a report published in 2001. As with most studies of the ketogenic diet, there was no control group (patients who were denied the treatment). The study enrolled 150 children and after three months, 83% of them were still on the diet, 26% had experienced a good reduction in seizures, 31% had an excellent reduction and 3% were seizure-free. [Note 6] At twelve months, 55% were still on the diet, 23% had a good response, 20% had an excellent response and 7% were seizure-free. Those who had discontinued the diet by this stage did so because it was ineffective, too restrictive or due to illness, and most of those who remained were benefiting from it. The percentage of those still on the diet at two, three and four years was 39%, 20% and 12% respectively. During this period the most common reason for discontinuing the diet...
diet was because the children had become seizure-free or significantly better. At four years, 16% of the original 150 children had a good reduction in seizure frequency, 14% had an excellent reduction and 13% were seizure-free, though these figures include many who were no longer on the diet. Those remaining on the diet after this duration were typically not seizure-free but had had an excellent response.

It is possible to combine the results of several small studies to produce evidence that is stronger than that available from each study alone—a statistical method known as meta-analysis. One such analysis in 2006 looked at 19 studies on a total of 1,084 patients. It concluded that half the patients achieved a 50% reduction in seizures and a third a 90% reduction.

The first randomised controlled trial was published in 2008, which had an intent-to-treat prospective design, but no blinding. It studied 145 children, half of whom were randomly selected to start the ketogenic diet immediately, and half to start after a three-month delay. The children who were delayed treatment acted as a control, which is particularly important for medical conditions where patients may get better or worse regardless of treatment. Of the children in the diet group, 38% had at least a 50% reduction in seizure frequency, 7% had at least a 90% reduction, and one child became seizure-free. Only 6% of the control group saw a greater than 50% reduction in seizure frequency and no children had a 90% reduction. The mean seizure frequency of the diet group fell by a third; the control group’s reduction. The mean seizure frequency of the diet group fell by a third; the control group’s reduction.

Indications and contra-indications

The ketogenic diet is indicated as an adjunctive (additional) treatment in children with drug-resistant epilepsy. The ketogenic diet is approved by national clinical guidelines in Scotland, England and Wales and reimbursed by nearly all by US insurance companies. Children with a focal lesion (a single point of brain abnormality causing the epilepsy) who would make suitable candidates for surgery are more likely to achieve good results with surgery than with the ketogenic diet. In the UK, the National Institute for Health and Clinical Excellence advise that the diet should not be recommended for adults with epilepsy. A minority of epilepsy centres that offer the ketogenic diet also offer a dietary therapy to adults. Some clinicians consider the two less restrictive dietary variants—the low glycemic index treatment and the modified Atkins diet—to be more appropriate for adolescents and adults. Children under six and children who are tube fed are most likely to comply with the restrictions of the ketogenic diet.

Advocates for the diet recommend it be seriously considered after two medications have failed, as the chance of other drugs succeeding is only 10%. The diet can be considered earlier for some epilepsy and genetic syndromes where it has shown particular usefulness. These include Dravet syndrome, infantile spasms, myoclonic-astatic epilepsy and tuberous sclerosis complex.

A survey in 2005 of 88 paediatric neurologists in the US found that 36% regularly prescribed the diet after three or more drugs had failed; 24% occasionally prescribed the diet as a last resort; 24% had only prescribed the diet in a few rare cases; and 16% had never prescribed the diet. There are several possible explanations for this gap between the evidence and clinical practice. One major factor may be the lack of adequately trained dietitians, who are needed to administer a ketogenic diet programme. Because the ketogenic diet radically alters the body’s metabolism, it is a first-line therapy in children with certain congenital metabolic diseases, but in others, it is absolutely contraindicated. The diseases pyruvate dehydrogenase (E1) deficiency and glucose transporter 1 deficiency syndrome prevent the body from using carbohydrates as fuel, which leads to a dependency on ketone bodies. The ketogenic diet is beneficial in treating the seizures and some other symptoms in these diseases. In contrast, the diseases pyruvate carboxylase deficiency, porphyria and other rare genetic disorders of fat metabolism prevent any use of the diet. A person with a disorder of fatty acid oxidation is unable to metabolise fatty acids, which replace carbohydrates as the major energy source on the diet. On the ketogenic diet, their body would consume its own protein stores for fuel, leading to acidosis, and eventually coma and death.

Interactions

The ketogenic diet is usually initiated in combination with the patient’s existing drug regime, though these may be discontinued if the diet is successful. There is some evidence of synergistic benefits when the diet is combined with the vagus nerve stimulator or with the drug zonisamide, and that the diet may be less successful in children receiving phenobarbital.

Adverse effects

The ketogenic diet is not a benign, holistic or natural treatment for epilepsy; as with any serious medical therapy, there may be complications. These are generally less severe and less frequent than with anticonvulsant medication or surgery. Common but easily treatable short-term side effects include constipation, low-grade acidosis, and hypoglycaemia if there is an initial fast. Cholesterol may increase by around 30%.

Long-term use of the ketogenic diet in children increases the risk of retarded growth, bone fractures and kidney stones. Supplements are necessary to counter the dietary deficiency in many micronutrients.

About 1 in 20 children on the ketogenic diet will develop kidney stones (compared with 1 in several thousand for the general population). A class of anticonvulsants known as carbonic anhydrase inhibitors (topiramate, zonisamide) are known to increase the risk of kidney stones, but the combination of these anticonvulsants and the ketogenic diet does not appear to elevate that risk. The stones are treatable and do not justify discontinuation of the diet. To prevent kidney stones, Johns Hopkins Hospital now gives oral potassium citrate supplements to all their ketogenic diet patients. However, this empiric usage has not been tested in a prospective controlled trial. Kidney stone formation (nephrolithiasis) occurs on the diet for four reasons.

Excess calcium in the urine (hypercalcuria) occurs due to increased bone demineralisation with acidosis. Bones are mainly composed of calcium phosphate. The phosphate reacts with the acid and the calcium is released and excreted by the kidneys. There is an abnormally low concentration of citrate in the urine (hypercitruria), which normally helps to dissolve free calcium.

The urine has a low pH, which stops uric acid from dissolving, leading to crystals that act as a nidus for calcium stone formation. Many institutions traditionally restricted the water intake of patients on the diet to 80% of normal daily needs; this practice is no longer encouraged. In adults, common side effects include weight loss, constipation, raised cholesterol levels, and in women, menstrual irregularities including amenorrhoea.
Proposal to widen access to multivitamins for use in the Ketogenic diet in children with epilepsy

Proposal summary

PHARMAC is seeking feedback on a proposal to amend the restrictions applying to multivitamin preparations in order to permit their use as a supplement to the Ketogenic diet in children with epilepsy.

This proposal has arisen from recommendations by the Pharmacology and Therapeutics Advisory Committee (PTAC) and the Special Foods Subcommittee of PTAC.

Key proposed changes that would apply to the KeraDiet, Paediatric Seravit, Ketorex Syrup and Metabolic Mineral Mixture brands of multivitamin supplements are:

- The Special Authority criteria would be altered to include the criterion “For use as a supplement to the Ketogenic diet in patients diagnosed with epilepsy.”
- The requirement for a specialist to apply for the Special Authorities would be removed, replaced with “any relevant practitioner.”
- Approvals would remain valid without further renewal unless notified.

The exact date at which these changes would take effect is yet to be determined, but it would likely be some time between 1 April and 1 July 2009.

Further details of the proposal can be found on the following pages.

Feedback sought

We welcome your feedback on this proposal. To provide feedback please submit an email, fax or letter by 4 pm, Wednesday 11 February 2009 to:

Geradine MacGibbon
Therapeutic Group Manager
PHARMAC
PO Box 10-254
Wellington 6143

All feedback received before the closing date will be considered when a decision is made on this proposal by PHARMAC’s Board (or Chief Executive under delegated authority).

The SCIO can be prescribed for HOME USE to help your children with autism, attention difficulties, superlearning, sports, injury, pain, relaxation....
Initiation
The Johns Hopkins Hospital protocol for initiating the ketogenic diet has been widely adopted. It involves a consultation with the patient and their guardians, and, later, a short hospital admission. Johns Hopkins begins the diet with a short fast, which occasionally poses a significant health risk in young children, so a stay in hospital is necessary to monitor for complications.

At initial consultation, patients are screened for conditions that may contraindicate the diet. A dietary history is obtained and the parameters of the diet selected: the ketogenic ratio of fat to combined protein and carbohydrate, the calorie requirements, and the fluid intake.

The day before admission to hospital, the level of carbohydrates in the diet is decreased and the patient begins fasting after his or her evening meal. On admission, only calorie- and caffeine-free fluids are allowed until dinner, which consists of “eggnog” [Note 7] restricted to one-third of the typical calories for a meal. The following breakfast and lunch are similar, and on the second day, the dinner is increased to “eggnog” with two-thirds of the usual calories. By the third day, dinner contains the full calorie quota and is a standard ketogenic meal (not “eggnog”). After a ketogenic breakfast on the fourth day, the patient is discharged. If possible, the patient’s current medicines are changed to carbohydrate-free formulations.

When in the hospital, glucose levels are checked and the patient is monitored for signs of symptomatic ketosis (which can be treated with a small quantity of orange juice). Lack of energy and lethargy are common but fluctuate. The diet may be modified if seizure frequency remains high, or the child is losing weight. Loss of seizure-control may come from unexpected sources. Even “sugar-free” food can contain carbohydrates such as maltodextrin, sorbitol, starch and fructose. The sorbitol content of suntan lotion and other skincare products may be high enough for some to be absorbed enough through the skin, and negate ketosis.

Discontinuation
About 10% of children on the ketogenic diet achieve freedom from seizures, and many manage to reduce or stop taking anticonvulsant drugs. At around two years on the diet, or after six months of being seizure-free, the diet may be gradually discontinued over two or three months. This is done by lowering the ketogenic ratio until urinary ketosis is no longer detected, and then lifting all calorie restrictions.

Children who discontinue the diet after achieving seizure freedom have about a 20% risk of seizures returning. The length of time until recurrence is highly variable but averages two years. This recurrence risk compares with 10% for resective surgery (where part of the brain is removed) and 30–50% for anticonvulsant therapy. Of those that have a recurrence, just over half can regain freedom from seizures either with anticonvulsants, or by returning to the ketogenic diet. Recurrence is more likely if, despite seizure freedom, an EEG shows ictaliform spikes. These spikes are an indication of epileptic activity in the brain, but are below the level that will cause a seizure. Recurrence is also likely if an MRI shows focal abnormalities (for example, children with tuberous sclerosis). Such children may remain on the diet longer than normal, and it has been suggested that children with tuberous sclerosis who achieve seizure freedom could remain on the ketogenic diet indefinitely.

Maintenance
At Johns Hopkins Hospital, outpatient clinics are held at 3, 6, 12, 18 and 24 months after initiation. A period of minor adjustments is necessary to ensure consistent ketosis is maintained and better adapt the meal plans to the patient. This fine tuning is typically done over the telephone with the hospital dietitian, and includes changing the number of calories, altering the ketogenic ratio, or adding some MCT or coconut oils to a classic diet. Urinary ketone levels are checked daily to detect if ketosis has been achieved, and confirm if the patient is following the diet, but the level of ketones does not correlate with an anticonvulsant effect. The test strip contains nitroprusside, which turns from buff-pink to maroon in the presence of acetoacetate (one of the three ketone bodies).

A short-lived increase in seizure frequency may occur during illness or if ketone levels fluctuate. The diet may be modified if seizure frequency remains high, or the child is losing weight. Loss of seizure-control may come from unexpected sources. Even “sugar-free” food can contain carbohydrates such as maltodextrin, sorbitol, starch and fructose. The sorbitol content of suntan lotion and other skincare products may be high enough for some to be absorbed enough through the skin, and negate ketosis.

Variants
The ratio of caloric contributions from food components of four diets

First, the energy requirements are set at 80–90% of the recommended daily amounts (RDA) for the child’s age (the high-fat diet requires less energy to process than a typical high-carbohydrate diet). Highly active children or those with muscle spasticity require more calories than this; immobile children require less. The ketogenic ratio of the diet compares the weight of fat to the combined weight of carbohydrate and protein. This is typically 4:1, but children who are under 18 months, who are over 12 years, or who are obese may be started on a 3:1 ratio. Fat is energy-rich, with 9 kcal/g compared to 4 kcal/g for carbohydrate or protein, so portions on the ketogenic diet are smaller than normal. The quantity of fat in the diet can be calculated from the overall energy requirements and

**Table: Variants**

<table>
<thead>
<tr>
<th>Diet Type</th>
<th>Carbohydrate Ratio</th>
</tr>
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<tbody>
<tr>
<td>Classic</td>
<td>2:1</td>
</tr>
<tr>
<td>Atkins Induction</td>
<td>4:1</td>
</tr>
<tr>
<td>MCT Keto</td>
<td>6:1</td>
</tr>
<tr>
<td>Typical American</td>
<td>1:1</td>
</tr>
</tbody>
</table>

**Figure: Ketogenic Diet Flowchart**

- **Initiation**
  - Begin ketogenic diet
  - Adjust as needed
- **Maintenance**
  - Monitor ketone levels
  - Adjust as needed
- **Discontinuation**
  - Gradually taper off
  - Monitor for recurrence
- **Maintenance**
  - Adjust as needed

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**Notes:**
- [Note 7]: "Eggnog" is a traditional Christmas drink made with eggs, milk, and spices, and usually sweetened with sugar. In the context of the ketogenic diet, it is restricted due to its carbohydrate content.
the chosen ketogenic ratio. Next, the protein levels are set to allow for growth and body maintenance, and are around 1 g protein for each kg of body weight. Lastly, the amount of carbohydrate is set according to what allowance is left, while maintaining the chosen ratio. Any carbohydrate in medications or supplements must be subtracted from this allowance. The total daily amount of fat, protein and carbohydrate is then evenly divided across the meals.

A computer program may be used to help generate recipes. The meals have four components: heavy whipping cream, a protein-rich food (typically meat), a fruit or vegetable, and butter, vegetable oil or mayonnaise. Only fruit and vegetables that are low in carbohydrate are allowed, which excludes bananas, potatoes, peas and corn. Suitable fruits are divided into two groups based on the amount of carbohydrate they contain. Vegetables are similarly divided into two groups. Foods within each of these four groups may be freely substituted to allow for variation without needing to recalculate portion sizes. For example, cooked broccoli, Brussels sprouts, cauliflower and green beans are all equivalent. Fresh, canned or frozen foods are equivalent but raw and cooked vegetables differ, and processed foods are an additional complication. Parents are required to be precise when measuring food quantities on an electronic scale accurate to 1 g.

The ketogenic diet is deficient in several vitamins and minerals, so sugar-free supplements are prescribed. The child must eat the whole meal and cannot have extra portions; any snacks must be incorporated into the meal plan. A small amount of MCT oil may be used to help with constipation or increase ketosis. A typical day of food for a child on a 4:1 ratio, 1,500 calorie ketogenic diet comprises:

- **Breakfast:** egg with bacon
  - 28 g egg, 11 g bacon, 37 g of 36% heavy whipping cream, 23 g butter, 9 g apple.
- **Snack:** peanut butter ball
  - 6 g peanut butter, 9 g butter.
- **Lunch:** tuna salad
  - 28 g tuna fish, 30 g mayonnaise, 10 g celery, 36 g of 36% heavy whipping cream and 15 g lettuce.
- **Snack:** keto yogurt
  - 18 g of 36% heavy whipping cream, 17 g sour cream, 4 g strawberries and artificial sweetener.
- **Dinner:** cheeseburger
  - 22 g minced (ground) beef, 10 g American cheese, 26 g butter, 38 g cream, 10 g lettuce and 11 g green beans.
- **Snack:** keto custard
  - 25 g of 36% heavy whipping cream, 9 g egg and pure vanilla flavouring.

Normal dietary fat contains long-chain triglycerides (LCT). Medium-chain triglycerides are more ketogenic than LCTs because they generate more ketones per calorie of energy when metabolised. Their use allows for a diet with a lower proportion of fat and a greater proportion of protein and carbohydrates, leading to more food choices and larger portion sizes. The original MCT diet developed by Peter Huttenlocher in the 1970s derived 60% of its calories from MCT oil.

Consuming that quantity of MCT oil caused abdominal cramps, diarrhoea and vomiting in some children. A figure of 45% is regarded as a balance between achieving good ketosis and minimising gastrointestinal complaints. The classical and modified MCT ketogenic diets are equally efficacious and differences in tolerability are not statistically significant. The MCT diet is less popular in the United States; MCT oil is more expensive than other dietary fats and is not covered by insurance companies.

**Modified Atkins**

A modified Atkins diet has been shown, in small uncontrolled studies, to be effective in children and adults. The diet consists of 60% fat, 30% protein and 10% carbohydrate by weight; calories are not restricted. Carbohydrate is limited to 10 g per day for at least one month, and gradually increased to 10% if this limitation is not tolerated. Consistently strong ketosis is more difficult to achieve than on the ketogenic diet; patients with wildly fluctuating urinary ketones have unfavourable seizure outcomes. Achieving the balance of fat, protein and carbohydrate can be difficult; patients may consume the appeasing protein (meat) and leave or vomit the fat. Older children and adolescents who refuse the ketogenic diet’s restrictions may tolerate the modified Atkins diet.

**Prescribed formulations**

Infants and patients fed via a gastrostomy tube can also be given a ketogenic diet. Parents make up a prescribed powdered formula, such as KetoCal, into a liquid feed. Gastrostomy feeding avoids any issues with palatability, and bottle-fed infants readily accept the ketogenic formula. Some studies have found this liquid feed to be more efficacious than a solid ketogenic diet. KetoCal is a nutritionally complete feed containing milk protein and supplemented with amino acids, fat, carbohydrate, vitamins, minerals and trace elements. It is used to administer the 4:1 ratio classic ketogenic diet in children over one year. Each 100 g of powder contains 73 g fat, 15 g protein and 3 g carbohydrate, and is typically diluted 1:5 with water. The formula is available unflavoured or in an artificially

**Low glycemic index treatment**

The low glycemic index treatment (LGIT) is an attempt to achieve the stable blood glucose levels seen in children on the classic ketogenic diet, using a much less restrictive regime. The hypothesis is that stable blood glucose may be one of the mechanisms of action involved in the ketogenic diet, which occurs because the absorption of the limited carbohydrates is slowed by the high fat content. Although it is also a high-fat diet (with approximately 60% calories from fat), the LGIT allows far more carbohydrate than either the classic ketogenic diet or the modified Atkins diet: approximately 40–60 g per day. However, the types of carbohydrate consumed are restricted to those that have anaglycemic index lower than 50. The LGIT, as with the modified Atkins diet, has not been studied in large or randomised trials. Despite this, both are offered at most centres that run ketogenic diet programmes, and in some centres they are the primary dietary therapy choice for adolescents.
sweetened vanilla flavour and is suitable for tube or sip feeding.

**Worldwide**

There are theoretically no restrictions on where the diet might be used, and it can cost less than modern anticonvulsants. However, fasting and dietary changes are affected by religious and cultural issues. A culture where food is often prepared by grandparents or hired help means more people have to be educated about the diet. When families dine together, sharing the same meal, it can be difficult to separate the child’s meal. In many countries, food labelling is not mandatory so calculating the proportions of fat, protein and carbohydrates is difficult. In some countries, it may be hard to find sugar-free forms of medicines and supplements, to purchase an accurate electronic scale, or to afford MCT oils.

In Israel, religious rules prevent mixing meat and milk in one dish. In Asia, the normal diet includes rice and noodles as the main energy source, making their elimination difficult. Therefore the MCT-oil form of the diet, which allows more carbohydrate, has proved useful. In India, religious beliefs commonly affect the diet: some patients are vegetarians or vegans, or will not eat root vegetables, or avoid beef. The Indian ketogenic diet is started without a fast due to cultural opposition towards fasting in children. The low-fat, high-carbohydrate nature of the normal Indian and Asian diet means that their ketogenic diets typically have a lower ketogenic ratio than in America and Europe. However, they appear to be just as effective.

In many developing countries, the ketogenic diet is expensive because dairy fats and meat are dearer than grain, fruit and vegetables. The modified Atkins diet has been proposed as a lower-cost alternative for those countries, with the slightly dearer food bill offset by a reduction in pharmaceutical costs if the diet is successful. The modified Atkins diet is less complex to explain and prepare and requires less support from a dietitian.

**Mechanism of action**

**Ketone bodies**

- $\beta$-hydroxybutyrate
- Acetoacetic acid
- Acetone

**Seizure pathology**

The brain is composed of a network of neurons that transmit signals by propagating nerve impulses. The propagation of this impulse from one neuron’s synapse to another is typically controlled by neurotransmitter chemicals, though there are also electrical pathways between some neurons. Neurotransmitters can inhibit impulse firing (the most important of which is $\gamma$-aminobutyric acid (GABA)) or they can excite the neuron into firing (the most important of which is glutamate). A neuron that releases inhibitory neurotransmitters from its terminals is called an inhibitory neuron, and the opposite applies to excitatory neurons. When the normal balance between inhibition and excitation is significantly disrupted in part or all of the brain, a seizure can occur. The GABA system is an important target for anticonvulsant drugs since seizures may be discouraged by increasing GABA synthesis, decreasing its breakdown, or enhancing its effect on neurons.

The nerve impulse is characterised by a great influx of sodium ions through channels in the neuron’s cell membrane followed by an efflux of potassium ions through other channels. The neuron is unable fire again for a while (known as the refractory period), which is mediated by another potassium channel. The flow through these ion channels is governed by a “gate” which is opened by either a voltage change or a chemical messenger known as a ligand (such as a neurotransmitter). These channels are another target for anticonvulsant drugs.

There is not one mechanism by which epilepsy occurs. Examples of pathological physiology include: unusual excitatory connections within the neuronal network of the brain; abnormal neuron structure leading to altered current flow; decreased inhibitory neurotransmitter synthesis; ineffective receptors for inhibitory neurotransmitters; insufficient breakdown of excitatory neurotransmitters leading to excess; immature synapse development; and impaired function of ionic channels.

**Seizure control**

Many hypotheses have been put forward to explain how the ketogenic diet works; it remains a mystery. Disproven hypotheses include systemic acidosis, electrolyte changes and hypoglycaemia. Changes in neurotransmitter levels occur and cerebral energy state is improved. Although many biochemical changes are known to occur in the brain of a patient on the ketogenic diet, it is not known which of these has an anticonvulsant effect. The lack of understanding in this area is similar to the situation with many anticonvulsant drugs.

On the ketogenic diet, carbohydrates are severely restricted and so cannot provide for all the metabolic needs of the body. Instead, fatty acids are used as the major source of fuel. These are used through fatty-acid oxidation in the mitochondria. Humans can convert some amino acids into glucose by gluconeogenesis, but cannot do this for fatty acids. Since amino acids are needed to make proteins, these cannot be used only to produce glucose. This poses a problem for the brain since it is normally fuelled solely by glucose, and fatty acids do not cross the blood-brain barrier.

To overcome this problem, the liver uses fatty acids to synthesise the three ketone $\beta$-hydroxybutyrate, acetoacetate and acetone. Ketone bodies can enter the brain and substitute for glucose.

The ketone bodies are possibly anticonvulsant in themselves; acetoacetate and acetone protect against seizures in animal models. The ketogenic diet results in adaptive changes to brain energy metabolism that increase the energy reserves; ketone bodies are a more
efficient fuel than glucose, and the number of mitochondria is increased. This may help the neurons to remain stable in the face of increased energy demand during a seizure, and may confer a neuroprotective effect.

The ketogenic diet has been studied in at least 14 rodent animal models of seizures. It is protective in many of these models and has a different protection profile than any known anticonvulsant. This, together with studies showing its efficacy in patients who have failed to achieve seizure control on half a dozen drugs, suggests a unique mechanism of action. Anticonvulsants suppress epileptic seizures but they neither cure nor prevent the development of the inherent seizure susceptibility. The development of epilepsy (epileptogenesis) is a process that is poorly understood. A few anticonvulsants have shown antiepileptogenic abilities in animal models of epileptogenesis. However, no anticonvulsant has ever achieved this in clinical trial in humans. The ketogenic diet has been found to have antiepileptogenic properties in rats.

Other applications

The treatment of several rare metabolic diseases may benefit directly from the ketogenic diet. Case reports on two children indicate a possible use in treating astrocytomas, which are a form of brain tumour, depression, migraine headaches, polycystic ovary syndrome, and type 2 diabetes mellitus have been shown to benefit in small case studies. There is evidence from uncontrolled clinical trials and studies in animal models that the ketogenic diet can provide symptomatic and disease-modifying activity in a broad range of neurodegenerative disorders including amyotrophic lateral sclerosis, Alzheimer’s disease and Parkinson’s disease, and may be protective in traumatic brain injury and stroke. Because tumour cells are inefficient in processing ketone bodies for energy, the ketogenic diet has also been suggested for cancer. As of 2008, there is not sufficient evidence to support the use of the ketogenic diet as a treatment for these conditions.

Notes

1. Unless otherwise stated, the term fasting in this article refers to going without food while maintaining calorie-free fluid intake.
2. Hippocrates, On the Sacred Disease, ch. 18; vol. 6.
3. Hippocrates, Epidemics, VII, 46; vol. 5.
4. Galen, De venae sect. adv. Erasistrateos Romae degentes, c. 8; vol. 11.
5. Galen, De victu attenuante, c. 1.
6. A good reduction is defined here to mean a 50–90% decrease in seizure frequency. An excellent reduction is a 90–99% decrease.
7. Ketogenic “eggnog” is used during induction and is a drink with the required ketogenic ratio. For example, a 4:1 ratio eggnog would contain 60 g of 36% heavy whipping cream, 25 g pasteurised raw egg, vanilla and saccharin flavour. This contains 245 calories, 4 g protein, 2 g carbohydrate and 24 g fat (24:6 = 4:1). The eggnog may also be cooked to make a custard, or frozen to make ice cream.

References

3. Zupec-Kania BA, Spellman E. An overview of the ketogenic diet for pediatric


8. Temkin O. The falling sickness: a history of epilepsy from the Greeks to the beginnings of modern neurology. 2nd ed. Baltimore: Williams & Wilkins; 1921.


23. Temkin O. The falling sickness: a history of epilepsy from the Greeks to the beginnings of modern neurology. 2nd ed. Baltimore: Williams & Wilkins; 1921.


7.

Further reading

Starting Your Autistic Child on a Gluten Free/Casein Free Diet

Special Diets for Children with Autism

While mainstream medical practitioners rarely recommend special diets for autism, many parents will hear of the success of such diets through websites, books, friends and conferences. The science around such diets is sketchy, but there are plenty of anecdotal stories of special diets having a profound and positive impact on children with autism. The gluten (wheat) free, casein (dairy) free diet is the most popular of the specialized diets, and there is evidence that the diet is often helpful in lessening autistic symptoms such as impulsive behaviors, lack of focus, and even speech problems. But wheat and dairy are a part of almost everything we serve in the United States -- and keeping a child away from ice cream, pizza, milk, and all most snack foods and cereals is no small task.

So, what does it take to start a gluten-free, casein-free (GFCF) diet?

Identifying Gluten and Casein in Your Child’s Diet

Removing gluten and casein from a child’s diet is not as simple as saying goodbye to milk and bread. According to Carol Ann Brannon, a nutritionist who specializes in diets for children with autism, gluten is not only ubiquitous, but may also find its way into your child’s system through the skin:

“Gluten is found in wheat, rye, barley, oats, spelt, and any derivatives of these grains, including, but not limited to malt starches, malt wash, hydrolyzed vegetable/plant proteins, grain vinegar, soy sauce, and natural flavorings. Casein is found in milk and milk products from mammals....Gluten is in even in Play-Doh, adhesive on stamps and stickers, and many hygiene products. Soy, another common food allergen, is in many foods and hand lotions, make-up, etc.”

Starting Your Autistic Child on a GFCF Diet

According to Brannon, there are two ways to start a GFCF diet: “dive in head first” or the slower, “get your feet wet” approach. The “dive in head first” parents prefer to go GFCF all at once and decide to place the entire family on the diet. Often, siblings and parents may also experience benefits from the diet. The “get your feet wet” parents opt to go gluten-free first, and then progress to excluding casein-containing foods and beverages.

An increasing number of GF foods are available due to the increase in celiac disease. A parent should select the approach that best suits their personality and their lifestyle. Many parents begin the diet with dread and fear, but soon find it is more manageable than they had imagined. GFCF diet support groups can be a tremendous help to parents. In addition, there are many websites and blogs for parents.

What Can My Child Eat on a GFCF Diet?

In general, says Brannon, “Children can eat a wide variety of meat, chicken, eggs, fruits, and vegetables — anything that does not contain wheat gluten or casein. It is generally recommended that organic, whole GFCF foods be consumed whenever possible.”

GFCF advocates caution that even a little bit of wheat or dairy could have a big impact on a child with autism. To avoid accidentally eating the wrong foods, it’s important to read labels carefully – wheat and dairy are often “hidden” ingredients in packaged products. It’s also very important to inform teachers, therapists, and other adults in your child’s life that he is now wheat and dairy free.

Sources:
- Interview with Carol Ann Brannon, MS, RD, LD, Nutrition Therapist
- Interview with Dr. Cynthia Molloy, M.D., M.S. Assistant Professor of Pediatrics, Center for Epidemiology and Biostatistics, Cincinnati Children’s Hospital Medical Center, March 13, 2007.

Questions over jab that has spared thousands

Solvent used in vaccine preparation could be contamination source

By Steve Connor, Science Editor Thursday, 26 February 2009

DAVID SANDISON

Ciar Neale’s seven-month old daughter, Iris, was vaccinated against meningitis C earlier this year: ‘I’m a big believer in vaccination,’ she said. ‘I think parents have a responsibility to their child and to other children to protect against diseases.’

Meningitis is a potentially dangerous inflammation of the membranes of the brain and spinal cord and can be caused by a range of viruses, bacteria and even drugs. It is classed as a medical emergency because it can kill very quickly.
The most common symptoms of meningitis are headaches and neck pain associated with fever, confusion and an inability to cope with bright light or loud noises. A rash can indicate infection with one of the range of bacteria that can cause the inflammation. The meningitis C vaccine is designed to protect against the “C” class of bacteria known to cause the condition and is made from inactivated proteins extracted from the Neisseria meningitidis bacterium. It does not protect against meningitis B.

Like other vaccines, the meningitis C vaccine works by stimulating the production of disease-fighting antibodies which, once primed, can be quickly marshalled in defence of the body when a real infection takes place. Since its introduction in 1999, the meningitis C vaccine has proved successful in reducing the number of people suffering from the illness. About 13 million children were immunised during the first year of the campaign.

Related articles
Prior to the introduction of the vaccine, group C meningococcal disease was the second most common cause of meningitis, accounting for 40 per cent of cases. Since then, the number of cases of meningitis C has fallen by more than 95 per cent.

There are two meningitis C vaccines used in Britain. One is made by Wyth, which is not connected with the current recall by the Medicines and Healthcare products Regulatory Agency (MHRA), and the other is the Novartis product Menjugate, which could be contaminated with the hospital-acquired infection Staphylococcus aureus – which is the microbe behind MRSA.

Two batches of the Novartis vaccine could be contaminated with the bacterium. Although standard tests proved negative for Staphylococcus, two non-standard tests carried out to determine whether it was better to send the vaccine by air rather than by road from Italy proved positive for the bacterium. The problem seems to stem from the use of a solvent called aluminium hydroxide used in the preparation of the vaccine which could have been contaminated with Staphylococcus aureus, according to Novartis.

The vaccine was tested extensively before its introduction and is considered to be safe by the regulatory agencies. After it was licensed in the UK, it has been monitored regularly for safety and adverse effects are monitored through the yellow card scheme of reporting used by GPs.

The MHRA said that Novartis was investigating the root cause of the problem, but there was no evidence that other batches of the aluminium hydroxide solvent used in the preparation were contaminated. The agency is also keen to reassure parents that there is no reason for children to be at risk from the vaccine but if they are concerned they should consult their GPs.

The Department of Health said last night that the batches of vaccine being recalled have passed the standard sterility tests carried out in the UK and the recall is purely a precautionary measure.

Case study: ‘The worst thing is that this is another scare for parents’
Ciar Neale’s seven-month-old daughter, Iris, was vaccinated against meningitis C earlier this year. But the 32-year-old from north London said that this latest scare would make other mothers think twice.

“I’m a big believer in vaccination,” she said. “I think parents have a responsibility to their child and to other children to protect against diseases. But if there is something wrong with the vaccine I’m not so sure I’d feel the same way.

“If there is a problem with a particular vaccine I do not think any parent would want to put a child at risk. Some parents already see vaccination as a risk and they will not want to add to that.

“Vaccinations are quite an emotive subject for parents. When I took Iris to get her injections she got quite upset and I felt terrible for letting someone stick a needle in my daughter and hurt her. I don’t know how I’d have felt if someone told me that by allowing her to be vaccinated I could have actually done more harm than good.

“I think the worst thing is that this is another scare for parents. The Measles Mumps and Rubella (MMR) story created a scare which saw the return of measles – a really horrible disease. It is a great shame that something like this could cause parents to decide not to have their child vaccinated.”

Mark Hughes

Class 2 Drug Alert (action within 48 hours): Novartis Vaccines and Diagnostics

Novartis Vaccines and Diagnostics S.r.l. are recalling the above batches of Menjugate Kit as a precaution following an initial failure of a sterility test carried out as part of a shipping validation study of the batch of aluminium hydroxide solvent used in them, batch number 088902. This batch passed its sterility test at the time of release.

Recipients are asked to quarantine any stock and notify Movianto UK Ltd on 01234 248789 that you have product to be collected. Alternatively please email Rosina.Clarke@movianto.com with details of the product to be collected.

In the UK, Novartis Vaccines’ co-promotion partner is Sanofi Pasteur MSD Ltd. However for information regarding this action please contact Novartis Vaccines and Diagnostics Limited on 08457 451500.

Primary Care Trusts are asked to bring this information to the attention of relevant clinics, General Practitioners and Community Pharmacists by copy of this letter.

Yours faithfully

Alison Bunce
Pharmaceutical Assessor, DMRC

Questions and answers

Q Why are these lots of Menjugate Kit being recalled?

A The tested samples were of one batch of solvent used in two batches (235012A and 236011) of Menjugate Kit, and were identified positive for the bacteria Staphylococcus aureus during the sterility test, they were not distributed to the UK market. However, as a precaution, these two batches of Menjugate Kit which were distributed in the UK are being recalled. There is at present no evidence that these two batches of Menjugate Kit are affected.

The batches concerned were tested prior to release and complied with all tests, including the sterility test. Product supplied to the UK was shipped using routine validated transport. The tested samples that failed the sterility test were part of a non-routine study undertaken by the company and were not part of the UK market product.

Q If there are no problems why have these batches of vaccine been withdrawn?

A This is an entirely precautionary action. There is no reason to believe the UK batches are at risk of the problems of the material that was tested. These batches of vaccine have been withdrawn to ensure that there are
There is a professional set of outside noise reduction headphones and a set of eye goggles with nine led lights over each eye. Our set of noise reduction headphones is designed for intense quality sound produced from our computer with the Indigo / SCIO operating. The Indigo / SCIO can then control and pick a desired music to stimulate the brain and monitor its results and change the next music selection to maximize the relaxation effects and the CES. A small click of the right frequency sound will trigger some of the lights to go on. Thus as we monitor the brain wave the system can select the appropriate music to stimulate the eyes thus the brain. The device has a simple output from the computer headphone jack. We design music with the right sound clicks of the proper hertz and the

MHRA Distribution (further recipients by cascade):
- Regional Contacts for NHS
- Trusts and Provider Units
- Chief Pharmacists: England, Scotland, Wales, Northern Ireland
- Prison Health Policy Unit (DH)
- Chief Pharmacists: Jersey, Guernsey, Alderney, Sark, Isle of Man, Gibraltar
- Special Hospitals
- Healthcare Commission for distribution to Independent Health Care Establishments
- Primary Care Trusts (England)

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The Significance of Brainwaves

With the discovery of brainwaves came the discovery that electrical activity in the brain will change depending on what the person is doing. For instance, the brainwaves of a sleeping person are vastly different than the brainwaves of someone wide awake. Over the years, more sensitive equipment has brought us closer to figuring out exactly what brainwaves represent and with that, what they mean about a person’s health and state of mind.

You can tell a lot about a person simply by observing their brainwave patterns. For example, anxious people tend to produce an overabundance of high Beta waves while people with ADD/ADHD tend to produce an overabundance of slower Alpha/Theta brainwaves.

Researchers have found that not only are brainwaves representative of mental state, but they can be stimulated to change a person’s mental state, and even help with a variety of mental disorders.

The Science Behind SCIO
Binaural Noise Therapy and Brainwave Stimulation

What are Brainwaves?

Your brain is made up of billions of brain cells called neurons, which use electricity to communicate with each other. The combination of millions of neurons sending signals at once produces an enormous amount of electrical activity in the brain, which can be detected using sensitive medical equipment (such as an EEG), measuring electricity levels over areas of the scalp.

The combination of electrical activity of the brain is commonly called a BrainWave pattern, because of its cyclic, “wave-like” nature.

Below is one of the first recordings of brain activity.

Here is a more modern EEG recording:

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Stimulating brainwaves with sound
NNS stimulates brainwaves through a scientific process known as Brainwave Entrainment

What is Brainwave Entrainment?

Brainwave Entrainment refers to the brain’s electrical response to rhythmic sensory stimulation, such as pulses of sound or light.
When the brain is given a stimulus, through the ears, eyes or other senses, it emits an electrical charge in response, called a Cortical Evoked Response (shown below). These electrical responses travel throughout the brain to become what you “see and hear”.

When the brain is presented with a rhythmic stimulus, such as a drum beat for example, the rhythm is reproduced in the brain in the form of these electrical impulses. If the rhythm becomes fast and consistent enough, it can start to resemble the natural internal rhythms of the brain, called brainwaves. When this happens, the brain responds by synchronizing its own electric cycles to the same rhythm. This is commonly called the Frequency Following Response (or FFR). FFR can be useful because brainwaves are very much related to mental state. For example, a 4 Hz brainwave is associated with sleep, so a 4 Hz sound pattern would help reproduce the sleep state in your brain.

Brainwave Entrainment has over 70 years of solid research behind it. SCIO can also generate binaural or monaural beats, which are the most commonly used brainwave entrainment techniques. Veterans of brainwave entrainment may find this strange, since headphones are such a traditional part of the brainwave entrainment experience. The reality of the matter is, however, that headphones have never been required for use with anything except Binaural beats, which present a slightly different tone to each ear. Monaural beats can be used very effectively without headphones, for example. So can pulses, clicks and light stimulation. In fact, many ancient cultures used Drums to enter deeply relaxed ‘trances’ during Shamanic rituals. Though they may not have called it brainwave entrainment, the rhythmic stimulus of the drum could have been the cause of the “trance-like” states reported during such rituals.

Any repeating stimulus can entrain the brain. Pulses of sound, light, physical vibrations or even electricity (CES machines). SCIO Synthesizer uses many techniques that don’t rely on left-right speaker assignments. Neurons in the brain will fire a response to any stimulus, whether you have headphones on or not. By listening to the sounds generated by SCIO, with or without headphones, the brain will start to entrain. What we have done with SCIO is perfect this process through extensive testing and optimization.

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Alpha</th>
<th>Beta</th>
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<tbody>
<tr>
<td>4</td>
<td></td>
<td></td>
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**SCIO Binaural Brain wave Synthesizer’s unique approach to brainwave entrainment**

For example, one SCIO filter removes and replaces the higher frequencies generated by the Noise, in a circular pattern over time. Because SCIO is generating noise that is structured to stimulate the brain over and over each second, the brain fires neural responses to the same rhythm. After about 6 minutes, brainwave entrainment is established, and the brain of the listener is synchronized to the frequencies embedded in the noise.

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What about Hemispheric Synchronization?

Hemispheric Synchronization is a byproduct of nearly all types of brainwave entrainment. In 1980, Tsuyoshi Inouye and associates at the Department of Neuropsychiatry at Osaka University Medical School in Japan found that photic stimulation in the alpha range produced hemispheric synchronization.

Dr. Norman Shealy later confirmed the effect, finding that photic stimulation produced “cerebral synchronization” in more than 5,000 patients. In 1984, Dr. Brockopp analyzed audio-visual brain stimulation and in particular hemispheric synchronization during EEG monitoring. He said “By inducing hemispheric coherence the machine can contribute to improved intellectual functioning of the brain.”

There is similar evidence that CES (electrical stimulation), motion systems, acoustic field generators and even floatation tanks can increase EEG symmetry.

Further Reading

- Bermer, F. “Cerebral and cerebellar potentials.” Physiological Review, 38, 357-388.

More on Brainwaves

<table>
<thead>
<tr>
<th>Wave</th>
<th>Frequency</th>
<th>Mental state / Sub-categories (bands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>12hz - 38hz</td>
<td>Wide awake. This is the state you are normally in from the moment you wake up to the time you go to sleep at night. Usually, this state in itself is uneventful, but don’t underestimate its importance. Entraining SMR and Beta 1 in particular can be extremely beneficial to people with mental or emotional disorders such as insomnia, depression or ADD. This band can also be used for increasing focus.</td>
</tr>
<tr>
<td>Alpha</td>
<td>8hz - 12hz</td>
<td>Awake but relaxed and not processing much information. When you get up in the morning and just before sleep, you are naturally in this state. When you close your eyes your brain automatically starts producing more Alpha waves. Alpha is usually the goal of experienced meditators, but to enter it using this program is incredibly easy. You can also use this state for effective self-hypnosis and mental re-programming.</td>
</tr>
<tr>
<td>Theta</td>
<td>3hz - 8hz</td>
<td>Light sleep or extreme relaxation. Theta can also be used for hypnosis.</td>
</tr>
<tr>
<td>Delta</td>
<td>0.2hz - 3hz</td>
<td>Deep, dreamless sleep. Delta is the slowest band of brainwaves. When your dominant brainwave is Delta, your body is healing itself and “resetting” its internal clocks. You do not dream in this state and are completely unconscious.</td>
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Clinical Investigations

Analysis of the EEG bispectrum, auditory evoked potentials and the EEG power spectrum during repeated transitions from consciousness to unconsciousness

R. J. Gajraj, M. Doi, H. Mantzaridis and GNC. Kenny

University Department of Anaesthesia, HCI International Medical Centre, Bearemore Street, Clydebank G81 4HX, Scotland; Department of Anaesthesiology and Intensive Care, Hamamatsu University School of Medicine, 3600 Honda, Hamamatsu 431-31, Japan; Department of Anaesthetics, Law Hospital, Carluke, Lanarkshire ML8 SER, Scotland

We have compared the auditory evoked potential (AEP) index (a numerical index derived from the AEP), 95% spectral edge frequency (SEF), median frequency (MF) and the bispectral index (BIS) during alternating periods of consciousness and unconsciousness produced by target-controlled infusions of...
propofol. We studied 12 patients undergoing hip or knee replacement under spinal anaesthesia. During periods of consciousness and unconsciousness, respective mean values for the four measurements were: AEP index, 60.8 (SD 13.7) and 37.6 (6.5); BIS, 85.1 (8.2) and 66.8 (10.5); SEF, 24.2 (2.2) and 18.7 (2.1); and MF, 10.9 (3.3) and 8.8 (2.0). Threshold values with a specificity of 100% for a state of unconsciousness were: AEP index, 37 (sensitivity 52%); BIS, 55 (sensitivity 15%); and SEF, 16.0 (sensitivity 9%). There was no recorded value for MF that was 100% specific for unconsciousness. Of the four measurements, only AEP index demonstrated a significant difference (P < 0.05) between all mean values 1 min before recovery of consciousness and all mean values 1 min after recovery of consciousness. Our findings suggest that of the four electrophysiological variables, AEP index was best at distinguishing the transition from unconsciousness to consciousness.

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The Associations Between 40 Hz-EEG and the Middle Latency Response of the Auditory Evoked Potential

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The study of the 40 Hz activity of the brain which was begun by Adrian (1942) has been furthered for the past years with several new approaches: A neural model for the generation of 40 Hz activity in attention has been published by Freeman (1975) whereas new possibilities in clinical applications and exploration of cognitive processes in an extended manner was proposed by Galambos and coworkers (1981). The present study demonstrates the relation between 40 Hz spontaneous activity in human EEG-recordings and the middle latency response of the auditory evoked potentials. The applied signal analysis method allows also a single trial analysis of EEG-EP epochs which can be extended in studies on cognitive processes. A perspective concerning the middle latency response of the auditory AEP is also given.

Continuous EEG and Evoked Potential Monitoring in the Neuroscience Intensive Care Unit

Jordan, Kenneth G.

Abstract

Summary: As with other methods long used in intensive care units (ICU) and operating rooms (OR), the goal of neuroscience ICU continuous EEG (NICU-EEG) and evoked potential (NICU-EP) monitoring is to extend our powers of observation to detect abnormalities at a reversible stage. EEG is an appropriate monitoring tool because it is linked to cerebral metabolism, is sensitive to ischemia and hypoxemia, correlates with cerebral topography, detects neuronal dysfunction at a reversible stage, and is the best method for detecting seizure activity. When applied systematically, it can impact medical decision-making in 81% of monitored patients. It is useful in monitoring precarious cerebral perfusion at the bedside, and it has revealed that nonconvulsive seizures, undetectable otherwise, occur in 34% of NICU patients. In convulsive status epilepticus, NICU-EEG can help avoid undertreatment and overtreatment. In comatose patients, it can provide useful prognostic information as well as detect potentially treatable causes. Traditional impediments to its application are yielding to technological advances and educational efforts. Real-time digitized EEG in particular has been a major advance. Within limits, somatosensory evoked potential monitoring (ICU-SEP) is useful in the prognosis of coma, but it is less helpful in monitoring focal cerebral ischemia.

Brainstem auditory evoked potential monitoring has a relatively restricted role in the NICU but is helpful in distinguishing structural from nonstructural causes of coma and can supplement ICU-SEP in predicting outcome.

Auditory evoked transient and sustained magnetic fields of the human brain

Localization of neural generators

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Summary

A long auditory stimulus elicits a magnetic evoked response in the human brain, consisting of transient deflections followed by a sustained response. The distributions of the magnetic fields indicate that the auditory evoked transient response at a latency of 100 ms as well as the auditory sustained response are generated at and around the primary auditory cortex.

Treating Handicapped Patients with the SCIO Device

Written By: Authors: Kinga Guylás, Quantum Biofeedback Therapist
Budapest, Hungary, 2 / 2008

Abstract

I have been using SCIO since 2004. I was practicing with SCIO at the Egyenlő Esélyekért Alapítvány (Foundation for Equal Chances) in Csömör Hungary for 3 years which is a center for handicapped young adults. People here live and work with different kinds of disabilities. They are handicapped either in vision, motion or in hearing; they can be mentally or psychiatrically injured or they can suffer of a cumulation of some of these above. Some people’s handicap originate from the foetal period, some were handicapped at birth and again, some suffered some kind of injuries at a later period of their lives due to an accident or illness. The SCIO device is absolutely safe, there has never been any record of any significant risk. The SCIO is highly effective at medically treating the clients in many ways.

In our treatment of these children we were able to dramatically help the children with the SCIO device. The SCIO was able to help sedate and relax the children when there were temper tantrums. The SCIO was able to help with immune system balancing and was used to stimulate cellular regeneration. Budapest, 5 February, 2008 © IUMSH 2008
The SCIO device sends into the patient a refined trivector signal and then modifies the signal guided by the unconscious reactions of the patient. This electrical tickle and the cybernetic loop of the SCIO have profound effects on the patient.

The SCIO thus can stimulate rejuvenation of injured tissue, have effects on hormones and moods, reduce pain, and stimulate detox, among many other functions. This new type of unconscious biofeedback has been so valuable to our patients that it is hard to imagine a practice without it.

Although biofeedback is an effective clinical procedure, it is not used in isolation from other therapeutic techniques. Since many of its clinical applications focus on the reduction of anxiety or physiological arousal, relaxation procedures have been used with biofeedback to maximise this effect. The patient undergoing biofeedback treatment is often introduced to a relaxation technique prior to receiving biofeedback.

Standardized relaxation techniques are effective for most patients. If the patient has difficulty, the therapist must be certain that the patient’s failure to relax is not due to a misconception or to therapeutic resistance. For example, some patients try too vigorously to relax, which results in increased tension. This may occur with Jacobson’s technique because patients spend too much time tensing muscles and too little time relaxing.

If a well-motivated patient, however, cannot adjust to the standard relaxation procedure, other methods are available. Biofeedback therapists must be familiar with alternative procedures when a standard technique fails to generate the desired response (i.e. Lowered
anoxemia at birth, due to or independently somewhere else and they the age of 18, some of them live in a family, homes and arrived at the Foundation after Some of these people were brought up in cellular repair and thus can accelerate healing. The device has excellent abilities to reduce cellular regeneration. The SCIO was able to help with immune system balancing and was used to stimulate The SCIO was able to help sedate and relax the SCIO device. In our treatment of these children we were irradiated or hyperactivity and stress.

Methods

Since 2004 we have used the SCIO at the handicapped children clinic in Hungary. Our research and treatment team use the SCIO at the Egyenlő Esélyekért Alapítvány (Foundation for Equal Chances) in Csömör Hungary for 3 years which is a center for handicapped young adults.

People here live and work with different kinds of disabilities. They are handicapped either in vision, motion or in hearing; they can be mentally or psychiatrically injured or they can suffer from a combination of some of these above. Some people’s handicap originate from the foetal period, some were handicapped at birth and again, some suffered some kind of injuries at a later period of their lives due to an accident or illness. In our treatment of these children we were able to dramatically help the children with the SCIO device.

The SCIO was able to help sedate and relax the children when there were temper tantrums.

The SCIO was able to help with immune system balancing and was used to stimulate cellular regeneration.

The device has excellent abilities to reduce healing time, as that the SCIO stimulates detox and recovery time and thus can help these somewhat immobile people to live a better life despite their restrictions.

Other temporary problems – depending on their nature – are successfully fixed with applying SCIO once or a couple of times. For example, a headache or a bad neck can be treated in one session; a massive pain in the knee needs several treatments. The SCIO can reduce recovery time by greatly stimulating the cellular rejuvenation.

By applying SCIO regularly and under medical control, allopathic medication intake could be reduced or stopped, or replaced by homeopathic remedies.

Unfortunately, there are not too many doctors schooled on „western medicine” in Hungary who could be a partner to alternative methods monitoring the patients in the background. The drugless therapy of the SCIO device can prevent the drug abuse and side effects of these drugs.

I observed during the sessions with SCIO that the questions of the SOC panel concerning cigarette-, alcohol-, carbohydrate and water consumption are of a big help to the patients. Many times they come back after the first session with me saying that they now drink tea with less sugar, or they use more fructose, they drink more water, smoke less or started some exercise.

The education of behavioral medicine is a valuable part of the process. This part of the SCIO program explicitly makes people learn to live more health conscious.

According to my experiences the more conscious someone lives the more hydrated, oxygenized he is, the better pH-balance he has, the shorter the necessary therapy becomes and the patient achieves a quicker success in healing.

Case descriptions

Male patient: anoxemia at birth, due to this multiply handicapped (mentally and emotional). I treated him regularly, every fortnight, from the age 28-31. When I met him:

- no verbal communication, sometimes a squeaking voice
- no eye contact, or very rarely and just for a short time
- when I was speaking to him, I did not know if he was listening or understood me
- he cannot read or write, his drawing equals the scratch of a two-year old child
- housebroken, he can eat and drink, get dressed with help
- imbalanced, one-sided motion, he wears therapeutic shoes, he needs to lean on attendant
- fine and developed motoric notions
- patient at sessions, he was mostly crooning a monotone tune and was shaking his body, or he was blowing air into an empty PET bottle
- when he had a chance, he displaced everything from the kitchen and bathroom at home, besmearing everything with cream from cans
- when he was stopped doing this, he went ballistic, blew up, beat his head into the door post
- he could perform a simple list of tasks under control for a short while

When I started to treat him, I knew that he had already been treated with SCIO earlier. I was told that he also had seizures earlier that stopped after the 2nd session. Among others, the main goal was to balance the energetics of the central nervous system.

I observed the following changes after the years I treated him:

- still no verbal communication, but there is eye contact for a longer time
- he is pointing out things that he likes to get
- he signals when he needs to use the toilet
- he visibly understand what I am saying
- he is paging story-books and newspapers during the sessions pointing out, showing the characters’ eyes, etc., for instance
- still walking imbalanced, but he can keep up with my walking speed, he can literally run, needs not lean on anyone
- no monotone crooning during the sessions, or very, very rarely

Female patient: 32 year old, hard of hearing as of birth. Due to this mentally slightly retarded but she can read and write. She sees
a psychiatrist due to her depression; she is put on medications. No menses in the past 4 years; loss of hair which is a side effect of the taken medications.

After consulting her doctor she reduced medication, and then completely gave up taking one of them. After 6 SCIO treatments she started to have her periods regularly and she has been having them since. She keeps seeing me for sessions with other problems.

Male patient: 28 years old, he is handicapped since birth, sitting in wheel chair. He has muscled upper body and arms, but he is gnomed downwards his hip, his leg muscles are atrophied.

Mentally he is slightly retarded; he can read and write. Among other problems, he had a one inch, open, wound at the low back that had not been healing for decades.

After 5 sessions the wound started to shrink; when I left the Foundation it was app. .33 of an inch. This may not sound like much but after 10 years this was seen as a great improvement.

Interesting Case Descriptions (Not Treated at the Foundation)

Female patient: 68 years old, having many physical and mental problems. One of her main concerns was an over pressure in her eye-balls. She was under regular medical control and medication. After 6-8 SCIO treatment the pressure went back to normal, she needs no medication. She feels fine since.

Female patient: 71 years old, the medical doctor’s opinion is that she has inherited arthritis, though she does not know about one single case like hers in her family. When she comes to see me, she can hardly walk, the joint of her big toe on her right foot is inflame, she cannot lift her fingers, she feels lancinating pain everywhere, especially in the toes and knees. She was feeling a change right after the 1st treatment, next time she says that she did not wake up at night, she does not feel the lancinating pain and she can turn in the bed without waking up. After three sessions she report a 75% decrease in the symptoms most importantly pain is much less. She is able to walk with a normal speed.

Discussion

Stress is a part of all disease pictures and stress reduction should be a part of all medicine. The SCIO/EPFX or in fact any biofeedback can be helpful for stimulating awareness, control, responsibility and return of health. The techniques tested in this paper were shown extremely helpful in reducing stress. There was never any record of any hurt or risk to any of our clients. There was evidence of helping and positive results on every client.

Heavily handicapped people are brought to ease and guided to an even emotional mood level with the regular application of SCIO. The SCIO can stimulate detox and recovery time and thus can help these somewhat immobile patients to live a better life despite their restrictions.

Other temporary problems – depending on their nature – are successfully fixed with applying SCIO once or a couple of times. For example, a headache or a bad neck can be treated in one session; a massive pain in the knee needs several treatments.

The SCIO can reduce recovery time by greatly stimulating the cellular rejuvenation.

In conclusion, the authors views the SCIO/EPFX as an important biofeedback tool useful in many stages of stress reduction-oriented therapy and would encourage allied professionals and regulatory bodies to recognize its value. This is very valuable in a handicapped children and adult clinic.

At the end of this short report, I wish to mention two things: I appreciate Bala Lodhia and Levi Baxa for sharing their knowledge with me as well as with many others. I learned from them the most.

Secondly, my experience with SCIO is like learning a foreign language: first you know some words, then you can put the first simple sentence together. Then you go on the compound sentences and you are not bound by your shallow lexicon any more.

You can express yourself delicately. So, there is basic, intermediate, proficiency level, and when you read classicals or watch a movie without subtitles, then you are delighted by the person who speaks this language as a mother tongue.

Thank you all for extending SCIO’s vocabulary and opening up new dimensions.

Budapest, 5. February, 2008

Future Study on Treating Handicapped People with SCIO Living and/or Working at „Összefogás“ Industrial Co-Operative and Foundation for Equal Chances

DRAFT

Introducing place

• how many people
• social background
• what injuries, handicaps
• trade carried out
• methods of treatments

About the SCIO device

• since when
• number of patients
• general conclusions of application

Individual cases upon the reports of 3 SCIO therapists

• patients indicated by case numbers
• sex
• age
• diagnosed disease upon findings and medical history
• actual complaints
• how many times the patient has been treated with SCIO in what period of time
• any side effects
• any changes on physical or mental level

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Related Articles:
“Being at Ease with Handicapped Children”
“Partnership Helps Handicapped Children”
“USA Counts One in 12 Children are Disabled”

The SCIO device can use the Triactor and Cybernetic Loop to rectify aberrant and dissonant energy patterns in the body. This has profound effects on all body functions but affects the corpus callosum most intensely.

This means that the ability of the conscious mind to perceive the subconscious is increased with the rectification process. The patient will probably not feel the effect, but will always be a positive effect. If there is a negative effect, it is because there is shielding or covert feelings or memories in the subconscious. These will cause disease if left untreated. A simple release may solve the problem.

The changes include:
1. Activate the innate intelligence to balance the body energies. This is the basic principle of chiropractic, acupuncture, and osteopathy medicine.
2. There is an easier exchange of energy and information from right brain to left brain via the corpus callosum. The corpus callosum is the largest energy form in the body and the rectification process has profound effects on stabilizing it, so it dramatically reduces switching phenomena.
3. The SCIO thereby increases the ability of the conscious mind to interface with the unconscious. This allows greater knowledge of self and of the higher self.
4. There is a greater memory access, a more true access of memory without emotional clouding.
5. There is a greater flexibility of connective tissue, allowing for more resilience.
6. There is a greater oxygenation and hydration ability of the body.
7. There is a smoother muscle control.
8. There is a general increase in well being that the conscious mind is so often unable to perceive. And thus there are thousands of subtle improvements to be found.
A Study of the Effects of Cranial Electrical Stimulation on Attention and Concentration

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Abstract

There have been several anecdotal accounts that cranial electrical stimulation (CES) enhances attention and the ability to learn new tasks in a normal population, but only one published investigation confirms that CES improves attention using the Alpha Stirn CES (Madden and Kirsch, 1987). The purpose of this study is to corroborate the findings of Madden and Kirsch, using more precise measures of attention, such as a Continuous Performance Test (CPT) A pretest and posttest CPT given two groups using the LISS CES device. The control group consisted of twenty-one subjects who received the placebo treatment. The experimental group of thirty-one subjects received twenty minutes of CES. Four measures of the CPT show significant gains in attention: Number of Hits, Hit RT SI Change, p = 0.16, Risk Taking, p = 0.55; and Attentiveness, p = 0.054. Based on subjects who demonstrated improvement by one standard deviation on two different measures of the CPT, thirty-one percent of the experimental group improved versus four percent of the control group.

The use of CES as a method of increasing attention to the central nervous system allowed the brain cells to rest and allowed for restoration of function. Attention to cranial electrotherapy in the West was stimulated by the International Symposia for Electrotherapeutic Sleep and Electroanesthesia, held in Graz, Austria, in 1966 (Wagender, 1969, cited in Klawanski et al., 1995). The first studies appeared in the U.S. in the early 1970s. One cause for the late involvement of U.S. investigators was the absence of available equipment, which led to some researchers gaining access to Russian made devices, while others constructed their own. By 1975, Brown reported seven different CES units being manufactured in the U.S. In terms of published research, the most productive years were between 1973 and 1977, when fifty journal articles and reviews were published.
Solomon et al., 1989). Another promising area of treatment is addiction, where CES has been used in the detoxification of opiate dependent patients. Alling, Johns on, and Ellmohazy (1990) reported promising results with CES as a treatment method that may help alleviate drug withdrawal and cravings. CES has also been used as a treatment for anxiety experienced by chemically dependent persons (Schmitt et al., 1986; Patterson et al., 1994).

In two studies of alcoholic inpatients, Smith (1982) found CES was associated with significant recovery of short-term memory loss and a significant improvement in cognitive functioning on the maze and form board subtests of the Revised Beta Examination of IQ. Another promising use of CES is with phobia patients; Smith and Shiromoto (1992) found CES significantly reduced the intensity of the fear response in phobic patients.

There have also been promising results with the use of CES with brain injured patients. Smith, Tiberi, and Marshall (1994) examined the effects of CES on closed head injured patients. CES ameliorated symptoms of tension, anxiety, depression, anger, fatigue, hostility, inertia, and confusion.

Schmitt, Capo, Frazier, and Boren (1984) conducted a double-blind study on inpatient alcohol and poly-drug abusers with cognitive brain dysfunction and found significant gains on three subscales of the Wechsler Adult Intelligence Scale (WAIS) that are clinical indicators of organic brain syndrome. Significant gains were also made on the Army Beta I.Q. test among CES-treated patients. Wilson and Childs (1988) conducted a case study of four patients suffering from attention-to-task deficits in which CES was used over a three week period. The results showed significant improvement in the post treatment scores.

Currently there are three commercial devices available for clinical application of CES (Liss, personal communication, October 1, 1998). In 1976, amendments to federal law regarding the U.S. Food and Drug Administration (FDA) brought medical devices that had already been marketed under FDA jurisdiction (Code of Federal Regulations, Title 21, Chapter 1). In 1989, the FDA amended its device regulations to require all medical devices that had not previously gone through a formal premarket approval process to do so. This process requires the submission of data adequate to support whatever claims of efficacy are to be made for the device and data supporting the safety of the device. More recently, the FDA has formally requested CES device manufacturers to comply with the requirement (Food and Drug Administration, 1993, as cited in Klawanski et al., 1995).

Treatment Effects

Researchers have reported mixed results in treating a number of conditions including anxiety, depression, pain, and insomnia through CES (Rosenthal and Wulfsboh, 1970; Feighner et al., 1973, Frankel et al., 1973, Passini et al., 1976; Smith and Day, 1977). This treatment possibility is important when one bears in mind that some drugs used to treat these ailments have undesirable side effects, can become addictive, or both.

Several published studies also report the LISS Cranial Stimulator is effective in relieving headache pain (Solomon and Guglielmo, 1985; Solomon et al., 1989). Another promising area of treatment is addiction, where CES has been used in the detoxification of opiate dependent patients. Alling, Johns on, and Ellmohazy (1990) reported promising results with CES as a treatment method that may help alleviate drug withdrawal and cravings. CES has also been used as a treatment for anxiety experienced by chemically dependent persons (Schmitt et al., 1986; Patterson et al., 1994).

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There is a growing body of research in the use of the LISS Stimulator with Cerebral Palsy patients. Studies have shown an inhibition of primitive reflexes, increased motor learning, increased coordination, and increased hand function in children with the ailment (Malden and Charash, 1985). Logan (1988) also found the LISS Stimulator beneficial in reducing spasms in Cerebral Palsy patients.

The treatment effects of CES in almost all of its applications appear to be cumulative. Treatment for anxiety and depression, for example, requires a minimum of five to seven days of at least thirty minutes per day for lighter forms of the disorders and two to three weeks of daily 30-40 minute sessions to alleviate the more entrenched forms (Smith, 1982).

**Effects of CES on the Central Nervous System**

Several researchers have studied the effects of the LISS Cranial Stimulator on neurotransmitter production measured in blood plasma and cerebral spinal fluid.

A study by Cady et al. (1989) measured blood plasma levels before and after the LISS Cranial Stimulator was used on normal subjects and depressed and chronic pain patients. Findings indicated serum levels of serotonin and beta-endorphin rise with CES over a two week treatment time.

Cady et al. (1989) also measured neurochemicals in cerebro spinal fluid and blood serum in five asymptomatic subjects. Results showed beta-endorphin, serotonin, and melatonin increased in both plasma and cerebrospinal fluid after CES. The CES-induced plasma increases in melatonin, serotonin, beta-endorphin, and norepinephrine suggest CES activates a broad hypothalamic response, which may account for its benefit in the treatment of depression.

The most recent study that examined the effects of CES on the production of neurotransmitters was conducted by Liss and Liss (1996), the developers of the LISS Cranial Stimulator. The results of the Liss and Liss study indicated a significant increase in levels of serum concentration of serotonin and beta-endorphins after twenty minutes of transcranial stimulation over those in the placebo group. There were also elevations in the levels of GABA and DHEA, with decreased levels of cortisol and tryptophan.

Closson (as cited in Liss and Liss, 1996), in a private experiment, drew blood samples periodically for two hours following twenty minutes of CES. Results showed ACTH rose an average of 75% over baseline within five minutes of stimulation, then gradually decreased to 25% over baseline by the end of two hours. Serotonin rose to 50% over baseline by twenty minutes and stayed at that level for the rest of the two-hour period. Beta-endorphin rose progressively from its baseline throughout the two-hour period and cortisol gradually decreased 18% over the same duration of time.

**Mechanism**

The previous studies confirm CES alters neurochemical production. Although some research addresses the mechanism of how the low level of current emitted with CES alters the brain’s neurochemistry, more research is needed. Liss and Liss (1996) began to address this important issue. Their research has shown stimulators were developed with the intent to match the dynamic electrical impedance of the body. Oscillographic recordings in human subjects following monopolar stimulation gave evidence of stored minuscule amounts of energy (less than 1 millampere equivalent direct current in each work phase) indicating that internal currents are produced. This work led to a hypothesis that states the mechanism by which the neurotransmitter levels change includes an internal current, which is caused by modulated energy of the stimulator acting on the stimulated tissue.

Liss and Liss (1996) hypothesized that physiologically, while the factors for an action may be present, if the triggering energy is insufficient, then no action will occur. They furthermore suggest that, in some cases, introducing the current of the LISS Cranial Stimulator facilitates the physiologic action. The stimulator introduces this energy into the nervous system to demodulate the stimulator energy into the information the organism needs to help alter the neurochemical levels of certain substances.

Liss and Liss (1996) suggested that the release of energy by the modulated carrier technique used by the LISS Cranial Stimulator is converted in the body into an internal current by energy stored and facilitated by the bulk capacitance of the head and body. This may be the mechanism by which the modulated current alters neurochemical production. Exactly how CES may increase attention is unclear. Theories are discussed by Hutchison (1991), and neurochemical and electromechanical research suggests CES may promote the ability to think and to retain and recall new information.

Norepinephrine is known to increase mental alertness; serotonin is thought to be involved in learning, mood, sleep/arousal, regulation
of pain, and memory. Beta-endorphins also have a strengthening effect on learning. The increase of these neurotransmitters may be the cause of the increased learning, memory, and attention attributed to the use of CES.

In experiments where norepinephrine levels in the brain were reduced, memory and learning decreased. When norepinephrine levels were increased in certain parts of the brain, memory and learning were enhanced (Stein and Belluzzi, 1975). The role of endorphins in learning is described by Routtenberg (1978). Pleasure pathways are closely associated with areas of the brain known to be involved in learning and the formation of memory. Routtenberg speculated that pathways of brain reward may function as pathways of consolidation of memory. Perhaps this explains why one feels a mild sense of elation when learning something new. A neuroscientist, Pert (as cited in Weintraub, 1984), has proposed that endorphins are part of the reward system for learning.

Another theory, discussed by Madden and Kirsch (1987), is that CES may stimulate the reticular formation of the brain stem, which plays a role in sleep and arousal, attention, movement, and various vital reflexes. The neurons of the activating portion of the reticular formation are excited by sensory stimuli conducted by way of collaterals from the somatosensory, auditory, visual, visceral sensory system. When a novel stimulus is received, attention is focused on it while general alertness increases. This behavioral arousal is independent of the modality of the stimulation and is accompanied by electroencephalographic changes from low-voltage to high-voltage activity over much of the cortex (Waxman and de Groot, 1995). Electrostimulation of this region may increase attention and alertness and help resist mental fatigue.

Research on the Effects of CES on Attention

Although the use of CES for anxiety, depression, the treatment of cognitive brain dysfunction, and insomnia is well documented (Schmitt et al., 1986; Gibson and O’Hair, 1987; Wilson and Childs, 1988; Cady et al., 1989), there is scant research in the area of CES increasing attention span and concentration in normal subjects. Madden and Kirsch (1987) addressed the research question: Can CES significantly improve learning and performance of a psychomotor task?

The study employed two groups controlling for the placebo effect by using a double-blind study. The dependent variable used was a computer typing game. Both groups played the computer game without CES stimulation to obtain pretest data. A CES device was worn by both groups, and they were told they were receiving CES during the second testing, although the unit was only activated for the experimental group. The object of the game was to destroy alien spaceships, which moved toward the center of the screen. Each alien was represented by a specific key, which required the subject to press the correct key and the space bar to destroy the alien ship and gain a point. Four games were played over a ten-minute period. All points were added for each game. A significant difference between group mean test scores was found at the .01 level, indicating CES increased attention and concentration while performing a psychomotor task. Another noteworthy finding of the Madden and Kirsch (1987) study was that longer induction periods for CES were more effective in improving learning and performance.

This study intended to test the findings of Madden and (1987) using a more precise measure of attention, the Conners’ Continuous Performance Test.

Methodology

Since the LISS Stimulator is considered a medical device by the FDA, the developer of the unit recommended this research project be reviewed and endorsed by a physician or chiropractor. David E. Sternberg, M.D., endorsed the investigation after reviewing the proposal, consent form, and exclusion criteria.

The study used an A-B design. The independent variable was the Cranial Electrical Stimulation. The dependent variable was the Continuous Performance Test. There were two groups of normal subjects. Both groups performed a pretest (used to obtain baseline data) and a posttest. The control group (NSTIM) did not receive CES stimulation; the experimental group (STIM) received stimulation.

Both groups performed the Continuous Performance Test (CPT) twice. The STIM group was given the pretest, received twenty minutes of stimulation for the CES, waited twenty minutes, then performed the second trial of the CPT. The twenty-minute waiting period was needed because the increase in production of the neuro-transmitters takes at least that length of time. The effects from the CES stimulation last for four hours (Liss, personal communication, April 30, 1997).

Samples Employed

Two groups (21 NSTIM and 31 STIM) were selected from recruitment efforts conducted at a Kansas City Public School, a software company, and a church. The subjects, males and females ranging in ages from eighteen to sixty, were recruited as volunteers and randomly assigned to the two groups. All of the subjects were from a non-psychiatric population and were screened for general physical health, cerebral palsy, epilepsy, multiple sclerosis, attention-deficit hyperactivity disorder, inpatient history of drug or alcohol abuse, depression, and anxiety.

Instruments Used

Several instruments were used in the study. The Conners’ Continuous Performance Test (CPT) was used to measure attention. The LISS Body Stimulator was the CES device. Two devices were implemented; one device...
for use. The water in the sponge acts as an electrical conductor. A Velcro™ band is used around the head to hold the electrodes in place. The unit turns itself off after twenty minutes of stimulation. Contraindications listed on the unit specification sheet are demand type cardiac pace makers and using the stimulator over the carotid sinus and laryngeal and pharyngeal muscles or both. The safety of using electrical stimulators during pregnancy has not been established.

Procedures Followed

Testing was performed in various locations, such as office settings, the home, and a classroom. Approximately one third of the subjects were tested in one location under identical conditions at a local public school. In some cases noises, voices, or both were audible to the subjects. When this occurred, the researcher attempted to keep the conditions the same for the pretest and the posttest. The majority of the subjects were tested in a quiet room with minimal interference from outside noises. The procedures for this study were as follows:

1. Subjects read a brief explanation of the study and signed a consent form.
2. Each subject completed a questionnaire and the Beck Depression Inventory and Beck Anxiety Inventory. The questionnaire and inventories were scored and used to qualify the subject for participation in the study.
3. A coin was tossed to determine to which group each subject was assigned.
4. Each subject was given test instructions and performed the CPT practice test.
5. The electrodes of the CES device were placed just below the temples, and the subjects were told they might or might not initially feel a tingling sensation. Subjects was short-circuited and used for the control group. The Beck Depression Inventory-II (BDI-II) and the Beck Anxiety Inventory (BAI) were used to exclude subjects with mild and more severe symptoms of depression and anxiety (Beck et al., 1993, 1996).

Conners’ Continuous Performance Test. Respondents were required to press the spacebar of the computer keyboard when any letter other than X appeared. The test is presented in a game-like format and starts with instructions. The letters displayed are about one inch in size and boldfaced. There are six blocks with three subblocks each of twenty trials. For each block, the subblocks have different interstimulus intervals (ISIs): one, two, or four seconds. Total administration time for the Standard test is fourteen minutes (Conners, 1995).

L1SS Body Stimulator. The CES device used was the L1SS Body Stimulator Bipolar Model No. SBL-502-B. Two units were employed. One unit was short-circuited for use with the control group. The unit specification information gives the following description of the waveform analysis:

- Modulated waveform... enables the microcurrent generated by the L1SS Body Stimulator to utilize the body’s own electrical characteristics. The carrier waveform of 15,000Hz and the first modulated waveform of 15hz and the second modulated waveform of 500hz are transmitted simultaneously. Each positive burst of energy is followed by a comparable negative burst of energy equal and opposite polarity to the initial burst. (Medi Consultants, Inc., no date)

The unit is 4.5 inches long, 2.66 inches wide and 1.0 inch high. It has two cables and two electrodes. Round sponges are made wet and placed over the electrodes when applied for use. The water in the sponge acts as an electrical conductor. A Velcro™ band is used around the head to hold the electrodes in place. The unit turns itself off after twenty minutes of stimulation. Contraindications listed on the unit specification sheet are demand type cardiac pace makers and using the stimulator over the carotid sinus and laryngeal and pharyngeal muscles or both. The safety of using electrical stimulators during pregnancy has not been established.

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in the experimental group had the unit set just below the level at which they might be expected to feel the tingling sensation. Control group subjects received the placebo unit, which emitted no electrical stimulation. Both units appeared identical to the subjects. When the units were positively engaged, the "on" light was activated and the green lights flashed. The stimulation was given for twenty minutes.

6. The posttest was performed about 20-60 minutes after stimulation. This variance in posttest time occurred due to the availability of the subjects and the limit of only one group. This variance was not considered detrimental to results because the effects of CES are reported to last from two to four hours.

Data Analysis

Statistical methods employed were split plot ANOVAs for each measure of the CPT, with one between factor, the group receiving stimulation and the control group, and one within factor, the pretests and posttests. Differences in the pretest and posttest r-scores were calculated for each subject. Subjects with a difference of at least one standard deviation on two measures of the CPT were considered as having significantly improved attention. This criterion was selected based on Conners's statement regarding the number of measures from the CPT used to determine if a problem in attention exists (Conners, 1995).

The four measures listed above revealed the NSTIM group experienced a decline in attention in the posttest, whereas the STIM group increased ability to attend. The change in attention in the control group may be explained by negative practice effects as described by Conners (1995).

Conners suggests such negative practice effects on the CPT may be due to the demands on one's ability to attend to a boring task.

Proportions were calculated based on the criteria of subjects who demonstrated improvement by one standard deviation on two different measures of the CPT. One of the conditions under which the posttest was conducted was to meet the demands on one's ability to attend to a boring task.

The second change in methodology was conducting the posttest after a minimum waiting period of twenty minutes, unlike the Madden and Kirsch (1987) posttest, which was conducted while the ten-minute stimulation was administered. The improved attention scores on the CPT after the twenty-minute waiting period indicated that the effects of the LISS Body Stimulator on attention go beyond the time of direct stimulation. Exactly how long the effects on attention would last is not known; however, it may be similar to the time the neurochemicals sustain their altered levels of attention in the control group may be explained by negative practice effects as described by Conners (1995). The results of this study indicate that CES significantly improves attention and concentration in a normal adult population.

The findings of this study confirm those found by Madden and Kirsch (1987) and also provide additional data on the effects of CES on attention.

There were four main differences between this study and those done by Madden and Kirsch (1987):

1. Number of Hits
   \[ F = 7.05, \quad p = .010 \]
2. Hit RT 1SI Change
   \[ F = 6.33, \quad p = .016 \]
3. Risk Taking
   \[ F = 3.84, \quad p = .055 \]
4. Attentiveness
   \[ F = 3.86, \quad p = .054 \]

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There were four main differences between this study and those done by Madden and Kirsch (1987):

1. The duration of time CES was administered to the subjects;
2. The conditions under which the posttest was conducted;
3. The dependent variable; and
4. The LISS Body Stimulator was used in this study as compared to the Alpha Stirn used in the Madden and Kirsch study.

The first two changes were based on a personal communication with the developer of the LISS Body Stimulator (Liss, personal communication, April 30, 1997) and the findings of Closson (as cited in Liss and Liss, 1996). The CES was administered for twenty minutes in this study versus ten minutes in the Madden and Kirsch study. Closson discovered the peak changes in neurochemicals affected by the LISS Body Stimulator occurred after twenty minutes of stimulation, and the increased levels were sustained for two hours.

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The third main difference between the two studies was the dependent variable: the versus a computer game. The CPT was chosen because it is specifically designed to measure several indicators of attention (Conners, 1995), providing more measures and precision than computer game scores.

The fourth difference between the two studies was the CES unit that was used. The Madden and Kirsch (1987) study used the Alpha Stirn, whereas this study used the LISS Body Stimulator.

When comparing the Madden and Kirsch (1987) findings to those of this study, two findings were similar:

(a) improved accuracy and
(b) the control group experienced a fatigue factor, whereas the experimental group maintained alertness.
Summary

To summarize, this study found results similar to those of the Madden and Kirsch (1987) study, demonstrating a significant improvement in accuracy and alertness. It has also added to the existing body of knowledge on how CES affects attention:

(a) the effects of CES on attention are sustained past the time of stimulation;
(b) increased perceptual sensitivity to targets; and
(c) faster reaction times as the time between targets increased.

Further research is needed to determine why certain measures of the CPT found significant results when others did not. Additional studies are recommended to evaluate the effect of CES on auditory attention and cumulative effects.

Although this investigation was centered on a normal adult population, it may serve as a basis for further research using CES with patients suffering from medical conditions that adversely affect their ability to attend and sustain attention.

Note

Originally submitted as a clinical dissertation accepted by the faculty of Forest Institute of Professional Psychology, Springfield, MO, November, 1997.
Neurotech Network

Neurotechnology for Cerebral Palsy

Cerebral Palsy is a prevalent neurological condition in our society. It is estimated that 2 of every 1,000 children have some form of cerebral palsy. The effects are wide ranging; the condition may impact speech, breathing, walking, balance or bladder function, just to name a few. In this issue of The Current, we explore the neurotechnology applications for cerebral palsy. These therapies and treatments are not a cure for the disorder or a prevention tool. Neurotechnology applications have proven to reduce spasticity, increase passive and active range of motion, improve bladder function, provide independent breathing, and aid with walking and balance. In essence, they assist with combating the secondary conditions related to cerebral palsy and provide enhanced function and rehabilitation. Not all therapies, devices or treatments are appropriate for all types of cerebral palsy and neurological diseases or disorders. Approved applications will vary. A medical evaluation should be conducted prior to use. This issue is for informational purposes only; a medical evaluation and supervision by a trained clinician, such as a physician or therapist is essential.

Applications

Just as there are many aspects to cerebral palsy, there are as many applications of neurotechnology. Below are descriptions of applications for different areas. This includes technology that is currently available, as well as some progress in research for what is coming in the near future. Lists of devices are available in the Resources section of this newsletter.

Spasticity and Pain Management

Involuntary muscle contractions or spasticity can restrict movement and cause rigidity. Researchers have observed reduced spasticity, improved motor control, increased range of motion and muscle strength, improved bladder function, better coordination of breathing and fewer respiratory infections, as well as better walking and balance. No one technology can achieve all of these observations but the applications are available.

Systems are segmented into three main areas: implanted, external or hybrid (a combination) of both. Implanted systems tend to be more "invasive" and therefore require a surgical or other procedure to install the system into the body of a potential user. Whereas, external systems are applied outside the body or on the surface of the skin. Finally, hybrid systems have components that are both implanted and external. As systems move from the lab to the clinic, there are a variety of things to consider before participating into a treatment, therapy or device protocol. Individuals must consider the time commitment, financial requirements and health benefits and risks that come with any program. Proper evaluation and supervision by a trained clinician, such as a physician or therapist is essential.

Respiratory, Cough and Swallowing Assistance

In some cases of cerebral palsy, breathing, coughing and swallowing are difficult to achieve. In the case of breathing assistance, current neurotechnology alternatives to mechanical ventilation are hybrid systems that include either a phrenic nerve stimulator or diaphragmatic stimulator. Unlike ventilator systems, which use mechanical pressure to force air into the lungs, the stimulation system pulls air into the lungs by stimulating the diaphragm muscle or the phrenic nerve. As the diaphragm contracts, the chest cavity expands and air is pulled into the lungs. Moreover, coughing is another respiratory function that may be difficult. Cough assistance systems (CAS) that are currently available use different pressures to clear the lungs through an external breathing mask attached to a separate control unit. Under investigation is a new hybrid system that uses an external controller and implanted electrodes to achieve a cough. The goal of this system is to create a ‘cough on demand’. Also using electrical stimulation, surface electrodes may be applied to allow a person to swallow. The electrical stimulation contracts a muscle to create a muscle contraction which may reduce spasticity if used over a period of 1-3 months. Other more complex systems for reducing spasticity or pain include implanted intrathecal baclofen pump therapy or implanted spinal cord stimulation devices. Realizing that these are treatments to reduce spasticity and pain, they may unmask increased voluntary control of muscles, improve range of motion or impact hand use or walking.

Hand Function and Upper Extremity Rehabilitation

Hemiplegia is one impact of cerebral palsy, leaving a person with the use of only one hand. Commercially available electrical stimulation systems to improve hand function have been developed for hemiplegia as a result of a stroke. Severely paralyzed people with CP may be candidates to use these same systems to improve hand function. The systems use surface electrodes to stimulate muscles in the forearm, thus providing gross hand grasp functions. Also using surface electrical stimulation is the area of rehabilitation for the upper extremities including the shoulder.

Educate: Applications for Cerebral Palsy

Neurotechnology applications for cerebral palsy is well documented in the medical literature. Using medical electronics interacting with the human nervous system, neurotechnology application have revolutionized the tools used for scientific analysis, functional rehabilitation and activities of daily living. Electrical stimulation was the pioneering application and has been studied in cerebral palsy for nearly 50 years. Investigators studying these applications have observed reduced spasticity, improved motor control, increased range of motion and muscle strength, improved bladder function, better coordination of breathing and fewer respiratory infections, as well as better walking and balance. No one technology can achieve all of these observations but the applications are available.

Neurotechnology applications for CP may relieve pain and movement restrictions. The advantages of reducing spasticity without causing paralysis or weakness is that some previously undetected movement abilities may be discovered. Applications range in type and complexity. An example of a simple system is the use of surface electrical stimulation, such as a TENS (Transcutaneous Electrical Nerve Stimulation) or NMES (Neural Muscular Electrical Stimulation) unit. Using electrodes on the surface of the skin to deliver electrical stimulation creating a muscle contraction may be reduce spasticity if used over a period of 1-3 months. Other more complex systems for reducing spasticity or pain include implanted intrathecal baclofen pump therapy or implanted spinal cord stimulation devices. Realizing that these are treatments to reduce spasticity and pain, they may unmask increased voluntary control of muscles, improve range of motion or impact hand use or walking.

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elbow and wrist. Studies are currently being conducted to observe improvements in wrist muscle strength using NMES and improved arm movements using electrical stimulation handcycling.

Urinary Incontinence

Neurotechnology applications for urinary incontinence have been widely studied and many options are commercially available. For people living with cerebral palsy reduced bladder control can be a life altering experience. Neurotechnology devices offer many options are commercially available. Incontinence have been widely studies and investigating the impact of their use on quality of life needs. The neurotechnology systems available for urinary incontinence include pelvic floor stimulators, bladder muscle stimulators, and tibial nerve stimulators. These devices use electrical stimulation to control bladder and sphincter muscles, allowing individuals to regain control over their bladder function.

1. Sacral nerve stimulator is an implanted device that manages the bladder by sending electrical impulses to the nerve that controls the bladder, sphincter, the muscles around it, and the sacral nerve roots.
2. Tibial nerve stimulator controls the bladder through percutaneous stimulation (an electrode inserted through the skin) of the tibial nerve in the lower leg.
3. Pelvic stimulator uses electrical stimulation to the pelvic floor muscle, which is generally delivered by a vaginal or anal probe connected to an external pulse generator.
4. Bladder muscle stimulator is a device that directly stimulates the bladder muscle with an implanted electrode.
5. An implanted device, soon to be in clinical trials, uses an electrode to stimulate the pudendal nerve to provide bladder function. These approaches should be discussed with your urologist and evaluated for your individual situation to determine which may or may not be appropriate for you.

Walking and Movement Analysis

In cerebral palsy, there may be many reasons why the person is not walking with a normal gait. A skilled team of rehabilitation specialists can make a required assessment as to what is causing the impaired walking function and how it may be improved. To help these professionals in their analysis, there are new neurosensing tools available. Motion Analysis Laboratories across the country are beginning to use monitoring systems; such as camera systems similar to those used for animation or kinematic measurements, that can assist rehabilitation professionals to make treatment recommendations. One of the prominent laboratories is the Motion & Gait Laboratory at Stanford. New wireless monitoring systems use EEG and EMG signals to capture the movements not in laboratories but in the real world while people are doing every day activities. While wearing sensors on the surface of the skin, medical professionals can monitor a person’s movements at home as well as during specific exercises. Once a thorough analysis is complete to understand what is interfering with walking then proper treatments may be applied.

The neurotechnology systems available for ambulation are wide and varied. The earliest introduction of neurotechnology to voluntary movement and walking was a combination of external electrical stimulation and bracing. New external systems are being developed that include full exoskeletal suits. More advanced hybrid systems for those with complete and partial paralysis are being developed by researchers. There are many commercially available options for assisted stepping for persons with walking ability but who need assistance with ankle and foot control. Using external electrical stimulation, these small systems stimulate the calf muscles in coordination with the gait of the user, thus, eliminating the need for ankle-foot orthotic bracing. Implanted assisted stepping systems may become available in the United States.

Exercise and Rehabilitation Systems

Exercise and rehabilitation is vital to people living with cerebral palsy but not as simple as going to the gym or taking a stroll around the neighborhood. Exercise is essential to prevent secondary conditions in the cardiovascular and circulatory systems of the body. Exercise can be achieved using Electrical Muscle Stimulation (EMS) which relies on the peripheral nervous system. EMS devices send pulses of electricity into the user’s skin that result in a contraction of the muscles. Whenever possible, it is beneficial to encourage voluntary movement. Exercise programs can be accomplished by starting one at home or in a specialized facility. Using EMS, such as FES (Functional Electrical Stimulation) cycling or rowing, will help minimize the loss of muscle bulk, improve muscle size and performance, and boost physical fitness. Before starting an EMS exercise regime, you should consult a physician or professional therapist.

For those with CP who are ambulatory, muscles may be reconditioned through rehabilitation. Movement enhancement systems are devices that are used to assist with exercise or the
About joining a new program through Creative Children Therapy. Inspired by three parents of children with special needs and a team of therapists, Creative Children Therapy is a non-profit organization giving a new light to therapy programs for children. Based in Miami, Florida, the center offers traditional services such as physical, occupational and speech therapy; complementary services including fitness training and massage therapy; as well as activity programs through dance, aquatics and martial arts. Their services are developed to encourage children with disabilities to actively explore new interests and broaden their involvement in the community.

Born from a research idea, Dr. Leonard Elbaum from Florida International University teamed up with Creative Children Therapy to create an intensive exercise program; now called the Giant Steps program. As with any skill such as playing soccer or performing on stage, frequent practice is needed for development and improvement of that skill. As with physical fitness, daily exercise is the order of the day. For children with disabilities, their case for daily exercise and practice is no different. But how that is accomplished may be different. Bringing neurotechnology into the Giant Steps program was a natural fit. The customized six-week therapy and fitness program is offered for teens and pre-teens with spastic cerebral palsy and related conditions. The first pilot program was last summer and consisted of eight children and adolescents. Prior to joining the program, each participant underwent an extensive evaluation including fitness, strength and balance testing, activities of daily living, gait analysis and goal setting.

Summary
The variety of neurotechnology applications for cerebral palsy has expanded over many years of development. Devices, therapy programs and treatment options have improved and research has expanded; however neurotechnology has not gained the “standard of care” status. You may find resources in the Resources section of this newsletter.

For more information, visit the Educate page of our website, www.NeurotechNetwork.org

Personal Experiences: Giant Steps
Children with cerebral palsy spend countless hours going to traditional therapy. For one mother, she heard “I love it!” from Ilana, her daughter. In search of a new way for Ilana to exercise, Marci Gutman helped to gather the equipment and the talent to offer an alternative for children with CP. Combining fitness and fun in one place, Ilana was excited about joining a new program through Creative Children Therapy. Inspired by three parents of children with special needs and a team of therapists, Creative Children Therapy is a non-profit organization giving a new light to therapy programs for children. Based in Miami, Florida, the center offers traditional services such as physical, occupational and speech therapy; complementary services including fitness training and massage therapy; as well as activity programs through dance, aquatics and martial arts. Their services are developed to encourage children with disabilities to actively explore new interests and broaden their involvement in the community. Born from a research idea, Dr. Leonard Elbaum from Florida International University teamed up with Creative Children Therapy to create an intensive exercise program; now called the Giant Steps program. As with any skill such as playing soccer or performing on stage, frequent practice is needed for development and improvement of that skill. As with physical fitness, daily exercise is the order of the day. For children with disabilities, their case for daily exercise and practice is no different. But how that is accomplished may be different. Bringing neurotechnology into the Giant Steps program was a natural fit. The customized six-week therapy and fitness program is offered for teens and pre-teens with spastic cerebral palsy and related conditions. The first pilot program was last summer and consisted of eight children and adolescents. Prior to joining the program, each participant underwent an extensive evaluation including fitness, strength and balance testing, activities of daily living, gait analysis and goal setting. Once a youth is accepted into the program, the two hour sessions begin five days per week.

Work of muscles in a limb. They reinforce the concept behind rehabilitation therapy which is to improve the function of a weakened muscle or to “boost” the voluntary function that already exists. Treadmill systems and robotics technology may improve locomotor skills and upper extremity function with repetitive motion therapy.

These systems represent potential tools to augment the work of physical therapists, who are often unable to provide the extensive amount of therapy needed. Starting an exercise regime is not a short term commitment. Several studies discovered that over the long term, improvements in walking, balance and speed of the gait can occur. At Florida International University, a new exercise program for children is being developed and studied using a variety of activities. See the Personal Experience section of this newsletter to learn more about this emerging program.

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Each session is segmented into 30 minute sections consisting of:

1. Traditional physical therapy
2. Functional Electrical Stimulation Cycling
3. Locomotor training (treadmill walking with assistance to support body weight & leg movements as needed)
4. Interactive video games (eg. the Wii) modified to challenge specific skills.

The unique feature of the program is teaming up participants in groups of 3-6, in effect creating the Curves of the CP world. These interactive teams add a social level to the program not available in traditional environments. Each group has at least one physical therapist and other support staff to achieve a one to one ratio of participants and staff members. At the conclusion of the six-week program, participants are re-evaluated and discussions ensue to repeat the program, discontinue it or extend it on a three-day per week basis.

“We are restricted to offering the program in the summer to not interfere with our participants’ school schedules,” states Ivette Quintana, a physical therapist with Creative Children Therapy. “Results from the pilot program were so encouraging that we are now looking to expand participants and enhance the program for the summer of 2009.” Significant gains by the participating children included overall muscle strength and endurance. Other improvement observations included independent sitting, ambulation with a walker and walking without the aid of an orthosis; which were not achievable by these individuals prior to completing the program. “When I would periodically walk through and meet the participants, I was amazed at their accomplishments,” boasts Dr. Elbaum. “This idea started as a research project and turned into a service project.” Seeing the results that were beyond his expectations, Dr. Elbaum is seeking to add a further research component by conducting some case studies, studying quality of life impact and seeking collaborations to observe the presence of neuroplasticity in the brain of the participants.

Twenty year old, Ilana is one of those achievers at Giant Steps. Living with cerebral palsy since she was four months old, traditional therapy became borrowing and mundane. Giant Steps offered her a new way to exercise and work toward becoming more independent. Prior to joining the program, Ilana’s main mobility was with a wheelchair but she was able to take 3 steps with a walker and assistance. After completing the program, she can now walk 40 feet with a walker; something unexpected since she was recently diagnosed with arthritis. Inspired to tell her story and those of others, Ilana started Disability News, http://www.disabilitynews.org/, a source for information of how disabilities prove ability. Eager to participate in the program this summer, Ilana can’t wait to get back on the FES bike. “Never stop thinking out of the box,” advises Marci, Ilana’s mother, to other parents of special needs children. “Our kids do everything that other kids do, but just in other ways.” A further description of the Giant Steps Program is available on the Cerebral Palsy Educate Page of our website.

For more information about Creative Children Therapy, call Lissette Menendez at 305.412.4177 or visit http://www.creative-children.org/.

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Resources For Cerebral Palsy

There are many resources available for those with cerebral palsy. The following is a listing of neurotechnology organizations offering solutions. They are segmented by various applications related to cerebral palsy. Note that some are not FDA approved and some are being tested in clinical trials. More may be found in our website database accessed from the Educate Page.

Walking & Movement Systems
- NeuroStep—Victhom Human Bionics
- ReWalk—Argo Medical Technologies
- NESS L300—Bioness, Inc.
- STIMuSTEP—FineTech Medical, Ltd
- WalkAide—Innovative Neurotronics
- ActiGait—Neurodan A/S
- Odstock Dropped Foot Stimulator—Odstock Medical Ltd.

Exercise & Rehabilitation Systems
- RT100, RT300 — Restorative Therapies, Inc.
- SpinoFLEX — Advanced Fitness Components
- Wearable Therapy — Bioflex, Inc.
- 300PV, Advance Dynamic ROM, EMS+2—Empi, Inc.
- Reo Therapy — Motoika
- NeoTone — Neotonus, Inc.
- RehaMove, MOTomed — RECK Technik GmbH & Co. KG
- StepGain GRF — Robomedica, Inc.
- RS-2m — RS Medical
- REGYS, ERGYS, NeuroEDUCATOR, SpectroSTIM - Therapeutic Alliances, Inc.
- Electronic Muscle Stimulation
Breathing, Cough & Swallowing Assistance
- Avery Breathing Pacemaker System—Avery Biomedical Devices, Inc.
- Atrostim Phrenic Nerve Stimulator v2—Atrotech, Ltd
- NeuRx Diaphragm Pacing Stimulation—Synapse Biomedical, Inc.
- Cough Assist—Respironics, Inc.
- VitalStim Therapy—Chattanooga Group

Hand Grasp & Rehab for Upper Extremities
- NESS H200—Bioness, Inc.
- STIMuGRIP—FineTech Medical, Ltd.

Pressure Sore Prevention & Wound Therapy
- POSIFECT—Biofisica

Spasticity & Pain Management
- Renew, Genesis, GenesisXP—St. Jude Medical Neurmodulation
- Precision Plus System—Boston Scientific Neurmodulation
- RestoreULTRA, RestoreADVANCED, PrimeADVANCED - Medtronic Inc.(SCS)
- PTM, SynchroMed II—Medtronic, Inc. (ITB)
- Dyatron STS Rx—Dyatronics Corporation
- Alpha Stim—Electromedical Products International
- MSP TENS, Microcurrent Stimulator, EZ STIM TENS, Electric Muscle Stimulator—Medical Science Products
- RS-4i Sequential Stimulation, RS-2i, RS-TENS Plus — RS Medical

Urinary Incontinence
- FineTech Brindley Vocare—FineTech Medical, Inc.
- InnoSense Minnova—Empi, Inc.
- EvaDri—Hollister, Inc.
- InterStim—Medtronic, Inc.
- NeoControl—Neotonus, Inc.
- NeuroBionix Urinary Implant—Vichom Human Bionics
- Conti4000—Zynex Medical, Inc.

Other Applications
- NeuroSwitch—Control Bionics
- Kinesia, Pressure Step—CleveMed

Noted Programs
- Motion & Gait Analysis Laboratory at Lucile Packard Children’s Hospital
- Creative Children Therapy
- Giant Steps Program

Prior to considering any new therapy, treatment or device, a proper evaluation must be conducted with a knowledgeable medical professional. There are health, medical and financial risks. Out of pocket costs and available insurance coverage for any treatment must be considered prior to starting a protocol. Finally, this is an evolving field of science and technology development. Updated information regarding these devices and organizations is available in the Educate section of our website at www.NeurotechNetwork.org

On the Horizon: Updates in the World of Neurotech
- Cyberonics, Inc., the Houston, TX manufacturer of vagus nerve stimulation systems, announced that the Centers for Medicare and Medicaid Services has published...
and less invasive approach, according to pre-
instead of the brain, may offer an effective
potential therapy to target the spinal cord
treatment of Parkinson’s disease. The first
discovered a novel stimulation method for
-Duke University Medical Center researchers
risks.
and food choices and may present significant
which alter digestive system anatomy, lifestyle
treat obesity using neuroblocking technology
obesity. The Maestro system is the first
to stimulate the overactivity of the
UCLA neurology professor Christopher
epilepsy. Reported in the journal Neurology,
-Second Sight Medical Products, Inc., the
-Neurotech Vendors Target Cerebral
Palsy Market
Neurotechnology vendors are beginning
target new and existing products to the
cerebral palsy market. Though the disorder
is not as large nor as homogenous as some
other conditions, there seems to be a good
fit with some devices originally targeted for
inducing people with an amputated arm
to experience a prosthetic rubber hand as
belonging to their own body. The results can
lead to the development of a new type of
touch-sensitive prosthetic hands.
Updates are available on our website.
Stay updated by signing up for email
NeurotechNetwork.org.

Come See Us! Neurotech Education Series
The Neurotechnology Education Series is
designed to build awareness and understanding of neurotechnology among
people that have impairments resulting from
neurological disorders and diseases as well
as caregivers and medical professionals. The
series includes featuring neurotechnology
presentations at disability and medical
conferences, building strategic alliances within the disability community,
developing public relations with the
disability media and enhancing information
dissemination using our dynamic website.
If you missed us at the United Cerebral Palsy
Annual Conference on April 23, then join us at
these upcoming events:
- Abilities Expo Midwest, Chicago, IL—June
25, 2009
- United Spinal Association’s Independence
Expo, Orlando, FL—August 8, 2009
- Abilities Expo Southeast, Atlanta, GA—
November 5 & 6, 2009
More presentations are being schedule. Check
out our website for an updated listing.

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- NEC Foundation of America
Join these supporters. Visit the Sponsor section
of our website at www.NeurotechNetwork.
org and donate on-line or contact us today.
In obtaining reimbursement for the device in said that users of the RT300 are successful was able to walk without an orthosis for the first time, and a fourth time in seven years, one was able to stand to sit independently for the first time, one was able to walk with a walker for the first time in seven years, and another one was able to walk independently for the first time. Researchers in the field are looking to advances in europlasticity, neural regeneration, and neuroprotection as long-term treatment strategies.

At the United Cerebral Palsy 2009 Annual Conference, held in San Francisco, CA earlier this month, several neurotech vendors participated in a conference track organized by Neurotech Network executive director Jennifer French. Medtronic Inc., which manufactures an intrathecal baclofen pump to treat spasticity, made a presentation describing their device. The company also had one of their users and her parent on hand to describe their experiences with the system.

Another firm that participated in the session was Restorative Therapies Inc., the Baltimore, MD manufacturer of neurorehabilitation systems. RTI CEO Andrew Barriskill described his company’s RT300 FES cycle and spoke of the company’s recent activities within the cerebral palsy community. A Florida-based wellness center called Creative Children Therapy, Inc. began a program called Giant Steps, which combines traditional physical therapy with time on the RT300 and treadmill walking. After a six-week pilot program last year with seven children with CP, one was able to sit independently for the first time, one was able to walk with a walker for the first time in seven years, one was able to stand independently for the first time, and a fourth was able to walk without an orthosis for the first time, according to Barriskill. Barriskill said that users of the RT300 are successful in obtaining reimbursement for the device in about 40 percent of cases. The device costs about $15,000.

Also presenting at the UCP conference was Nader Kameli, COO of Victorni Human Bionics’ Neurobionix division. Kameli described the company’s Neurostep implanted stimulator to treat drop foot gait disorders, which recently received CE Mark approval in Europe. He also disclosed details about the second generation of the Neurostep device currently under development.

The new system will have the capability to address more gait disorders than currently available surface stimulation devices, which are geared to ankle dorsiflexion. The new Neurostep system will be able to treat individuals with spasticity or balance disorders, and will also be able to help with knee flexion. Neurostep will likely cost between $15,000 and $20,000 when it is available in the U.S.

### Cranial Electrotherapy Stimulation: A Safe Neuromedical Treatment for Anxiety, Depression, or Insomnia.

*(Letters to the Editor) Southern Medical Journal – December 1, 2004, Marshall F. Gilula*

To the Editor: The Institute of Medicine’s To Err is Human made headlines by estimating that medical errors account for between 44,000 and 98,000 deaths annually in the United States. Together with the subsequent quality dimension report, Crossing the Quality Chasm, the Institute of Medicine has brought patient safety into the spotlight.

(1) The greatest variance of adverse events in medicine probably is due to medication errors. Today’s primary care physician has a multitude of electronic devices such as personal digital assistants, software, and newsletters designed to help minimize medication error and promote safe medication practices.

(2) Electronic therapeutic devices can actively reduce the number of medication errors by reducing the amount of medication needed to treat anxiety, depression, insomnia, and pain. Among the electromedical devices available to the ordinary office practice of general medicine is the cranial electrotherapy stimulation (CES) device. CES is the noninvasive application of low levels of microcurrent (less than 1 milliampere) stimulation applied transcutaneously to the brain for therapeutic purposes.

Physicians associate these devices with pain treatment centers and the management of chronic, severe pain, but CES can be efficacious for other conditions.

CES is a treatment modality that has been neglected by mainstream medicine for the treatment of anxiety, depression, or insomnia. Selective serotonin reuptake inhibitors (SSRIs) are known as the gold standard for the treatment of depression. However, CES is now more relevant because of recent government warnings on SSRIs.

Thus far, CES has not demonstrated any of these adverse effects. There is no shortage of antidepressant research, but today’s peer-reviewed literature has a relative dearth of CES reports.

The companies that produce these devices are small and as yet unable to support high-budget standards of double-blinded, randomized, institutional review board-controlled studies. A surprising number of CES studies in the peer-reviewed literature have been done without funding.

CES in the United States has received Food and Drug Administration marketing clearance for the treatment of anxiety, depression, and insomnia. CES devices are sold over the counter in Europe and other parts of the world. Mood-disordered alcoholics have shown increased activity of the enzyme MAO-B in the spinal fluid after 20 CES treatments.

(3) Patients with treatment-resistant depression have shown significant (P < 0.0089) elevations in plasma serotonin.

(4) Increases in cerebrospinal fluid levels of [beta]-endorphins up to 219%, plasma endorphins up to 98%, and cerebrospinal fluid serotonin up to 200% have been demonstrated in normal volunteers receiving 20 minutes of CES.

(5) A recent annotated bibliography of CES by Kirsch (6) details 126 human and 29 experimental animal studies of CES conducted over the past 40 years. More than half the studies cited are from the peer-reviewed literature. The majority of the studies were double-blinded and conducted at major American universities.

In aggregate, there were 6,007 patients treated under varying research conditions, with 4,541 actually receiving CES treatment. One hundred twelve (89%) of the studies reported positive outcomes.

Seventeen studies followed up the patients to assess any continued results after 1 week to 2 years, and all the patients showed at least some residual effect after one or a series of treatments.

CES is both noninvasive and considerably less expensive. Neurosurgical implantation techniques of deep brain-stimulating electrodes and vagal nerve stimulators that are currently used and studied for the treatment of affective disorders are more expensive. However, CES requires continuing medical assessment and supervision.

The same caveat is true of all antidepressants.

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References


and other medications in today’s Physician’s Desk Reference for the treatment of anxiety, depression, and insomnia. The patient safety movement and burgeoning Internet resources are working to increase the number of patients more actively involved in their own care.

CES deserves to be a modality in the armamentarium not only for chronic pain but for reducing or occasionally replacing the amount of medication necessary in the treatment of anxiety and depression. CES is not a miraculous modality, but it’s definitely worth a try.

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References
Alcoholism (study)

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This study was performed in the field by practicing Biofeedback technicians. Data was collected and the study supervised by the Ethics International Institutional Review Board of Romania. The Data analysis and study presentation is done By The Centro Ricerche, University of Venice + Padova, Italy © Ethics International, 2007.

Abstract

This study demonstrates the safety and effective qualities of the SCIO device used in a large scale study. A large scale study of over 97,000 patients with over 275,000 patient visits reported their diseases. Many of them reported this disease. And the results of their therapy is reported in this study.

Introduction

Overview

This large scale research was designed to produce a extensive study of people with a wide variety of diseases to see who gets or feels better while using the SCIO for stress reduction and patient monitoring. The SCIO is a evoked potential Universal ElectroPhysiological Medical apparatus that gauges how a individual reacts to miscellaneous homeopathic substances. The device is registered in Europe, America, Canada, S Africa, Australia, S. America, Mexico and elsewhere. The traditional software is fully registered. Some additional functions where determined by the manufacturer to be worthy of evaluation. Thus a study was necessary to determine safety and efficacy. (As a result of these studies these additional functions are now registered within the EC)

An European ethics committee was officially registered and government permission attained to do the insignificant risk study. Qualified registered and or licensed Biofeedback therapists where enlisted to perform the study. Therapists were enrolled from all over the world including N. America, Europe, Africa, Australia, Asia, and S. America. They were trained in the aspects of the study and how to attain informed consent and transmit the results to the ethics committee or IRB (Institutional Review Board).

2,569 therapists enlisted in the study. There were 98,760 patients. 69% had more than one visit. 43% had over two visits. There were over 275,000 patient visits recorded.

The therapists were trained and supervised by medical staff. They were to perform the SCIO therapy and analysis. They were to report any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. Then the therapist is to inquire on any reported changes during the meeting and on follow-ups any measured variations. It must be pointed out that the Therapists were free to do any additional therapies they wish such as homeopathy, nutrition, exercise, etc. Therapists were told to not recommend synthetic drugs. Thus the evaluation was not reduced to just the device but to the total effect of seeing a SCIO therapist.

• Part 1. The emphasis was on substantiating safety followed by efficacy of the SCIO.
• Part 2. Proving the efficacy of the SCIO on diseases (emphasis on degenerative disease)
• Part 3. Proving the efficacy of the SCIO on the avant garde therapies of Complementary Med
• Part 4. QQC standardization

Methods and Materials:

SCIO Device

The SCIO is an evoked potential Universal Electro-Physiological Medical device that measures how a person reacts to items. It is designed to measure reactions for allergy, homeopathy, nutrition, sarcodes, nosodes, vitamins, minerals, enzymes and many more items. Biofeedback is used for pre-diagnostic work and or therapy.

The QXCI software will allow the unconscious of the patient to guide to repair electrical and vibrational aberrations in your body. For complete functional details and pictures, see appendix.

Subspace Software

The QXCI software is designed for electro-physiological connection to the patient to allow reactivity testing and rectification of subtle abnormalities of the body electric. If a patient is not available a subspace or distance healing link has been designed for subspace therapeutics. Many reports of the success of the subspace have been reported and thus the effectiveness and the safety of the subspace link is part of this test. Many companies have tried to copy the subspace of Prof. Nelson and their counterfeit attempts have ended in failure.

SOC Index

The SCIO interview opens with a behavioral medicine interview. This is called the SOC index. Named after the work of Samuel Hahneman the father of homeopathy, he said that the body heals itself with it’s innate knowledge. But the patient can suppress or obstruct the healing process with some behavior. Hahneman said that the worst way to interfere with the healing natural process was allopathy or synthetic drugs. Theses upset the natural healing process by unnatural intervention and regulation disturbance. Other ways to Suppress or Obstruct the Cure are smoking, mercury amalgams, stress, lack of water, exercise and many others. This behavioral survey then gives an index of SOC.

The scores relate to the risk of Suppression and Obstruction to the natural Cure. The higher the scores the more the Suppression and or Obstruction. The scores of 100 or lower are ideal. A copy of the SOC index questions appear in the appendix.
**Study Technicians**
The study technicians were educated and supervised by medical officers. The study technicians were to execute the SCIO therapy and analysis. All were trained to the standards of the International Medical University of Natural Education. Therapists from all over the world including N. America, Europe, Africa, Australia, Asia, S. America and elsewhere were enlisted to perform the study according to the Helsinki study ethics regulations.

They were to chronicle any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. Then the study technician is to inquire on any disclosed observations during the test and on follow-ups report any measured changes.

To test the device as subspace against the placebo effect, two of the 2,500+ therapists were given placebo SCIO devices that were totally outwardly the same but were not functional. These two blind therapists were then assigned 35 patients each (only 63 showed). This was to assess the double blind factor of the placebo effect as compared to the device. Thus the studied groups were

A. placebo group, B. subspace group, and C. attached harness group.

Cross placebo group manipulation was used to further evaluate the effect.

**Important Questions:** these are the key questions of the study

1. Define Diseases or Patient Concerns
2. Percentage of Improvement in Symptoms
3. Percentage of Improvement in Feeling Better
4. Percentage of Improvement Measured
5. Percentage of Improvement in Stress Reduction
6. Percentage of Improvement in SOC Behavior
7. What Measured+How (relevant measures to the patient’s health situation)
8. If Patient worsened please describe in detail involving SOC_

After the patient visit is was complete the data was e-mailed to the Ethics Committee or IRB for storage and then analysis. This maneuver minimized the risk of data loss or tampering. Case studies were reported separately in the disease analysis.

**Medical Details**
An illness characterized by preoccupation with alcohol and loss of control over its consumption such as to lead to intoxication if drinking is begun; by chronicity; by progression; and by tendency toward relapse. Avoid sugar, cigarettes and coffee. Do not replace one addiction with another. Deal with addiction thru 12 step process.

**Measured symptoms include**
- Alcohol Craving
- Motor instability
- Reduced mental function
- Increased pulse rate
- Decreased blood pressure
- Dilated pupils
- Flushing of skin
- Drowsiness or stupor
- Quinquad’s S.

**Results**
Before we review the direct disease improvement profiles, we need to review the overall results. The first most basic of question in the results is the basic feedback of the generic patient conditions.

1. Percentage of Improvement in Symptoms
2. Percentage of Improvement in Feeling Better
3. Percentage of Improvement Measured
4. Percentage of Improvement in Stress Reduction
5. Percentage of Improvement in SOC Behavior

The SOC index gives us great insight to this study. Each disease has a different cut off where the ability of the SCIO to help was compromised. As a general index scores of 200 + where much less successful.

**This groups significant SOC cut off was 50.**
The Large scale study had over 98,000 patients and 275,000 patient visits we have direct evidence of the safety and efficacy. A placebo group was used for the large scale test to help validate the results.

This disease group total number of patients was 411

**Subspace Treatment 202 patients, 209 SCIO Harness Patients**

**Overall Assessment**

**A. Subspace Treatment 588 patient visits**
There were 0 cases of patients who reported a negative Improvement.

None of these cases reported any major difficulty.

**There were**
- 5 cases reporting no improvement of Symptoms, .009% of Subgroup
- 8 cases reporting no improvement in feeling better, .012% of Subgroup
- 0 cases reporting no improvement in stress reduction, .0% of Subgroup
- 50% - Percentage of Improvement in Symptoms
- 76% - Percentage of Improvement in Feeling Better
- 37% - Percentage of Improvement Measured
- 59% - Percentage of Improvement in Stress Reduction
- 34% - Percentage of Improvement in SOC Behavior

**Discussion:**
The results show significant improvement in symptoms and feeling better. The Collective results show a dramatic benefit to the SCIO therapist visit.

**B. SCIO Harness Treatment 633 patient visits**
There were 1 cases of patients who reported a negative Improvement.

None of these cases reported any major difficulty.

**There were**
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- 8 cases reporting no improvement in feeling better, .012% of Subgroup
- 0 cases reporting no improvement in stress reduction, .0% of Subgroup
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Depression + Seasonal Affective Disorder (study)

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Big Tobacco, Big Sugar, Big Pharma, Big Oil, and Big War Industry are exempt from lay and they kill and injure, maim and cripple in the name of profit. They seek to control and dominate medicine to further build their profits.

Their money controls governments, regulators, and the small minded media. The Ultra Rich Master Echelon Computer now sees and hears all the things we say, write, and do. Rights of privacy are gone worldwide. They have taken away our rights of free speech.

The Ultra Rich control the media and refuse to tell stories that expose or offend the Ultra Rich Power. They control every movie that gets distribution, every song that hits the radio, everything that is put on the world news. They use science and psychology to control and manipulate the minds of the masses. But medicine is controlled by Universities that teach medicine. There is now one university starting to defend Natural Medicine. IMUNE has a new 12 month home study course that can be bought with Karma and you can learn how to do natural medicine and how to break free from the Ultra Rich control.

Well, the game of Reality Monopoly is still being played all over the world. One percent of the world’s population is winning and now controls over 80% of the wealth. The law allows the game to continue till we will see one winner and 6 billion plus losers.
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3. Percentage of Improvement in Feeling Better
4. Percentage of Improvement in Stress Reduction
5. Percentage of Improvement in SOC Behavior
6. Percentage of Improvement in SOC Behavior

**Results**

Before we review the direct disease improvement profiles, we need to review the overall results. The first most basic of question in the results is the basic feedback of the generic patient conditions.

1. Percentage of Improvement in Symptoms
2. Percentage of Improvement in Feeling Better
3. Percentage of Improvement in Stress Reduction
4. Percentage of Improvement in SOC Behavior
5. Percentage of Improvement in SOC Behavior

The SOC index gives us great insight to this
There were difficulty.

A. Subspace Treatment 21,092 patient visits
There were 25 cases of patients who reported a negative improvement.
None of these cases reported any major difficulty.

There were
- 32 cases reporting no improvement of symptoms, 0.001% of Subgroup
- 32 cases reporting no improvement in feeling better, 0.001% of Subgroup
- 32 cases reporting no improvement in stress reduction, 0.001% of Subgroup
- 55% - Percentage of Improvement in Symptoms
- 61% - Percentage of Improvement in Feeling Better
- 56% - Percentage of Improvement in Measured
- 70% - Percentage of Improvement in Stress Reduction
- 12% - Percentage of Improvement in SOC Behavior

Discussion:
The results show significant improvement in symptoms and feeling better. The Collective results show a dramatic benefit to the SCIO therapist visit.

B. SCIO Harness Treatment 39,983 patient visits
There were 25 cases of patients who reported a negative improvement.
None of these cases reported any major difficulty.

There were
- 32 cases reporting no improvement of symptoms, 0.001% of Subgroup
- 32 cases reporting no improvement in feeling better, 0.001% of Subgroup
- 32 cases reporting no improvement in stress reduction, 0.001% of Subgroup
- 55% - Percentage of Improvement in Symptoms
- 61% - Percentage of Improvement in Feeling Better
- 56% - Percentage of Improvement in Measured
- 70% - Percentage of Improvement in Stress Reduction
- 12% - Percentage of Improvement in SOC Behavior

Discussion:
The results show significant improvement in symptoms and feeling better. The Collective results show a dramatic benefit to the SCIO device used in a large scale study.

Overall Assessment

A. Subspace Treatment 13,878 patients, 18,152
SCIO Harness Patients

Overview

Introduction

Abstract

This study demonstrates the safety and effective qualities of the SCIO device used in a large scale study. A large scale study of over 97,000 patients with over 275,000 patient visits reported their diseases. Many of them reported this disease. And the results of their therapy is reported in this study.

This study was performed in the field by practicing Biofeedback technicians. Data was collected and the study supervised by the Ethics International Institutional Review Board of Romania. The Data analysis and study presentation is done By the Centro Ricerche of Prof. William Nelson University of Venice + Padova, Italy

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were 98,760 patients. 69% had more than one visit. 43% had over two visits. There were over 275,000 patient visits recorded.

The therapists were trained and supervised by medical staff. They were to perform the SCIO therapy and analysis. They were to report any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. Then the therapist is to inquire on any reported changes during the meeting and on follow-ups any measured variations. It must be pointed out that the Therapists were free to do any additional therapies they wish such as homeopathy, nutrition, exercise, etc. Therapists were told to not recommend synthetic drugs. Thus the evaluation was not reduced to just the device but to the total effect of seeing a SCIO therapist.

- Part 1. The emphasis was on substantiating safety followed by efficacy of the SCIO.
- Part 2. Proving the efficacy of the SCIO on diseases (emphasis on degenerative disease)
- Part 3. Proving the efficacy of the SCIO on the avant garde therapies of Complementary Med
- Part 4. QQC standardization

Methods and Materials

SCIO Device

The SCIO is an evoked potential Universal Electro-Physiological Medical device that measures how a person reacts to items. It is designed to measure reactions for allergy, homeopathy, nutrition, sarcodes, nosodes, vitamins, minerals, enzymes and many more items. Biofeedback is used for pre-diagnostic work and or therapy.

The QXCI software will allow the unconscious of the patient to guide to repair electrical and vibrational aberrations in your body. For complete functional details and pictures, see appendix.

Subspace Software

The QXCI software is designed for electro-physiological connection to the patient to allow reactivity testing and rectification of subtle abnormalities of the body electric. If a patient is not available a subspace or distance healing link has been designed for subspace therapeutics. Many reports of the success of the subspace have been reported and thus the effectiveness and the safety of the subspace link is part of this test. Many companies have tried to copy the subspace of Prof. Nelson and their counterfeit attempts have ended in failure.

SOC Index

The SCIO interview opens with a behavioral medicine interview. This is called the SOC Index. Named after the work of Samuel Hahneman the father of homeopathy, he said that the body heals itself with it’s innate knowledge. But the patient can suppress or obstruct the healing process with some behavior. Hahneman said that the worst way to interfere with the healing natural process was allopathy or synthetic drugs. Theses upset the natural healing process by unnatural intervention and regulation disturbance. Other ways to Suppress or Obstruct the Cure are smoking, mercury amalgams, stress, lack of water, exercise and many others. This behavioral survey then gives an index of SOC. The scores relate to the risk of Suppression and Obstruction to the natural Cure. The higher the scores the more the Suppression and or Obstruction. The scores of 100 or lower are ideal. A copy of the SOC index questions appear in the appendix.

Study Technicians

The study technicians were educated and supervised by medical officers. The study technicians were to execute the SCIO therapy and analysis. All were trained to the standards of the International Medical University of Natural Education. Therapists from all over the world including N. America, Europe, Africa, Australia, Asia, S. America and elsewhere were enlisted to perform the study according to the Helsinki study ethics regulations.

They were to chronicle any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. The then the study technician is to inquire on any disclosed observations during the test and on follow-ups report any measured changes.

To test the device as subspace against the placebo effect, two of the 2,500+ therapists were given placebo SCIO devices that were totally outwardly the same but were not functional. These two blind therapists were then assigned 35 patients each (only 63 showed). This was to assess the double blind factor of the placebo effect as compared to the device. Thus the studied groups were A. placebo group, B. subspace group, and C. attached harness group.

Cross placebo group manipulation was used to further evaluate the effect. Important Questions: these are the key questions of the study

1. Define Diseases or Patient Concerns
2. Percentage of Improvement in Symptoms
3. Percentage of Improvement in Feeling Better
4. Percentage of Improvement Measured
5. Percentage of Improvement in Stress Reduction
6. Percentage of Improvement in SOC Behavior
7. What Measured+How (relevant measures to the patient’s health situation)
8. If Patient worsened please describe in detail involving SOC_

After the patient visit is was complete the data was e-mailed to the Ethics Committee or IRB for storage and then analysis. This maneuver minimized the risk of data loss or tampering. Case studies were reported separately in the disease analysis.

Medical Details

Chronic inability to sleep, or sleep prematurely ended or interrupted by periods of wakefulness. Avoid stimulants and stress. Difficulty in sleeping, or disturbed sleep patterns leaving the perception of insufficient sleep. Insomnia is a common symptom, and may be due to several emotional and physical disorders.

With advancing age, the total amount of sleep tends to shorten. Stage 4 can disappear; sleep becomes more interrupted. Theses changes may be subjectively distressing and lead to requests for treatment. There is no evidence, however, that such insomnia interferes with health. Initial insomnia (difficulty in falling asleep) commonly is associated with an emotional disturbance such as anxiety, a phobic state, or depression; other symptoms of the emotional problem, will be present.

In early morning awakening, the patient falls asleep normally but awakens several hours before his usual time and either cannot fall asleep again or drifts into a restless, unsatisfying sleep. This pattern is a common phenomenon of aging, but sometimes is associated with depression and should be
investigated. Tendencies to anxiety, self-reproach, and self-punitive thinking often are magnified in the morning. An inverted sleep rhythm may develop in elderly persons because of inappropriate use of sedatives, often prescribed for insomnia. Patients become drowsy in the morning, sleep or doze much of the day, and have fitful and interrupted sleep at night. If sedation is increased, restlessness, and wandering in a clouded or confused state may occur at night. When sedation is withdrawn from a patient who regularly takes heavy doses of hypnotics, a rebound wakefulness commonly ensues, which the patient interprets as a recurrence of his/her insomnia.

Results
Before we review the direct disease improvement profiles, we need to review the overall results. The first most basic of question in the results is the basic feedback of the generic patient conditions.
1. Percentage of Improvement in Symptoms
2. Percentage of Improvement in Feeling Better
3. Percentage of Improvement Measured
4. Percentage of Improvement in Stress Reduction
5. Percentage of Improvement in SOC Behavior

The SOC index gives us great insight to this study. Each disease has a different cut off where the ability of the SCIO to help was compromised. As a general index scores of 200+ where much less successful. This groups significant SOC cut off was ----. The Large scale study had over 98,000 patients and 275,000 patient visits we have direct evidence of the safety and efficacy. A placebo group was used for the large scale test to help validate the results.
This disease group total number of patients was 2,198

Subspace Treatment 392 patients, 1,806
SCIO Harness Patients

Overall Assessment
A. Subspace Treatment 433 patient visits

There were 1 cases of patients who reported a negative improvement.
None of these cases reported any major difficulty.
There were

• 1 cases reporting no improvement of Symptoms, .002% of Subgroup
• 1 cases reporting no improvement in feeling better, .002% of Subgroup
• 1 cases reporting no improvement in stress reduction .002% of Subgroup
• 22% - Percentage of Improvement in Symptoms
• 20% - Percentage of Improvement in Feeling Better
• 43% - Percentage of Improvement in Stress Reduction
• 35% - Percentage of Improvement Measured
• 44% - Percentage of Improvement in SOC Behavior

B. SCIO Harness Treatment 2,145 patient visits

There were 3 cases of patients who reported a negative improvement.
None of these cases reported any major difficulty.

There were

• 3 cases reporting no improvement of Symptoms ,.001 % of Subgroup
• 3 cases reporting no improvement in feeling better, .001% of Subgroup
• 3 cases reporting no improvement in stress reduction, .001% of Subgroup
• 43% - Percentage of Improvement in Symptoms
• 44% - Percentage of Improvement in Feeling Better
• 51% - Percentage of Improvement Measured
• 50% - Percentage of Improvement in Stress Reduction
• 5% - Percentage of Improvement in SOC Behavior

Discussion:
The results show significant improvement in symptoms and feeling better. The Collective results show a dramatic benefit to the SCIO therapist visit.
I was able to visualize the digits in my mind's eye as beautiful rolling numerical panorama, with prime numbers as signposts.

Be sure to watch the "Chess Hustlers" in Video 3 and the Japanese Students manipulating numbers with an "imaginary abacas" in their minds to do extraordinary calculations in their minds. The Japanese Children are not Savants as they have been practicing hours per day for years.

If you only have time to watch 1 of the 5 parts below make it number 4!

In video #5 Daniel is given the ultimate linguistics challenge – Learn the Icelandic language in 7 days. And of course he does!

Note: There is another series of videos that are not the same but very close to this series. Search for "The boy with the incredible brain" Daniel Tammet

While possessing Savant Syndrome, Daniel can describe his inner world to scientists. When Dustin Hoffman starred in the 1989

Professor Desiré Dubounet and her friends have spent over 35 million dollars to bring the world a professional and thorough course on Wellness, Naturopathy and Neuro-Electro-Physiology of Biofeedback as Bioresonance. She is such a humanitarian Angel, she lets you pay for the course videos, books and materials with Karma...
Hollywood movie Rain Man the “autistic savant” was suddenly transformed from being a rare disability that few people had heard of into a familiar household term. In fact the term savant syndrome is preferable to “autistic savant”, as only about 50% of people with savant syndrome actually have autism. The others have a different cause of severe mental disabilities coexisting with some outstanding talent or ability. The “island of genius” is always linked to incredible memory capacity, and may involve musical, artistic, mathematical or mechanical talents. It is all the more remarkable as it exists within a sea of mental handicap.

Some Examples of Savant Abilities
Impressive mathematical abilities that savants possess often include lightning calculation. Calendar memory is sometimes seen, whereby the savant is asked a question like what day of the week was January 14th 1973? and can give the answer within seconds. At the 1964 American Psychiatric Association Annual Meeting, two autistic identical twin brothers were presented who had a calendar calculating span of over 40,000 years backwards and forwards. Others can multiply and divide huge numbers and calculate square roots in their heads, yet often have difficulty with simple arithmetic and are unable to accomplish simple mathematical transactions in daily life, like counting out change in a shop. Some savants are incredibly talented artists and musicians. For example, the successful artist Stephen Wiltshire is a savant, with autism. He has been filmed completing a highly accurate and detailed sketch of London covering 4 square miles, 12 major landmarks and 200 other buildings, all drawn to scale and perspective, after observing it all during a helicopter ride that only took 12 minutes! Musically talented savants often have perfect pitch and remarkable musical memory.

Some savants have remarkable mechanical or spatial skills, like the ability to construct complex and detailed models, or to measure distances very precisely without instruments. The real savant who was the inspiration for Dustin Hoffman’s character in Rain Man had memorized over 8600 books and possessed encyclopedic knowledge of geography, music, literature, history and sports. He also had a fascinating ability to read extremely rapidly, scanning one page with the left eye and the other with the right simultaneously.

Inside the Savant’s Brain
Many researchers believe that the underlying cause of savant syndrome is left brain injury with right brain compensation. Brain imaging with CT, PET and MRI scanning often shows evidence of left brain deficits or damage in savants. The theory is also backed up by cases of acquired savant syndrome, where savant abilities appear after damage to the left side of the brain, either following trauma like a fall or gunshot wound, or after the onset of dementia that particularly damaged the left brain. The savant mentioned above, upon whom the Rain Man character was based, was found on MRI to have substantial brain damage, including entire absence of the corpus callosum, which normally connects the left and right hemispheres of the brain.

Research Directions – Can We All Find Our Inner Savant?
Ever since the existence of this remarkable syndrome was first recognized, people have been fascinated by how such prodigious talents can coexist with severe disabilities within the same individual. In recent years, researchers have begun asking whether they can reveal savant like abilities in healthy volunteers if they temporarily immobilize parts of the left brain with a technique called Repeatitive Transcranial Magnetic Stimulation. In some people, there was an improvement in savant type skills, like drawing and proofreading, but the improvements were not dramatic, and did not occur in everyone. Some subjects even experienced temporary short term memory loss afterwards.

The existence of savant syndrome remains a conundrum that fascinates us and challenges our understanding of what the human brain is capable of.

Daniel Tammet, Boy with the Incredible Brain
Daniel Tammet — Selected Bibliography


Daniel Paul Tammet is a British high-functioning autistic savant, gifted with a facility for mathematics problems, sequence memory, and natural language learning. As one of the world’s high-functioning autistic savants leading a relatively normal life, he offers incredible insight into the world of autism, Asperger’s syndrome and other severe cognitive impairments. He challenges us to think about how society treats those who are different and what tolerance and understanding really mean.
In conjunction with this event, we have compiled a bibliography consisting of books, journal articles and websites on Daniel Tammet’s syndrome, synesthesia and savant syndrome.

Books

- RJ506.A9 J325 2004eb

Journal Articles

- Barnhill, Gena P. Outcomes in adults with Asperger syndrome. Focus on Autism & Other Developmental Disabilities, Summer2007, 22 (2)
- Dowd, Rachel. His beautiful mind. Advocate, 6/19/2007 (987)
- Geiert, Nadja. What color are your 2’s? Science Now, 3/24/2005
- Hornik, Susan. For some, pain is orange. Smithsonian, Feb2001, 31 (11)
- Kher, Unmesh. Ah, the blue smell of It!. Time Europe, 6/18/2001, 157 (24)
- Miller, Greg. The man who memorized pi. Science Now, 4/14/2005
- Miller, Leon K. The savant syndrome: Intellectual impairment and exceptional skill. Psychological Bulletin, Jan99, 125 (1)
- Murray, Stuart. Autism and the contemporary sentimental: fiction and the narrative fascination of the present. Literature & Medicine, Spring2006, 25 (1)
- Simmer, Julia. C is for "colour". New Scientist, 7/14/2007, 194 (2612)
- Tammet, Daniel. What it feels like to be a savant. Esquire, Aug2005, 144 (2)
- Treffert, Darold A. & Christensen, Daniel D. Inside the mind of a savant. Scientific American Mind, 2006, 17 (3)
is always more we can do once we transcend the limitations of our doubting self limiting verbal mind. As Helen Keller once said “the only obstacles are in the human mind”. And she ought to know, and we ought to listen.

Dedication

So in our new biology of the Neomorpheus we need to account for and deal with Daniel. It was my son Daniel whose life helped me to understand things better. So to this end I dedicate this book to my son Daniel. I named him after the Bible’s Daniel who had dreams that shaped reality, fought with a lion, lived in the furnace, and proved many things for us to see. And I named him Perseverance for his middle name to give him the energy of focus dedication. Daniel was born autistic because of a SYNthetic drug. And when I researched this I found that all SYNthetic drugs make disease and the whole of medicine was wrong to depend solely on their use. This led me to discover and then champion natural medicine, all because of my son Daniel. In the name of dedication I dedicate this book to my son Daniel.

Websites

- Brain Man: one man’s gift may be the key to better understanding the brain
- Daniel Tammet - The Incredible Brain
  http://www.mymultiplesclerosis.co.uk/misc/danieltammet.html
- A genius explains - Interview of mathematical and linguistic whiz Daniel Tammet by Richard Johnson
  http://www.guardian.co.uk/weekend/story/0,,1409903,00.html
- Optimnem: The official website of Daniel Tammet
  http://www.optimnem.co.uk/

If you watch the videos of Daniel it will show you a new way of seeing things. Please take the time for my words cannot capture the way your perceptions of thought will change. The above article points out some very interesting and unavoidable truths for the world today.

First what we know about thought and the human mind is all wrong.

Second the verbal area of the Brain is not only very limited it is extremely limited and there are capacities in the brain way beyond verbal capacities. The verbal brain is but a tool for our real bodies. It is the language interface. It is not the master, it is not the intellect we thought it was, it is not the height of the mind. It is a tool. The mind has capacities unknown.

The Buddhists have many quote major unknowables, one the beginning of all things. If we think too much on the beginning of all things we will get a headache and still not know. Second is the power of the Buddha mind to see and affect things at a distance. And third is the power of any human mind. Its capacities are quote unknowable. There

Desire’s Children

The traits most needed in today’s world. I have named my children

Daniel Persevarance, Kara Bliss, Destiny Patience, and Sterling Precision.

These are the personality traits that can serve you well.

Remember!
CLEARING THE CORE OF AUTISM

Gail Cunningham Wylie

SCIO PATHY

ALL STEPS to the completion of TEST. (MAY REQUIRE Several Sessions - Record VARHOP/E values for each session)

STEP 1  SETTING UP BACKGROUND PROGRAMS

(A) Hololinguistic Therapy:

- Programs
- Therapy

Type the following words into the yellow spaces: (Centre of Therapy screen).

Primary Disease: Autism, Virus
Organ Relation: All
Emotional Blockage: Resistance to Change, Anxiety

- Add to Schuman Wave (box) – to start the Hololinguistic program.
- Multi Media (box) – at the bottom left of screen to start Manfly.

(B) Body Viewer:

- Activate Body Viewer (Body viewer icon appears on screen).
- Program Start
- Load Individual Movie Program
- Stop Animation

Piggyback: Lymph System, Brain (Limbic system) to run in the background throughout the session.

- The Lymph System: Organ Systems
- Lymphatics
- Lymph
- Stop Animation

- The Brain: Organ Systems
- Brain
- Limbic
- Stop Animation

- Body Viewer icon (Returns to TEST screen).

(C) Shaping Function:

- Programs
- NLP Emotional Growth
- Mental Factors + Emotion Chart

- Value of Neurotransmitters

- Close (Close until TEST screen appears).

** IF the suggested therapy is NLP – complete the Unconscious Choice of therapy.

- Programs
- NLP Emotional Growth
- NLP Emotional Growth Therapies (Top of NLP Emotional Growth screen)

- Unconscious Choice of therapy (Message appears) COMPLETE the Therapy suggested in the message.
- Close (Returns to TEST screen).

- Programs
- Short Sarcodes (RECTIFY: Lymph, Liver, Kidneys, Large Intestine, Endocrine)
- Close (Returns to TEST screen).

STEP 2  CLEARING THE RESISTANCE TO CHANGE

- Programs
- NLP Emotional Growth
- Unconscious Reactivity

TYPE into the White hold tray: Should resistance to change be inverted?

- YES or NO Unconscious Reaction test

IF the answer is "NO" - Close (Close until TEST screen appears).

- GO TO STEP 3.

IF the answer is "YES" or "UNSURE" – Return to TEST screen.

- Close (Close until TEST screen appears).

- Treatments or SCIO EPR Enhancements (Top centre of TEST screen). Stimulate Reaction/Duplicate Remedy (IRB)

Type: Invert Resistance to Change
- Start Correction (Rectify to 100 or until button turns grey).

- Close (Returns to TEST screen).

STEP 3  CONFIRMING AUTISM

- Programs
- NLP Emotional Growth
- Unconscious Reactivity

TYPE: Does n.o.m.e. have autism?

- Yes or NO Unconscious Reaction test

IF the answer is "NO" – use other terms for the spectrum$: Asperger’s Syndrome, Heightened Sensitivity to Sensory Stimulation.
If the answer remains "NO" – then you are finished. If you have a good grounding in autism and autism like disorders you may want to ask other questions to determine the cause of the symptoms expressed. – i.e. sulfur transferase dysfunction.

If the answer is "YES" or “UNSURE” – use that term throughout the rest of the session: autism, Asperger’s, etc.

**STEP 4** DETERMINING/CONFIRMING THE MIASMS INVOLVED

A LIST of the MIASM- is printed out in Step 4 of the worksheet.

- Programs
- NLP Emotional Growth
- Unconscious Reactivity

**TYPE:** is the ... (i.e. MIASM-ALLER). ... ... miasm one of the causes of autism in n.a.m.e?

(Repeat this question for each of the miasms listed.

- YES or NO Unconscious Reaction test

**N.B.** CIRCLE the MIASM- answered as: "YES" or "UNSURE".

**TYPE:** Are the MIASM-VIR and the ... MIASM- (all miasms answered as "YES"), etc., the only miasmic causes of autism for n.a.m.e?

If the answer is "YES" - GO TO STEP 5. 

- Close (Close until TEST screen appears).

If the answer is "NO" or "UNSURE" - GO TO STEP 4 and REPEAT ALL steps until "YES" appears for the question asked above.

- Close (Close until TEST screen appears).

**STEP 5** DETERMINING WHICH VIRUSES ARE INVOLVED

**Type:** Autism into the YELLOW hold tray. (If "Autism" is no longer there).

**Type:** Miasm- into the "Search for Item" tray. 

- Search above Tray

(VIRUS: Filter or Sub file button located above the Hold Trays). 

**N.B.** RECORD the names of the Viruses that appear highlighted in YELLOW. (Bottom right side of TEST screen).

FIND & RECORD the Matrix number for each Virus. **TYPE** name of the Virus into the "Search for Item" tray. 

- Search above Tray

To speed up the process, it is wise to record all of the numbers for a specific type of virus instead of just the one that comes up (for example all the gripes).

If a treatment appears for a specific Virus instead of the Virus itself – SEARCH the name of the Virus and record ALL of the matrix numbers for this type of Virus.

If OTHER miasms are involved: **TYPE:** MIA... into the "Search for Item" tray. 

- Search above Tray

(Left click on the other MIA... and pull it into the FUSCIA Hold Tray. (On the right side of the matrix). 

**VIRUS** (Filter or Sub file button located above the Hold Trays). 

**N.B.** RECORD the names of the Viruses that appear highlighted in YELLOW. (Bottom right side of TEST screen).

FIND & RECORD the Matrix number for each Virus. (Type the name of the Virus into the Search Tray). 

- Search above tray

REPEAT this step for each MIA... that received the answer "YES".

**STEP 6** CONFIRMING THE VIRUSES INVOLVED

- Programs
- NLP Emotional Growth
- Unconscious Reactivity

**TYPE** into the Hold Tray: **Is the item located at** (the matrix number for each Virus) **on the main matrix one of the causes of autism in n.a.m.e?**

- YES or NO Unconscious Reaction test

**N.B.** RECORD the matrix number that is answered with "YES" or "UNSURE". REPEAT this procedure for EVERY Virus recorded.

**TYPE:** Are the only viral causes of autism for n.a.m.e. the items found at matrix #, matrix #, etc. on the main matrix? (Use the matrix numbers you have gathered).

**TO SAVE TIME:** RIGHT CLICK – copy this question to save time later when you return to NLP with other Viruses.

If the answer to the question is "NO" or "UNSURE" - REPEAT STEP 5 & STEP 6 until "YES" appears for the above question.

If the answer is "YES": **TYPE:** Should the Virus that appears at matrix # on the main matrix be explored?

- YES or NO Unconscious Reaction test

**REPEAT** the above question for EACH virus found. If the answer is "YES": Circle the matrix number of that VIRUS.

- Close (Close until TEST screen appears).

**STEP 7** ZAPPING TO REMOVE THE VIRUSES

- Information
- INFO view (Blue box appears on TEST screen).

- Information
- Empty INFO to Start 

- Message box appears: Are you sure, empty info table?

- YES (Empties info table -- Blue box on TEST screen is now empty).

**TYPE:** The matrix number of each Virus into the GO TO NO box. (Located on the right side of main matrix table on the TEST screen). (ONLY one number at a Time)!!

**N.B.** LOAD the INFO GRID with a MAXIMUM of 10 VIRUSES AT A TIME

- GO TO NO (Left CLICK and DRAG the featured item into the Info table on the TEST screen).

- LOAD Report
- LOAD Report [Report Items Loaded message appears].

- AutoFocus ZAP (Top left on TEST screen).

- 9 Minutes (9 Min will appear on the main matrix Treat button).

- 9 Min Treat (Located on right side of main matrix on TEST screen). 

- Wait for treatment to finish.

- AutoFocus ZAP - 9 Minutes - 9 Min Treat 

- Wait for treatment to finish & REPEAT (At least 3 times).

**N.B.** Viruses take a minimum of 15 minutes to CLEAR, therefore it is more time efficient to run this step at least THREE times before proceeding to STEP 8.

**REPEAT** this procedure until ALL of the viruses identified in STEP 4 & STEP 6 until the NLP program have been placed & treated in the INFO table.

**STEP 8** SQUEEZE/COMPLETING THE CLEARING OF THE VIRUSES

- Information
- Information

- Information
- Empty INFO to Start 

- Message box appears: Are you sure, empty info table?

- YES (Empties info table -- Blue box on TEST screen is now empty).

**TYPE:** The matrix number of each Virus into the GO TO NO box. (Located on the right side of main matrix table on the TEST screen). (ONLY one number at a Time)!!

**N.B.** LOAD the INFO GRID with a MAXIMUM of 10 VIRUSES AT A TIME

- GO TO NO (Left CLICK and DRAG the featured item into the Info table on the TEST screen).

- LOAD Report
- LOAD Report [Report Items Loaded message appears].

- AutoFocus ZAP (Top left on TEST screen).

- 9 Minutes (9 Min will appear on the main matrix Treat button).

- 9 Min Treat (Located on right side of main matrix on TEST screen). 

- Wait for treatment to finish.

- AutoFocus ZAP - 9 Minutes - 9 Min Treat 

- Wait for treatment to finish & REPEAT (At least 3 times).

**N.B.** Viruses take a minimum of 15 minutes to CLEAR, therefore it is more time efficient to run this step at least THREE times before proceeding to STEP 8.

**REPEAT** this procedure until ALL of the viruses identified in STEP 4 & STEP 6 until the NLP program have been placed & treated in the INFO table.
**Step 9** Finding the Chromosomes Involved

**Type:** Autism into the **YELLOW** Hold Tray.

Type: Miasm- into the “Search for Item” Tray. Search Above Tray (Lists all of the miasms).

Left CLICK & DRAG the Miasm-Vir from the matrix into the FUSCIA Hold tray. (On right side of matrix).

Chromosomes (Filter/ Sub file located above the Hold Trays).

Both Trays

**N.B.** RECORD the NUMBER & LETTER for each Chromosome that appears highlighted in YELLOW.

If items appear in the yellow bars that are NOT specific Chromosomes – Double CLICK the YELLOW highlighted line until that item has been rectified. (The Reactivity/Rectify % above the BLUE bar graph indicates the rectification value).

**N.B.** If an item appears – “CHANGE IN CHROMOSOME STRUCTURE” or “CHANGE IN CHROMOSOME NUMBER” – record the matrix number of this item in the Step 9 chart.

REPEAT this process for ALL of the miasms recorded in **Step 4.** (If more than ONE miasm is involved).

**Step 10** Repairing the Chromosomes Involved

- Programs
- Therapy
- Auto Trivector
- DNA The Book Of Life (If “DNA The Book Of Life” does not appear; access it by clicking onto the atom icon).

CLEAR the word *ALL* from the “Insert Chromosome” hold tray.

**Type:** The Chromosome numbers and letters into the Hold Tray. (SPACE between each Chromosome letter and only a single space between the Chromosome letter & it’s number) i.e. 12Q.. double space..5P etc.

- Scan and Repair Genes (Wait for the process to complete).

- Telomere Repair (Seals in the DNA work done). (Run TELIOMERE for 5 minutes only)!

- Close (Close until TEST screen appears).

**Step 11** Clearing the Impact of Miasm & Chromosomes on the Body

Type AUTISM into the **YELLOW** Hold Tray. (On right side of main matrix).

**Type:** the number and letter of a chromosome into the “Search for Item” tray. i.e. 5P

Left Click & DRAG the information into the FUSCIA Hold Tray. (On right side of main matrix).

Left Click & DRAG the information into the **RED** Hold Tray. (Below the matrix).

Left Click & DRAG the information into the **PURPLE** (Harmonic Coupling of two items) Hold Tray. (Below the matrix).

Both Trays (Located on right side of matrix).

- Each highlighted YELLOW item until rectified. (95% to 100%)

**N.B.** If your client has not alarmed you may use the Stimulate Reaction screen to treat the highlighted YELLOW items for each Echo & Focus button all at ONCE.

- Treatments or SCIO EPR Enhancements (At top of the TEST page).
- Stimulate Reaction/Duplicate Remedy (IRB)

**Type:** TAYFi (Treat All Yellow Flagged Items) into the white hold tray.

- Scan and Repair Genes (REPEAT until rectification is 100 or until bar turns white)

- Telomere Repair (Seals in the DNA work done). (Run TELIOMERE for 5 minutes only)!

- Close (Close until TEST screen appears).

**Note:** Suggestions given for further treatment – These items appear with the first word NOT capitalized – UNLESS IT IS AN EMOTION.

Note any virus, chromosome or miasm that appears. This info may be useful later.

( % Reactivity/Rectify above **BLUE bar graph** indicates rectification value).

Check for Mental Echo (Below matrix).

Check for Causal Echo (Below matrix).

Check for Etheric Echo (Below matrix).

Check for Curative Echo (Below matrix).

GO TO **PURPLE** Tray - Search Harmonic (Right side - at the end of **PURPLE** Tray).

- Each highlighted **YELLOW** item until rectified. ( % Reactivity/Rectify above **BLUE bar graph** indicates rectification value).

**Two tabs** have appeared under the items highlighted in **YELLOW**.

- Emotion Focus
- General Focus
- Homeo Focus
- Top 6 Homeopathics

**N.B.** If your client has not alarmed you may use the Stimulate Reaction screen to treat the highlighted **YELLOW** items for each Echo & Focus button all at ONCE.

**TAYFi** (Treat All Yellow Flagged Items) into the white hold tray.

- Scan and Repair Genes (Wait for the process to complete).

- Telomere Repair (Seals in the DNA work done). (Run TELIOMERE for 5 minutes only)!

- Close (Close until TEST screen appears).

**REPEAT** this whole sequence for EACH of the Chromosome numbers you have gathered.
You may add the second Chromosome number on top of the one in the RED Hold tray as it will replace the existing number.

N.B. You MUST CLEAR the PURPLE hold tray (HARMONIC Coupling of two items) or the Chromosome numbers will pile up there.

FIND each miasm involved by clicking miasm-in the “Search for Item” tray and Search Above Tray.

Individually bring each miasm into the RED Hold Tray and the PURPLE Hold Tray at the bottom of the matrix. REPEAT the above procedure.

You may do this procedure with each of the Viruses you have cleared. HOWEVER, it takes a long time and does not seem to be necessary. You may want to focus on specific Viruses that have been noted in the family history. i.e. “His maternal grandmother had polio” or were related to the regression of the child. i.e. “He lost everything after he received his MMR or DPT vaccination”.

Return to: Programs NLP Emotional Growth Unconscious Reactivity

ASK: Has the autism been cleared from n.a.m.e.’s body?

If the answer is “YES” - CONGRATULATIONS for a job WELL DONE !!! CELEBRATE !!

Close (Close until TEST screen appears). Go to STEP 12

If the answer is "NO" or "UNSURE" – You have missed something, either a Virus, a Masm or a Chromosome.

RETURN TO STEP 3, follow the processes outlined and ASK the following questions to determine what was missed.

Have we missed a virus in clearing autism from n.a.m.e.’s body?
Have we missed a miasm in clearing autism from n.a.m.e.’s body?
Have we missed a chromosome in clearing autism from n.a.m.e.’s body?

Follow through with the protocol on whatever was missed. You can use the information that you have noted as a starting point.

If you get a “no” as an answer for all of the above questions ask

Is there another cause of autism in _ _ _ _ _ ? (such as Birth Trauma?)

STEP 12 ENDING THE SESSION

- Programs - Body Scan And Face Therapy (Complete this therapy).
- Close (Returns to TEST screen).
- Close (Closes TEST screen).
- Check Current Rectifications (NOTE the issueS NOT REcTIfied).
- Rectify of all Below - Overall Rectify - Tools+Data-Transfer
- Save - Load Back - Yes (To EXIT)

FOLLOW-UP

Although the autism has been cleared the body may still be experiencing numerous problems due to the blockage that the viruses caused over time and the trauma that the individual has experienced because of the autism. The body is now in a state in which it is able to begin the healing process and it will do so on its own in time. However, this process can be speeded up through regular EPFX treatments.

If there is no change in behavior (communication, social interaction, anxiety) in the individual reported over time, go back and ask whether the autism has been cleared. We often find that there is another layer buried under the first one which was hidden (thus the “yes” response) and exposed in time. Complete the whole procedure again.

CLEARING THE CORE OF AUTISM

WORK SHEET

Client Name: Birth Date: Birth Place:

SESSION DATE: _ _ _ _ _ _ _ _ _ _, 2010 _ _ _ _ Hrs. V A R H O P/E / CV ResFreq S

OC

SESSION DATE: _ _ _ _ _ _ _ _ _ _, 2010 _ _ _ _ Hrs. V A R H O P/E / CV ResFreq S

OC

SESSION DATE: _ _ _ _ _ _ _ _ _ _, 2010 _ _ _ _ Hrs. V A R H O P/E / CV ResFreq S

OC

STEP 1. BACKGROUND PROGRAMS

1. All steps to completion of TEST.
2. THERAPY. Complete Trivector & Hololinguistic Therapy (Schuman Wave) and Multi Media

   Primary Disease: Autism Virus Organ Relation: All Emotional Blockage: Resistance to Change Anxiety

3. BODY VIEWER: Piggyback: Lymph system, Brain (Reticular formation, Limbic system), etc. to run in the background.

4. SHAPING FUNCTION: (Add 5 neurotransmitters).

5. Therapy: Complete the following therapies:

   (a.) Auto Colour Therapy: ____________

ALARM PHASE . . . . . . . . . . ADAPTATION PHASE . . . . . . . . . . EXHAUSTION PHASE
(c.) Therapy Suggested (in YELLOW): ____________________
(d.) Therapy Suggested (in PURPLE): ____________________

If the Therapy Suggested is NLP: NLP Emotional Growth – Therapies. Complete Unconscious Choice of therapy.

(e.) Short Sarcodes. RECTIFY: (Liver, Kidneys, Lymph, Large intestine, Endocrine,)

STEP 2. CLEARING RESISTANCE TO CHANGE

1. NLP Emotional Growth - Unconscious Reactivity. ASK: Should we invert the resistance to change?
   IF the answer is "NO": Go to STEP 3.
   IF the answer is "YES": Go to TEST - TREATMENTS (SCIO EPR Enhancements)– Stimulate Reaction/Duplicate Remedy (IRB).

"Invert Resistance to Change": Rectified to _________% _________%

STEP 3. CONFIRMING AUTISM AND THE MIASMS

ASK: Does ___________ have autism? Yes/No/Unsure
IF No ASK: Does ___________ have Asperger’s? Yes/No/Unsure
IF No ASK: Does ___________ have heightened sensitivity to sensory input? Yes/No/Unsure
IF "No" you are finished the protocol.

Is the autism in ________________ due to any other miasm other than the virus miasm?

IF the answer is "NO": Go to STEP 5.
IF the answer is "YES": Go to STEP 4.

STEP 4. DETERMINING / CONFIRMING THE MIASMS INVOLVED

# 1067 MIASM-ALLER (Allergies)  # 1068 MIASM-CANC (Cancer)  # 1069 MIASM-CF (Chronic Fatigue)
# 1070 MIASM-CHOL (Cholera)  # 1071 MIASM-CHOLI (Choli)  # 1072 MIASM-LEP (Leprosy)
# 1073 MIASM-MEN (Mental)  # 1074 MIASM-MZL (Measles)  # 1075 MIASM-PSO (Psora)

NLP Emotional Growth – Unconscious Reactivity.

ASK the following question for each of the miasms in the ABOVE LIST:

Is the ______________ miasm one of the causes of autism in ______________ ?

CIRCLE all of the "YES" or "UNSURE" miasms in the above LIST.

ASK: Are the MIASM-VIR miasm and the_________ miasm, and the_________ miasm, etc. ("YES" or "UNSURE" miasms) the only miasmic causes of autism in ______________ ?

IF the answer is "YES": Go to STEP 5.
IF the answer is "NO": REPEAT STEP 4.

STEP 5. DETERMINING WHICH VIRUSES ARE INVOLVED

TYPE: AUTISM into the YELLOW hold tray. TYPE: MIASM-- into the “Search for Item” tray. Search Above Tray.

Left: MIASM-VIR and pull it into the FUSCIA hold tray. VIRUS filter button. Both Trays.

RECORD the YELLOW highlighted VIRUSES. TYPE the name of each virus into the “Search for Item” tray. Search Above Tray.

RECORD the MATRIX NUMBER for all of the viruses that were HIGHLIGHTED in YELLOW.

Complete this step by Pulling each of the "YES" or "UNSURE" MIASMS into the FUSCIA hold tray and RECORDING the YELLOW highlighted viruses and RECORDING the MATRIX NUMBER for each of these items.

VIRUSES from the MIASMS - BOTH TRAYS TEST

"AUTISM" with "MIASM-VIR"

# 1076 MIASM-SYC (Syphilis)  # 1077 MIASM-VY (Vaccination)  # 1078 MIASM-TB (Tuberculosis)
# 1079 MIASM-TET (Tetanus)  # 1080 MIASM-VAC (Vaccination)  # 1081 MIASM-VIR (Virus)
VIRUSES from the MIASMS - BOTH TRAYS TEST

"AUTISM" with "MIASMA-FNG"
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"AUTISM" with "MIASMA-PSO"
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"AUTISM" with "MIASMA-TET"
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"AUTISM" with "MIASMA-CAN"
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"AUTISM" with "MIASMA-TB"
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"AUTISM" with "MIASMA-LEP"
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"AUTISM" with "MIASMA-MZL"
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"AUTISM" with "MIASMA-CHOL"
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"AUTISM" with "MIASMA-ALLER"
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"AUTISM" with "MIASMA-MEN"
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"AUTISM" with "MIASMA-SYC"
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"AUTISM" with "MIASMA-MEN"
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352

353

Smoking and addiction
Clear the info table.
Load Report.
GO TO NO for all viruses recorded.

Left click – Drag viruses into the info table. (Maximum 10 at a time.

Autofocus Zap for minimum of 27 minutes.

**STEP 6. CONFIRMING THE VIRUSES**

ASK: Is the item found at [matrix number] on the main matrix, one of the causes of AUTISM in _________________?

IF “YES” or “UNSURE” RECORD the matrix number in Column A below. IF “NO” DO NOT RECORD the matrix # in COLUMN A.

ASK: Should the virus that is found at (# . . . .) on the main matrix, be exploded?

IF “YES” or “UNSURE” - Place “YES” in Column C. IF “NO” Place “NO” in Column C.

REPEAT (A) and (B) for every virus previously noted in STEP 6.

ASK: Are the items found at #... #... #... etc. on the main matrix the ONLY VIRAL causes of autism in __________?

IF “YES” Continue on to next step. IF “NO” REPEAT STEP 5 and STEP 6. (Until the answer is “YES”)

**STEP 7. REMOVING THE VIRUSES**

**USING INFO TABLE (AUTOFOCUS ZAP)**

Clear the info table.
Load Report.

354 for all viruses recorded.

Left click – Drag viruses into the info table. (Maximum 10 at a time.)

Autofocus Zap for minimum of 27 minutes.

**STEP 8. CHECKING/CLEARING THE VIRUSES**

ASK: Has the item found at (# . . . .) on the main matrix been cleared from _________________’s body?

and/or

ASK: Has the item found at (# . . . .) on the main matrix been exploded in _________________’s body?

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<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEARED?</td>
<td>EXPLODE?</td>
<td>MATRIX #</td>
<td>EXPLODED?</td>
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Both Trays? 354

Both Trays? 355
Smoking and addiction

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
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<tbody>
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**MATIX # EXPLODED?**

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<th>CLEARED?</th>
<th>EXPLODE?</th>
<th>EXPLODED?</th>
<th>MATIX #</th>
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</thead>
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</table>

**Both Trays?**

Both Trays?  
Both Trays?

**STEP 9. FINDING CHROMOSOMES INVOLVED - USING CHROMO FILTER**

"AUTISM" with "MIASM-VIR"

| # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # | # |

"AUTISM" with "MIASM-FLG"
"AUTISM" with "MIASM-PSO"

"AUTISM" with "MIASM-TEF"

"AUTISM" with "MIASM-CAN"

"AUTISM" with "MIASM-LIP"

"AUTISM" with "MIASM-SYC"

"AUTISM" with "MIASM-VAC"

"AUTISM" with "MIASM-CF"

"AUTISM" with "MIASM-MEN"

"AUTISM" with "MIASM-SYP"

"AUTISM" with "MIASM-CHOL"

"AUTISM" with "MIASM-TH"

"AUTISM" with "MIASM-MZL"

358

"AUTISM" with "MIASM-ALLER"

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**STEP 10. REPAIRING CHROMOSOMES INVOLVED USING DNA**

DNA - - Remove "ALL" & insert the Chromosome numbers (Numbers need to be entered only ONCE in this tray).

Complete the DNA program for all of the chromosomes listed. REMEMBER - List the chromosome numbers ONLY ONCE!

---

**STEP 11. CLEARING CHROMOSOMES USING ECHO, & FOCUS THERAPIES**

Type AUTISM into the YELLOW Hold Tray. (On right side of main matrix).

**TYPE: Chromosome** into the “Search for Item” tray. i.e. 5 P

Left Click & DRAG the information into the FUSCIA Hold Tray. (On right side of main matrix).

Left Click & DRAG the information into the RED Hold Tray. (Below the matrix).

Left Click & DRAG the information into the PURPLE (Harmonic Coupling of two items) Hold Tray. (Below the matrix).

Both Trays (Located on right side of matrix).

Each highlighted YELLOW item until rectified. (95% to 100%) ** Note The SUGGESTIONS given)

---

Suggestions: 359
HAS THE AUTISM BEEN CLEARED FROM:

BODY? YES/NO/UNEQUE

360

Complete: Body Scan and Face Therapies.

Current Rectifications.

Step 12 Closing the Session

Reward your client with some FEEL GOOD or RELAXATION energies.

Via NP, Reiki, and Face Therapies.

HAS THE AUTISM BEEN CLEARED FROM:

BODY? YES/NO/UNEQUE

360

Complete: Body Scan and Face Therapies.

Current Rectifications.

Step 12 Closing the Session

Reward your client with some FEEL GOOD or RELAXATION energies.

Via NP, Reiki, and Face Therapies.
Your Author, Editor and Professor of Medicine

Delicious Rubout

Desire