Dyslexia

	Page
What is dyslexia?	1
How is dyslexia identified?	2
What causes dyslexia	6
Dyslexia treatments: Diet and supplements	12
Exercise	18
Classroom techniques	19
Conclusion	20
References	21

What is Dyslexia?

The word ‘dyslexia’ comes from the Greek: dys- meaning ‘difficult’, Lexia – to do with language. There are many definitions of dyslexia. Some definitions are given below:

- Dyslexia is present when the authorization of word identification (reading), and/or word spelling does not develop or does so very incompletely or with great difficulty. (Health Council of the Netherlands, 1997)
- Dyslexia causes difficulties in learning to read, write and spell. Short-term memory, mathematics, concentration, personal organization and sequencing may also be affected. (Dyslexia Institute U.K. 2002)
- Dyslexia usually arises from a weakness in the processing of language-based information. Biological in origin, but environmental factors also contribute. (Dyslexia Institute U.K. 2002)
- Dyslexia is a severe reading problem of neurological origin in a person with average or above average intelligence, for whom there are no other physical, medical, or psychological conditions sufficiently serious to account for the language handling deficits. <http://www.dyslexia.org>

For a child to be diagnosed with developmental dyslexia, he/she has to have had severe and persistent problems in learning to read and spell at the word-level. (This child may also have poor short-term memory and poor organizational skills.) The term dyslexia is not applied to children who have severe learning difficulties, but to children of average or above average intelligence who have specific literacy difficulty. Early identification, (pre-school level) will lead to early intervention and thus reduce the likelihood of later educational failure, including reading failure (McGill, 2004:4-5).

Facts about dyslexia

- Dyslexia affects at least 5 - 10 per cent of the population.
- Dyslexia may occur in children of average to high intelligence.
- Within the dyslexic profile, individuals can show different strengths and weaknesses.
- Difficulties can be slight, moderate or severe.

- Dyslexia occurs in both males and females but is far more common in males.
- Dyslexic students who are nurtured can display strengths of ingenuity, creativity and lateral thinking. They are likely to have good spatial and verbal skills, contribute well in discussions, solve puzzles and be good at design, building and construction.
- There may be overlapping characteristics between other specific learning difficulties such as A.D.D. and A.D.H.D.
- Dyslexic children may have coordination problems.
- Several genes have been identified as possible causative factors. If one parent is dyslexic there is a 50% chance that any of his/her children will inherit dyslexia.
- Brain imaging has shown differences in specific areas of the dyslexic brain compared to non-dyslexic brains.
  (McGill, 2004:7)

How is dyslexia identified?

First, the differentiation must be made between a real reading problem and an IQ problem. Both reading tests and IQ tests should be conducted to see how they compare. If there is a big discrepancy between potential and production, then dyslexia may be indicated.

Second, the use of the right brain in reading should be tested. A student who uses their right brain for reading will have difficulty with phonetic pronunciation of words. A test would be given using misspelled homophones. Example: Ask a child to pronounce these made-up spellings: brade, blone, or peze - (braid, blown, peas).The right hemisphere has great difficulty with these.

Third, the state of the corpus callosum should be tested. (The corpus callosum is the great commisure of the brain between the cerebral hemispheres). This test is called Tactile Localization. The test consists of touching the student lightly on the inside of his fingers with his hand behind his back where he can't see what you did. Then you ask him to show you on the other hand where he was touched. That information has to go through the Corpus callosum. If the corpus callosum is underdeveloped, the child will have great difficulty doing this.

The Corpus callosum should be fully matured by about ten years old. If a child of moderate to high intelligence has reading difficulties, makes mistakes on the misspelled homophones and responds poorly to the Tactile Localization test, then most likely the child has dyslexia.

< http://www.dyslexia.org>

Cognitive difficulties
A person with dyslexia has problems with short-term working memory (auditory/visual recall). Processing of information is slow, resulting in loss of information. The ‘memory shelf’ becomes overloaded resulting in information

not being stored or acquired. Problems arise is phonological processing (processing sounds). Problems arise in synthesizing information (bringing all the information stored in the brain together.) Auditory and/or visual information may not be processed completely, accurately or efficiently. Problems occur in sequencing (time, number, alphabet sequences and co-ordination). (McGill, 2004:8)

Most children are only diagnosed with dyslexia after several years of struggling at school. Learning to read, write and spell are not necessarily related to intelligence so any child in a mainstream school who is behind their peers at language skills, whether they be verbal or written, should be considered for dyslexia testing. A dyslexic child will often have problems with their five senses, especially vision and hearing. Dyslexics may find it difficult to hear exactly what is being said so they become isolate as they are unable to keep up with their classmates' conversations. Sometimes their hearing will be over sensitive and they choose to spend a lot of time alone to avoid the shouts and boisterous behavior of other children. Other problems with their senses may be sensitivity to bright light, particular smells and the feel of certain fabrics. Other dyslexia signs can show themselves in general clumsiness, under achievement in sports and a tendency to motion sickness. These indicate an under-developed cerebellum, (the part of the brain governing balance and coordination) or weak vestibular balance system. <http://www.myomancy.com/category/dyslexia>

Identification in the Foundational Stage (Pre-school)
Strengths may be seen in:

- building and construction activities
- geometric and pattern activities
- problem-solving activities

Weaknesses may be seen in:

- memory (auditory/visual; recalling a sequenced activity; forgetting instructions)
- sequencing (songs; patterns; letters/numbers)
- speech (muddled words e.g. par cark for car park; problems remembering names; problems processing sounds and linking to letter shapes)
- language (Problems in following instructions; retelling a story; interest in listening to stories but not interested in learning to read)
- listening (poor concentration; difficulties in identifying rhyme and rhythm)
- motor skills (fine/gross; movement/balance; running, skipping; left/right; walking early and not crawling; slow to develop a dominant hand; dressing skills slow)
- rhythm (poor co-ordination)
- orientation (trouble with left/right; orders right to left rather than left to right)
- colour recognition and discrimination may be a problem

Pupils with these difficulties will need more help and additional practice in:

- ball skills
- walking

- balancing
- using play equipment
- dance, songs with actions
- nursery rhymes
- stories and listening games
- memory games
- naming objects; word and letter order
- sequencing and copying colours, shapes and patterns
- threading beads
- sorting and classifying
- holding a pencil and copying
- organization of materials and themselves

(McGill, 2004:10-12)

Identification in the Primary School

Aspects for identification:

Strengths

- spatial skills; building and making; oral language; sport; non-verbal activities

Weaknesses

- weakness in memory; concentration; sequencing; following instructions; recalling information; literacy; organizational skills

Reading difficulties:

- difficulty in recognizing words by sight
- problems with matching sounds to letter shapes
- problems with blending sounds and word decoding strategies
- problems with retelling stories in correct sequence of events
- difficulties reading aloud – lack of fluency, expression, accuracy; word omissions; 'made-up' words or sentences, pronunciation problems

Difficulties in verbal response:

- difficulties with self-expression, explanation and verbalizing order of events

Difficulties in spelling:

- often no relationship between the word and letters used
- can spell orally but can't write correctly
- reversal of letters
- wrong use of phonics
- problems isolating individual sounds

Writing difficulties:

- poor ordering of events
- words/phrases missed out
- punctuation problems
- writes slowly
- messy

- can’t copy from the board

Handwriting difficulties:
- poor motor control
- reversals of letters
- poor letter formation and joining

Emotional/behavioural elements:
- poor concentration
- poor listening
- avoids reading/writing
- easily distracted
- many avoidance strategies
- lacks confidence
- often tired after seemingly little output
- problems in organizing self and work
- poor self-esteem
- withdrawn, disruptive or class clown
- complains of teasing
- easily upset
- coping procedures may be swaying, aggression or difficult behaviours

(McGill, 2004:13-15)

Identification in the secondary school

Strengths:
- spatial skills, art
- creative, imaginative and practical skills
- oral skills
- verbal responses to questions
- sport

Weaknesses in memory:
- problems with recalling information, recalling instructions and recalling written information
- problems with sequencing and order
- reading difficulties
- problems with organization and remembering to bring books and equipment

Weakness in literacy:
- problems ordering ideas and use of expressive language
- problems with decoding; phonics; reading strategies
- problems with spelling
- difficulties in recalling reading and spelling rules
- problems reading aloud
- messy handwriting

Sequencing Problems:

- problems writing in an ordered, structured way
- problems with copying from board
- physical co-ordination problems

Synthesizing information
- problems in bringing information together and transferring skills and knowledge from subject to subject

Emotional behavioural elements
- withdrawn behaviours
- non-involvement in class
- poor self-exteem
- aggression and non-compliance
- exhibitionist behaviour to cover up for what he/she can't do
- work avoidance
- distress caused by teasing

(McGill, 2004:16-17)

What causes dyslexia?

Finding no. 1: Inherited factors

Where dyslexia is identified, between a third and a half of children have a history of learning difficulties in their family. With the technical advances that have come about in brain-scanning in recent years, research has been carried out examining the brains of dyslexic people. Bunches of cells beneath the surface of the brain have been detected which lie on the surface in the brain of a non-dyslexic person. These groups of cells ought to have moved to the brain's surface at the time when the brain was developing in the foetus, but failed to make the journey. They are known as 'ectopic' cells (like an ectopic pregnancy, where the egg fails to reach the womb and is fertilized in the Fallopian tube).

These ectopic clusters of cells are mainly found in the left and the front of the brain - the areas which are important for reading and writing. Another area of the brain - the magno-cellular system, which deals with our ability to see moving images - is smaller in the brains of dyslexic people. This makes reading harder, where the brain has to quickly interpret the different letters and words which the eyes see as they scan words and sentences.
With the use of EEG (electroencephalogram), where small electrodes with wires are temporarily attached to the outside of a person's head, it has been possible to see increased brain activity on the right side of the brain when a child is beginning to learn to read. Increased activity is noticeable on the left side in an advanced reader.

However, the brains of dyslexic children show an unusual variation in left- and right-side activity. Recent research has found that, whereas non-dyslexic children use the left side of their brain for language work, dyslexic children have to use the right side as well. This is not the side of the brain that is conducive to language work, and, as a result, the brains of dyslexic children

and adults have to work about six times harder. This may be why dyslexic children and adults become fatigued by language work and dealing with text. John Bradford http://www.dyslexia-parent.com/mag24.html

Summary: Dyslexia seems to run in families, and may be caused be an underdeveloped mango-cellular system, which deals with the ability to see moving images.

Finding no. 2: Hearing problems at an early age
If a child suffers frequent colds and throat infections in the first five years, the ears can be blocked from time to time so that hearing is impaired. The parents can easily be unaware of this until a doctor actually looks into the child's ear. This condition is sometimes known as 'glue ear' or 'conductive hearing loss'. If the difficulty is not noticed at an early stage, then the developing brain does not make the links between the sounds it hears.

This early learning of sounds and words is fundamental to the child's developing ability to handle language and text. If a child cannot hear clearly, it will be unable to hear the difference between words like 'pin' and 'thin', or 'fan' and 'van'. The lack of clear hearing will also delay the child's phonemic awareness - the ability to hear that words are made up of smaller sounds and syllables, like 'c-a-t', or 'in-ter-est-ing'.

A delay in phonemic awareness causes lifelong difficulties - dyslexia - if corrective action is not taken at a very early stage. The most common treatment is the insertion of a tiny tube or grommet into the child's ear. This allows the fluid to drain off so that the child's hearing is restored. Another treatment is the removal of the tonsils, which are sometimes the cause of the repeated infections.
http://www.dyslexia-parent.com/mag24.html John Bradford

Summary: Ear/nose/throat infections in children under five may be a factor in delayed development of certain parts of the brain.

Finding no. 3: Dyslexia linked to nerve damage
Dr John Stein, from Oxford University would agree with John Bradford, confirming that the mango-cellular system is affected in the case of dyslexia. Dr. Stein reports that damage has been found in the optic nerves of dyslexic children, and believes other areas of the brain's nervous system may also be affected. Dr Stein believes that dyslexics suffer from a defect in a set of very large nerve cells known as magno-cells. These cells rapidly transmit electrical impulses from the retina in the eye to the brain so that it can recognise rapid changes or movement.

Other researchers have shown that the magno-cells in dyslexics operate more slowly than usual, and postmortem examinations have revealed abnormalities in the shape and position of the cells. The magno-cell defects could make reading difficult because they make it impossible to process the quick eye movements needed to decipher text. Dr Stein has found that many dyslexics

find it difficult to hold their eyes steady between movements, probably because the magno-cells are failing to send proper signals to the brain. Dr Stein believes that the magno-cells are damaged in the womb by antibodies produced by the mother's immune system which attack the cells and stunt their development. He believes other nervous pathways governing hearing and coordination may also be affected.

People with dyslexia have no difficulty understanding the meaning of words, recognising individual letter shapes, and seeing anything other than text. This has led many scientists to say that dyslexia is caused by a specific problem with the language centres in the brain.

But Dr Stein believes the condition arises from an inability to sense the most rapid changes in the world around us, particularly in what we see and hear. He believes that during foetal development, something damages or attacks the vulnerable young nerve cells responsible for relaying information about fast-changing events. This may explain why dyslexic children have associated conditions such as clumsiness, poor balance and coordination.

To test his theory, Dr Stein asked people to watch two computer screens displaying tiny dots moving around at random. He found that dyslexics were less likely to spot synchronized movement of the dots than people who were not suffering from the condition. Dr Stein found that the poorer the ability to spot a change in motion, the worse the reading and spelling.

<http://news.bbc.co.uk/1/low/health/325537.stm>

Summary: Dyslexics may also have problems with magno-cells, large nerve cells that rapidly transmit electrical impulses from the retina in the eye to the brain, meaning that they have difficulty in recognizing rapid changes or movement. Damage may originate in antibodies passed on to the foetus from the mother.

Finding no. 4: underutilized left brain hemisphere and central bridge of corpus callosum

There are thought to be various main factors within the brain that contribute to dyslexia. Two of those factors are linked an underutilized left hemisphere and a central bridge of tissue in the corpus callosum. Via brain scanning techniques, such as the fMRI, scientists have proven that dyslectics fail to use the angular gyrus (visual association area) in the left hemisphere of the brain when they read, unlike non-dyslexics. The link between the angular gyrus and the occipital and temporal lobes appears to be almost disconnected, causing problems between visual and auditory processing. Problems in the corpus callosum are blamed for poor reading abilities. The right hemisphere of the brain recognizes a word as connected to a definition. The left hemisphere is in charge of putting the sounds of the word together to make it audible. The corpus callosum is the bridge between the two sides of the brain; if this bridge is weak or faulty, then signals will not transfer well. Lack of proper signaling results in a breakdown of communication, which leads to understanding and

execution difficulties. Doctor Harold Levinson's major research findings in the early 1970s helped to back this up. His research was able to demonstrate that learning disabilities including dyslexia were due to a "simple signal-scrambling disturbance of the inner-ear". Without the ability of a fully functioning inner-ear, signals get crossed and lost, resulting in a general confusion that inhibits learning and comprehension. It is also thought that the language sectors of the brain in a person with dyslexia are smaller than that of a non-dyslectic. http://serendip.brynmawr.edu/bb/neuro/neuro99/web1/Stevenson.html

The corpus callosum is intimately involved in cerebral organization, both during growth and all through adulthood. This thick bridge of neural tissue in the middle of the brain connecting the two hemispheres conveys information from one side to the other. Far more than being a mere information carrier, however, it seems to take an active role from infancy in directing the development of the brain into the highly lateralized organ it is. The function of the corpus callosum during cognitive activity seems to be one of maintaining the balance of arousal and attention between the two sides that enables each side to contribute its part to achieve an integrated whole. Thus it allocates each kind of processing to the area of the brain which is programmed for the job, controls arousal and the distribution of attention over the two hemispheres and enables sustained attention during complex cognitive tasks.

The corpus callosum is also involved in the control of certain kinds of eye movements. When the eyes move, as in making saccades, or in convergence, information as to what to do comes to the brain from two sources-- the eye muscles that tell where the eyes are now, and the two retinas, which see slightly different things. This input goes to both sides of the brain, and smooth integration of this information requires fast and accurate interhemispheric "chit-chat." Thus the corpus callosum is intimately involved in smooth tracking, smooth convergence, stable ocular dominance, and matched focusing.

Transfer of information from the fingertips of one hand to the other without looking also requires use of the corpus callosum. The information on the fingers of one hand must cross this neural bridge to get to the opposite hand.

It seems reasonable to assume that without the fast, accurate guidance of a central control mechanism, the brain might show the kinds of symptoms which we see in dyslexia. For instance, poor allocation of neural space and insufficient arousal of the left hemisphere might encourage inappropriate reliance on right hemispheric strategies during language and number processing. Without the sustained attention and focus provided by a robust corpus callosum, you would expect the kind of distractibility and inattentiveness so often seen in dyslectic children.
www.dyslexia.org Reading From Scratch ---by Dorothy van den Honert

Some studies have shown that the dyslexic's brain needs to work ten to twenty times harder than a non-dyslexic brain to achieve the same goal.

<http://www.myomancy.com/category/dyslexia>

Summary:

Dyslexia is caused by an imbalance of signals in the executive brain centre. There is a disruption in the synapses resulting in words registering at different rates. There is an imbalance between the right and left sides of the brain. (The right side is responsible for creative, spatial and visual functions; the left side is responsible for language, logic, sequencing). In dyslexic people, the left side of the brain, responsible for connecting sounds to make them audible, does not operate to its full potential, has to work much harder than in non-dyslexic people. If the corpus callosum is underdeveloped there will be difficulty in sustaining attention during difficult tasks. For the dyslexic person, they are trying to use their right side of the brain for the purpose that the left side of the brain does best (language). The right side of the brain of a dyslexic person is more developed than the left side, meaning that they will show more creative strength. However using the side of the brain that is not 'wired' for language, the brain will therefore have to work much harder.

Finding no. 5
There can be cerebellar developmental delay

Research suggests that the cerebellum plays a key role in learning by comparing what the brain expects to happen with what actually happens. As the subjects learn the sequence, the difference between expected and actual results diminishes and the work load on the cerebellum reduces. In the better developed, non-dyslexic brains, the cerebellum is more efficient at this process so sequence learning and the corresponding drop off in cerebellum activity occurs sooner. This supports movement based treatments such as Dore or Learning Breakthrough, which use activity based therapies to learn sequences. Reading is a complex cognitive activity that involves functions arising from different networks of brain structures. To achieve reading fluency, the skill must be automatized. The cerebellum appears to have all the potentialities to facilitate the numerous and coordinated operations involved in proficient reading.

<http://www.myomancy.com/2007/01/the_cerebellum_>

A study was carried out in 2006 at the Children's Hospital "Bambino Gesù", Santa Marinella, Rome, Italy, in combination with University Tor Vergata, Rome, Italy and the Department of Psychology, University "La Sapienza", Rome, Italy. Deny Menghini, Gisela E. Hagberg, Carlo Caltagirone, Laura Petrosini and Stefano Vicari report the following:

To evaluate implicit learning we administered a classical version of the serial reaction time task (SRTT) related to sequence learning. Using functional magnetic resonance imaging we investigated brain activation patterns associated with implicit learning deficits in 14 adults with dyslexia, matched with 14 normal readers. SRTT results indicated the absence of implicit learning in the dyslexic group. Brain activation patterns indicated inferior parietal areas and cerebellar lobule.
<http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6WNP->

Another study was carried out at the Department of psychology, University of Sheffield, U.K., Angela Fawcett and Rod Nicolson, report the following:
In the trial, children were grouped within IQ bands. Children with moderate to high IQ, (with dyslexia) were compared to children with low IQ (without dyslexia). Comparisons were made on postural stability and muscle tone. The low IQ children performed better than the dyslexic children, demonstrating that the majority of children with dyslexia suffer from a mild cerebral abnormality. The cerebellum is known as the 'hind-brain'. Damaged to different parts of the cerebellum and lead to different symptoms including disturbances in posture and balance and dyscoordination. Traditionally, the cerebellum has been considered as a motor area, and is also known to be involved in adaptive learning control. Recent research has shown that the cerebellar hemispheres are linked both to the frontal motor areas and the frontal cortex including Braca's language area. The cerebellum is therefore central for the acquisition of language dexterity. There is now overwhelming evidence of the importance of the cerebellum in language. It has now been demonstrated that patients with cerebellar damage show deficits in attention and working memory, and dyslexic type symptoms in reading. The Sheffield Dyslexia Research concluded that dyslexic children showed severe deficits in a range of skills including rapid processing.

<http://www.investigacion-psicopedagogica.org/revista/articulos/4/english/Art_4_45.pdf >

Summary: The cerebellum plays an important role in language as well as sequencing. Delayed cerebellum development will cause difficulties in performing language-based tasks.

Finding no. 6: Environmental factors

Environmental factors may contribute to damaged nerve cells, possibly pesticides being passed from mother to foetus. The following article from 'The Lancet' suggests that pesticides may contribute to dyslexia.

Exposure to Pesticides Linked to Learning Problems
People exposed to pesticides on a regular basis, such as farmers and gardeners, may have 5 times or more the normal risk of developing subtle neurological impairments or learning problems categorised as mild cognitive dysfunction (MCD), researchers in the Netherlands report. The authors note that currently "Little is known about the adverse effects of substances, such as pesticides and metals, on the development of mild cognitive dysfunction." MCD includes problems with verbal learning, word fluency and recall, among others. The investigators evaluated exposure histories for 791 individuals. "Of the 17 people who reported pesticide exposure, six (35%) had mild cognitive dysfunction at baseline, whereas only 85 (11%) of 774 individuals in the unexposed group had MCD," the researchers write. The study authors conclude that additional larger studies are needed to more accurately evaluate the risk of these types of pesticide exposures leading to subtle cognitive impairments (The Lancet September 9, 2000;356:912-913).

Summary: Causes cognitive dysfunction may be caused by exposure to pesticides. The possibility of chemicals passed on from mother to foetus may be a factor in delayed development of certain parts of the brain.

Dyslexia Treatments

There are many dyslexia treatments available. Many are designed to teach reading to dyslexics. Other focus on the balance and coordination in an attempt to tackle the root causes of dyslexia. Others tackle dyslexia through dietary supplements. Multiple different approaches will be required before a dyslexic child is set free of their problem.
<www.myomancy.com/category/dyslexia>

Finding no. 1: Diet and supplements

John Bradford believes that children with any degree of Attention Deficit are particularly prone to reactions against certain foods that make them speedy and unable to calmly get on with their work. Most notable of these are Cola drinks, chocolate, sweets and orange juice (fresh) or squash, aspartame (sweetener used in 'Diet' drinks), as well as foods which contain additives, such as crisps, foods and drinks with colorings, 'party' foods and some throat lozenges. He says that unfortunately, these tastes are quite addictive, and it can take quite a while to wean a child off them and onto additive-free foods such as fruit, salads and fresh, cooked vegetables. However, after a while his taste for food with additives will be reduced, there will be a noticeable improvement in the child's ability to remain calm and attentive.
<http://www.dyslexia-parent.com/mag24.html>

A gluten-free diet

This is useful for even mildly allergic patients About 1 in 3 children with dyslexia and related disorders have a gluten allergy, but not severe enough to be diagnosed as Celiac Disease. These children will have a dramatic response to treatment with a gluten free diet alone.

Moods can change, tiredness will improve, as will balance and coordination. Not only can the affected person see it, but their relatives, partners and close acquaintances will see the behavioural changes as well.

<http://www.quizdoc.com/web-content/css/Pages/Treatments.html>

A diet low in sugar and other refined carbohydrates

Refined sugar overworks the pancreas and adrenal glands as they struggle to keep the blood sugar levels in balance. This is known as adrenal exhaustion, or adrenal fatigue. It is characterised by a deficiency in the function of the adrenal glands.

Factors that lead to adrenal exhaustion include the following:

lack of sleep, overexertion, poor diet, smoking, alcohol, caffeine, drugs, heavy metal toxicity *and too much sugar.*

The adrenal glands sit on top of the kidneys and are responsible for the secretion of adrenaline, cortisol, DHEA and other hormones that are required for proper body function during times of stress, whether it is physical, emotional, or mental. Over long periods of stress, the adrenal glands become exhausted and so does the person. The whole body, including the immune system, becomes weak and vulnerable.

The adrenal glands secrete adrenaline, for example, when we need to run, meet a deadline, or give a presentation. They secrete cortisol to keep the body going under long periods of stress, inflammation, or infection. If, however, the long periods of stress are not balanced by healthy food, and plenty of rest and recuperation, the adrenal glands are not fully able to maintain energy, organ function, immune function, and prevent inflammation. This can contribute to a range of chronic health problems including continued fatigue, sugar cravings, lack of energy, increased effort to do everyday tasks, decreased ability to handle stress, increased proneness to colds and flu, depression, poor memory, less tolerance, hypoglycemia, allergies and low immune response.

When you eat sugar, it is quickly absorbed into your blood stream in the form of glucose. This puts your pancreas into overdrive, making insulin (which carries glucose to your cells to be used for energy) to normalize blood sugar levels. But this rapid release of insulin causes a sudden drop in blood sugar. In reaction to the falling blood sugar, excess adrenal cortisone is stimulated to raise blood sugar back to normal. A constantly high intake of simple dietary sugar keeps this roller coaster going and eventually overworks or "burns out" normal pancreas and adrenal function leading to hypoglycemia, and chronic fatigue.

<http://www.stevia.com/SteviaColumn.asp?ID=871>

If glucose levels fall to low (or too rapidly), the central nervous system (brain) is adversely affected by this interruption in its fuel supply. Symptoms that can result from low blood sugar include: hunger, fatigue, irritability, mood swings, anxiety, nervousness, confusion, headache, heart palpitations, blurred vision, dizziness, trembling, sudden profuse sweating, awakening in the middle of the night, and, in severe cases, loss of consciousness. A healthy diet made up of vegetables, fruits and proteins, as well as high fibre carbohydrates, will help the blood sugar to remain at more stable levels, reducing stress on the adrenals. (Debe, J.A.)

A recent study, for example, found that children who eat significant amounts of junk food are much more likely to develop asthma than kids who don’t eat junk food. While the researchers didn’t tie asthma to sugar itself, they did point out that a diet full of candy and other highly processed junk foods is deficient in a number of nutrients essential to health.

<http://www.stevia.com/SteviaColumn.asp?ID=871>

Here are just three of the many effects of sugar listed by Dr. Mercola:

> Sugar can suppress your immune system and impair your defenses against infectious disease.
> Sugar upsets the mineral relationships in your body: causes chromium and copper deficiencies and interferes with absorption of calcium and magnesium.
> Sugar can cause can cause a rapid rise of adrenaline, hyperactivity, anxiety, difficulty concentrating, and crankiness in children.

<www.mercola.com>

Because the adrenal glands may be already exhausted due to excessive cerebral activity that accompanies dyslexia, adding sugar to the diet only accentuates the problem and creates further exhaustion due to the constant swings of low to high blood sugar. Refined carbohydrates are also nutrient deficient, so allow the body's supply of nutrients to fall further below the required amounts. Increased brain activity requires more nutrients, not less.

Nutrients for neurotransmission
The functioning of the brain depends upon substances called neurotransmitters. Neurotransmitters are brain chemicals that act as electrical switches in the brain and, through the functioning of the nervous system, are ultimately responsible for all the functions of the body. If the brain does no t have an adequate supply of neurotransmitters, or the nutrients from which to make them, it begins to develop the biochemical equivalent of a power failure or short circuit. This can take the form of the mind going blank or plugging into other irrelevant information.
(Balch 2006:559)

Omega-3

Omega-3 fatty acids are concentrated in the brain and are associated with cognitive function. They are the good fats, unlike saturated fats and transfats. Omega-3 prtects against inflammation and high cholesterol.

It is well established that the main components of fish oil, EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid), together with the omega-6 fatty acids, arachidonic acid (AA) and dihomogamma linolenic acid (DGLA), play a major role in the structure of neuronal membranes. There is also substantial evidence that children with ADHD tend to be deficient in EPA and DHA.

Considering this evidence, researchers at Oxford University decided to investigate whether supplementation with fish oils would help children with DCD and ADHD. Their clinical trial involved 100 children between the ages of 5 and 12 years who had been diagnosed with DCD and showed symptoms of ADHD as well. The children were randomized to receive 6 placebo (olive oil)

capsules a day or 6 capsules a day of an essential fatty acid (EFA) mixture providing a total of 558 mg of EPA, 174 mg of DHA, 60 mg of gamma-linolenic acid plus 10 mg of natural alpha-tocopherol (vitamin E). Half the children received the EFA mixture for 6 months, while the other half received the placebo for 3 months and then the EFA mixture for the remaining 3 months of the trial.

The improvements in the EFA groups were substantial. While no improvement was noted in motor skills, both reading and spelling skills improved significantly. The mean increase in reading age for the first 3 months was 9.5 months in the EFA group versus 3.3 months in the placebo group. Similarly, the increase in spelling age during the first 3 months of the trial was 6.6 months in the EFA group versus 1.2 months in the placebo group. Improvements in ADHD symptoms were also substantial, particularly in regard to hyperactivity, cognitive problems, anxiousness and shyness. The rate of improvements noted for the first 3 months continued for the subsequent 3 months of the trial. The researchers conclude that the EFA supplement may be a safe, tolerable and effective treatment for improving academic progress and behaviour among children with dyslexia.
http://www.oilofpisces.com/attentiondeficitdisorder.html

Food sources of omega-3: cold water fish such as salmon – (Alaskan salmon has shown to be free from heavy-metals); mercury-free fish oils; walnuts; flaxseed and flaxseed oil

Amino acids:

Amino acids are necessary for normal brain function; serve as fuel for the brain and prevent excess ammonia from damaging the brain.

L- glutamine, L-phenylalanine and L-aspartic acid – for brain function

L-carnitine – required for making protein and delivering essential fatty acids to the cells.

L-tyrosine – helps sharpen learning, memory and awareness; elevates mood and motivation.

Taurine – an important antioxidant and immune regulator, necessary for white blood cell activation and neurological function. Taurine is an essential building block of all other amino acids.

Acetylcholine – most important of the neurotransmitters. Maximizes mental ability and prevents memory loss.

Dimethylglycine (DMG) – a powerful antioxidant; increases oxygenation of tissues; helps brain function

Multivitamins - good quality, broad-spectrum. These should include:

Vitamin A – an important antioxidant that aids in protecting brain function.

Vitamin C – an antioxidant, vital to functioning of the adrenal glands, which will be under stress due to increased brain activity.

Vitamin E – also an antioxidant. Aids circulation, including brain circulation. Fights free radicals and improves the flow of oxygen throughout the body and brain.

Food sources of antioxidants: berries, especially blueberries, goji berries, sweet potatoes, tomatoes, spinach, broccoli, nuts and seeds, citrus fruits)

Vitamin B complex – Extremely important in the functioning of the central nervous system. Vitamin B3 improves circulation and is helpful for brain related disorders. Vitamin B6 is needed for normal brain function.

Vitamin B12 – is involved in maintenance of the myelin sheaths that cover and protect nerve endings.

Folic acid – a brain food vital for the health of the nervous system.

B vitamins and folic acid protect neurons by breaking down homocysteine, an amino acid that is toxic to nerve cells. They are also involved in making red blood cells, which carry oxygen.

Food sources of B vitamins: spinach and other dark leafy greens, broccoli, asparagus, strawberries, melons, legumes, citrus fruits.

Selenium – detoxifies the cells

Calcium – important in normal nerve impulse transmission.

Magnesium – to calm the nervous system

Zinc – protects the brain cells

Kelp or alfalfa – for necessary mineral balance

Boron – improves brain and memory function

Manganese – helps nourish the brain and nerves. Aids in the utilization of choline.

A probiotic supplement – to aid digestive function thereby making the uptake of nutrients more efficient

(Balch:2006:398-399 and 559-562)

The Biomedical Approach

According to the Biomedical approach, dietary intervention is a critical part of the “Biomedical” treatment of Autism, ADHD/ADD, OCD, PDD-NOS, RETTS, Aspergers, epilepsy, Dyspraxia, Dyslexia, Cerebellar Ataxia, Down Syndrome, schizophrenia and other neurodevelopmental disorders that result in learning delay and behavioural issues.

The biomedical approach has helped thousands of children improve in speech, language, socialization, behaviour, immunity, digestion and more. Biomedical intervention is also important in treating neurobiological illness such as chronic infections (ear, nose, throat, upper respiratory, urinary tract), allergies, eczema, food sensitivities, digestive disorders, anxiety, depression. Four key components in “Biomedical Intervention” must all be addressed for successful treatment. Diet helps immensely but it is not the only factor.

1. Dietary Intervention that includes restorative foods and eliminates harmful foods

2. Gastro Intestinal healing to improve digestive function to best absorb nutrients and effectively screen out toxins

3. Nutritional Medicine to support organ systems for improved metabolic, immunologic, neurologic and digestive function. Supplement are prescribed based on individual needs and include vitamins, minerals, amino acids, essential fatty acids

4. Detoxification of heavy metals (mercury, lead, arsenic…) and POPs (persistent organic pollutants like PCBs)

<http://mindd.org/serendipity/archives.php/48-Biomedical-Treatments.html>
May 27 08

Summary:
Diet: Dyslexic children usually perform better on a gluten-free diet. Also consider other potential foods that may cause allergies, such as dairy, peanuts and orange juice. Follow a healthy diet, majoring on natural foods, eliminating sugar and foods additives. Parents should set an example and keep problem foods out of the house.

Supplements: Children with dyslexia and A.D.D. have been shown to be deficient in EPA and DHA and will benefit from fish oil supplements. Dyslexic children are deficient in EPA and DHA because these oils are essential to eye and brain function including co-ordination, learning ability, memory and concentration. Because the brain of a dyslexic person works much harder than that of a non-dyslexic person, dyslexic children use up their dietary supply of these oils very rapidly, so need supplementation. The same would apply to vitamins and minerals, in particular B vitamins. Additional supplements will be required to support brain function, realizing that strenuous

brain activity uses up the body's supply of minerals and vitamins. Care should be taken to keep the body free of toxins, due to the tax that toxins have on the energy stores of the body. A regular detoxification supplement, or antioxidant will therefore be important. Fish oils should be guaranteed to be mercury-free, so as not to overload the body with heavy metals. Amino acids are extremely important to detoxify and clear the brain.

Finding no. 2: Dyslexia and exercise

Study:

A regimen of twice-daily physical exercise has enabled 40 UK school children to overcome dyslexia and rejoin mainstream lessons without requiring extra help in class. Twenty-five schools around the UK are now implementing the system following the success at Balsall Common Primary School, West Midlands.

Before the parents of a dyslexic pupil named Simon approached Balsall's headmaster, Trevor Davies, they "had tried various traditional treatments, both in school and with support agencies, but the lack of any real improvement saw them reach the end of their tether and they turned to me for help."

By searching the Internet, Davies found that the Dore Achievement Centre in Kenilworth, Warwicks, had been treating dyslexia with an exercise program they called DDAT - Dyslexia, Dyspraxia and Attention Disorder Treatment.

Davies put Simon on the program. Noting a sharp improvement in Simon's work and self-esteem, teachers collaborated with the University of Exeter to launch a wider study. They identified 40 Balsall students 7-10 years of age with moderate to acute learning difficulties commonly associated with dyslexia.

The 10-minute routines, conducted before and after school, involved getting children to stand on a cushion on one leg and then throw a beanbag from one hand to the other to improve coordination, or balance on a wobble-board (a board balanced on a ball or cylinder). They were designed to stimulate the cerebellum. The exercise group showed such a swift improvement that some teachers thought parents were doing the homework.

After six months the control group was also introduced into the exercise program so it too could benefit. The researchers re-screened the children after the treatment and all were shown to be free of dyslexic symptoms, not needing remedial help in school. Davies said pupils who also suffered from Attention Deficit Hyperactivity Disorder were helped as well.

<http://www.alternativementalhealth.com/Ezine/Ezine47.htm#article09 >

Summary:

Delayed cerebellar development can be aided by the practice of physical/motor sequences, a technique used with success in the Dore program.

In support of the previous article I have personally seen results using exercise-based therapy with children with reading difficulties. I have developed a series of exercises linked to action rhymes and actions involving left-right brain coordination and crossing the body's mid-line, e.g. passing left hand over mid-line to left knee; mirror image drawing. I have included some of these in the appendix. These kinds of activities not only improve the functioning of the cerebellum but also strengthen the corpus callosum, thereby improving the transmission of signals between the left and right brain. Developing both sides of the brain will contribute to a person's ability to by multi-skilled, both artistically and academically. Another area to consider may be the early physical milestones such as crawling. Missed stages may mean delayed cerebellar development and may be compensated for by exercises.

Finding no. 3: Classroom techniques
Suggestions to assist auditory and visual processing – all levels

- phonics
- memory building exercises
- auditory activities
- lighting modification to reduce pattern glare
- computer screen filter
- seating closer to front of class
- modification of worksheet – larger print size; colour paper
- eliminate need to copy from board
- reduce copying generally
- support visual tracking – use ruler beneath line of words being read

(McGill, 2004:18-20)

Multi-sensory learning

Pupils with dyslexia learn best when all the senses are used: auditory; oral; visual; tactile; kinesthetic (use of body and muscle actions to imprint memory). The following strategies can be used in multi-sensory learning:

- memory games and exercises involving following verbal instructions, memorizing rhymes, and looking for a missing object/ image
- multi-sensory teaching of letters, with special emphasis on vowel sounds. letters can be taught using colour and texture to track shape
- sequences of movements such as those in action songs and action rhymes
- strategies for remembering left and right
- minimizing the number of spelling words to learn. Some pupils may need to start with 3 at one time
- use of pictures to reinforce word meaning
- highlighting and underlining texts
- drawing and interpretation – flowcharts; mind maps; story maps; charts, graphs, tables

Suggestions for general approaches to raise self-esteem and motivation

- show understanding of pupil's problem
- discuss problems and find solutions
- for older pupils, discuss dyslexia and what it means
- identify strengths; point out that some famous people are dyslexic
- give reassurance
- deal with any bullying

(McGill, 2004:21)

Conclusion

Dyslexia is a condition which results from the under development of certain parts of the brain, namely the corpus callosum (for transmission of signals between hemispheres), the cerebellum (for balance and coordination) and the magno-cellular system, (which deals with our ability to see moving images). Hereditary is a major cause of dyslexia. However there is some evidence to show that delayed development of certain parts of the brain may be due to chemicals of antibodies passed from mother to foetus while in the womb. People with dyslexia will have a greater chance of improving their literacy and coordination skills if the problem is identified early (pre-school years), and if attention is given to all methods that have been proven to gain positive results. These are: language learning strategies, diet, nutritional supplements and exercises for coordination and strengthening the cerebellum and corpus callosum.

References

Books:

McGill, C, 2004, “Supporting Children with Dyslexia’, Hull Learning Services, U.K.

Balch, Phyllis A.,2006, Prescriptions for Nutritional Healing, 4th edition, Penguin, U.S.A.

Web sites:

<http://www.dyslexia.org> May 08

<http://www.myomancy.com/category/dyslexia> May 08<http://www.myomancy.com/2007/01/the_cerebellum_> May 08

<http://www.dyslexia-parent.com/mag24.html> John Bradford May 08

<http://news.bbc.co.uk/1/low/health/325537.stm> BBC News Online: Health

Thursday, April 22, 1999 Published at 07:35 GMT 08:35 UK

<http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6WNP-

<http://www.investigacion-> May 08

<psicopedagogica.org/revista/articulos/4/english/Art_4_45.pdf> May 08

<http://www.quizdoc.com/web-content/css/Pages/Treatments.html > May 08

<http://www.stevia.com/SteviaColumn.asp?ID=871> May 08<http://www.oilofpisces.com/attentiondeficitdisorder.html > Richardson, A.J. and Montgomery, P. The Oxford-Durham study: a randomized, controlled trial of dietary supplementation with fatty acids in children with developmental coordination disorder. Pediatrics, Vol. 115, May 2005, pp. 1360-66

<http://mindd.org/serendipity/archives.php/48-Biomedical-Treatments.html > May 27 08

<http://www.alternativementalhealth.com/Ezine/Ezine47.htm#article09 > May 08

Articles:

The Lancet September 9, 2000;356:912-913

Debé, Dr. Joseph A., Do you need a carbohydrate challenge? <www.drdebe.com>

<http://www.alternativementalhealth.com/Ezine/Ezine47.htm#article09 >