HealthSolutions

Nutrition & Dyslexia/Dyspraxia – What Works

INCREASE YOUR OMEGA 3 FATS

Children with dyslexia, dyspraxia and learning difficulties are very often deficient in these essential fats and/or the nutrients needed to properly utilise them, and the benefits of increasing the intake of these fats have been clearly documented in many studies. A high concentration of essential fats is needed in the eyes before they can manage the very rapid movements associated with vision.

A study of 97 dyslexic children by Dr Alex Richardson and colleagues at Hammersmith Hospital in London revealed that essential fat deficiency clearly contributes to the severity of dyslexic problems. Those children with the worst essential fat deficiencies showed significantly poorer reading and lower general ability than the non-deficient children.

The Oxford-Durham trial, involving 117 children between the age of 5 and 12, all of whom were attending mainstream school and met the criteria for DCD/dyspraxia, found significant improvements in reading, writing and symptoms of ADHD after 3 months of taking Brainsharp Omega 3 fish oil supplements from Eskimo containing the omega-3 oils EPA, DHA and the omega-6 oil GLA versus placebo.

If your child has some of the outward symptoms of essential fat deficiency - rough dry patches on the skin, cracked lips, dull or dry hair, soft or brittle nails, and excessive thirst - it is fair to say that this could be an underlying factor in learning difficulties they might be experiencing, such as concentration or visual problems, mood swings, disturbed sleep patterns and in some cases behavioural problems. This is because dyslexia, dyspraxia, learning difficulties and ADHD all involve poor nerve cell communications in the brain, and essential fats are crucial in keeping neurons talking to each other.

To test the value of supplementing essential fats in dyspraxia, Dr Jacqueline Stordy of the University of Surrey in the UK gave essential fat supplements containing DHA, EPA, AA and DGLA to 15 children whose performance on standardised measures of motor and coordination skills placed them in the bottom 1 per cent of the population. After 12 weeks of supplementation, they all showed significant improvements in manual dexterity, ball skills, balance and parental ratings of their dyspraxic symptoms.

Stordy also assessed the benefit of essential fat supplementation in dyslexia, and found that after just four weeks of supplementation with EPA and DHA, their night vision and dark adaptation (which are usually very poor in dyslexics) had completely normalised.

The Structure of Fats

Fats are composed of fatty acids and glycerol. All fatty acids are made of a spine of carbon atoms, each attached to a hydrogen atom. Hydrogen atoms repel water, giving fats their “fatty” quality. Fatty acids come in a large variety of lengths and structures. If every carbon atom has a hydrogen atom attached, the fatty acid is saturated. If some of the hydrogen atoms are missing and have been replaced by a double bond between

the carbon atoms, then the fatty acid is said to be unsaturated. Where there is one double bond, the fatty acid is known as a
monounsaturated fatty acid; where there is more than one double bond, the fatty acid is known as a polyunsaturated fatty acid. As a rough guide, saturates are solid at room temperature and tend to be derived from animal sources. Most unsaturated fats are liquid at room temperature and are usually vegetable fats.

Fat is an essential nutrient that performs a number of vital functions, however it has gained an unfortunate reputation. There are many different types of fat, and as always, 'everything in moderation' is key. The variety of fats present in foods can be roughly categorized as the good, the bad and the ugly.

The Functions of Fats

Fat is a rich source of energy, 1g of fat provides 37kJ (9kcal), more than double that provided by either protein or carbohydrate, which provide 17kJ/g (4kcal) and 16kJ/g (3.75kcal) respectively.

Fat keeps your body insulated

Fat carries the essential fat-soluble vitamins A, D, E and K.

Fat is the primary component of the protective layer around cells known as the cell membrane.

The essential fatty acids, alpha linolenic acid (*n-3*) and linoleic acid (*n-6*), have a number of roles - they are involved in regulating blood flow, blood vessel contraction, blood clotting, inflammation and immunity.

Cholesterol is a vital fat. It is required in cell membranes and it functions as the precursor of steroid hormones such as estrogen, testosterone, the stress hormone cortisol and vitamin D.

The Good

The "good" fats are those that are essential to health. Alpha linolenic acid (*n-3,* ALA) and linoleic acid (*n-6,* LA) are both good fats used to synthesise EPA (eicosapentanoic acid) / DHA (docosaheixanoic acid) and AA (arachidonic acid) respectively. There fats are all polyunsaturated fatty acids.
DHA and EPA are found only in oily fish and certain marine algae, whereas ALA is found in flaxseeds, hemp seeds and walnuts. AA is found in meats and LA is found in vegetable oils.
The sources of fat in the typical modern diet are predominantly meat, dairy and processed foods while fish consumption is low. As a result, deficiency of omega-3 fats and excess of omega-6 fatty acids is widespread.
These fats are crucial. 60% of the dry weight of the brain is composed of fatty tissue; with one third of this fatty tissue made up of DHA and AA. DHA has six carbon bonds making it the most curved and flexible of all fats. The structure of the fatty acids in the cell membrane determine its fluidity; and so it is the brain's requirement for a highly flexible membrane that makes DHA so crucial. Where DHA is lacking, it

will be substituted with DPA, an omega-6, and membrane fluidity will decrease. The less flexible the membrane, the less speedily messages will be transmitted between neurons. DHA is essential, because it not only increases the speed at which nerve messages are sent by improving membrane fluidity, but also by forming a large part of the myelin sheath (a fatty insulation layer) which functions to speed up nerve impulse (messages) transmission time. It also promotes the excitability of the membrane, increases neurotransmitter function and reduces neuronal damage.

EPA is important as the precursor to prostaglandin PG3. Prostaglandins are hormone-like substances that affect blood flow, blood vessel contraction, blood clotting, inflammation and immunity. PG3 is anti-inflammatory and favourably affects blood viscosity (i.e. prevent clotting) and thus blood flow. By contrast, prostaglandins (PG2) derived from omega-6 fatty acids stimulate the immune system and aid the formation of blood clots.
The omega-9 monounsaturated fats, found in olive oil and avocadoes, although not essential, are regarded as “good fats”.
A great deal of research data is now available indicating that sole use or excess intake of omega-6 rich vegetable oils is actually detrimental to health For optimal health the diet should be rich in antioxidants from fruit, vegetables, green tea and
cocoa and provide a ratio of 4:1 or for inflammatory disorders even 1:1 omega-6 to omega-3 content. The average diet provides a ratio of between 10 and 20:1 – this relative excess of omega-6 is thought to be an important contributory factor to the epidemic of chronic disease including cardiovascular disease, type 2 diabetes, obesity and other inflammatory disorders.

The Bad

These are the saturated fats - fats that have no essential function but are natural and are not at all harmful unless eaten in excess. Saturates are found in dairy (especially butter, cream and Greek yogurt), meat and in palm, cotton and coconut oils.
Excess consumption of saturated fat is hypothesized to increase the risk of heart disease, although the mechanisms are not fully understood.
Coconut oil is an exceptional case. It is the richest source (other than mothers milk) of lauric acid, a medium chain saturated fatty acid that appears to have antimicrobial, antiviral and immune enhancing properties as well as favorable effects on cardiovascular risk profile.

The Ugly

The bad fats, that are prudent to avoid entirely, are trans fats. Trans fats are created by adding hydrogen to vegetable oil - a process called hydrogenation. They are more solid than oil, making them less likely to spoil, giving manufactured foods a longer shelf life. Their negative impact on health is startling: they increase “bad” LDL cholesterol while decreasing “good”
HDL cholesterol. The human lipase enzyme, which breaks down fats, is ineffective with the trans configuration, so trans fats remain in the blood stream for a much longer period of time and are more prone to being deposited in arteries. Recent work has linked intake of trans fats to an increased risk of fetal loss.
Commercial baked goods — such as biscuits, confectionary and cakes — and many manufactured fried foods such chips, crisps and burgers — contain trans fats.

Shortenings and some margarines also are high in trans fat. Foods with hydrogenated vegetable oil listed on the label contain trans fats.

Cholesterol - The Jekyll and Hyde Fat

Cholesterol is essential for normal functioning of the body. It is synthesized in many cells, mainly the liver. Low cholesterol is associated with premature death and memory decline. Dietary intake of cholesterol does not affect cholesterol levels, as when dietary intake is low the body will simply upregulate cholesterol synthesis. At present it is regarded as fact that elevated concentrations of oxidized LDL particles, especially "small dense LDL" (sdLDL) particles, are associated with the formation of atheroma (fatty deposits) in the walls of arteries, a condition known as *atherosclerosis*, the principal cause of coronary heart disease and other forms of cardiovascular disease (CVD). Total cholesterol does not appear to be linked with CVD; and a high ratio of HDL to LDL, independent of total cholesterol, appears to be protective.

Cooking and Fats

All oils will oxidize and hydrogenate to a very minor degree if repeatedly heated to very high temperatures such as in commercial frying operations, but this is unlikely to affect home cooking. Polyunsaturated fats, due to their structure, are highly vulnerable to oxidation, and are therefore not ideal for cooking at high temperatures. Studies have shown that oxidation and hydrogenation occurs to a lesser degree in Rapeseed oil than in other oils. Saturated fats are entirely stable in high temperatures and therefore using butter to cook at these temperatures is often preferable to olive oil.

Recommended Intake

Children ages 6 -10 with normal activity levels, eating a diet providing the recommended 1,800kcal. No more than 20g of saturated fat should be in the diet. As a general guide, about 30-35% of daily calorie intake should be from fat. The best sources are oily fish, avocadoes, nuts and seeds, eggs, olive oil and sensible amounts of quality meat and dairy (including butter).
The confusion surrounding the role of dietary fat in heart disease has created an unjustified fear of fat consumption. Fats are an important part of the diet and provided overall calorie intake is appropriate and the diet high quality, fat consumption will enhance, rather than damage, children's health.

Side effects of Fish Oil Supplements? Rarely causes loose stools in sensitive individuals if you start on too high a dose.

Contraindications with medication? Essential fats may have a 'blood-thinning' effect and should not be mixed with 'blood thinning' medication.

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GENOVA DIAGNOSTICS STUDY: INTESTINAL BACTERIA IN CHILDREN WITH DYSLEXIA

Urinary amino acid test and Genova Diagnostics faecal microbiology test was performed on 86 children with dyslexia. Results indicated a marked change in both the amino acids metabolism and the normal intestinal bacteria usually found in the large intestine of healthy individual.

A healthy gastrointestinal tract is one that has a particular set of bacteria living within it. Normally it is difficult to change the number and type of these healthy bacteria and they are remarkably stable over many different populations around the world, even though we live in different environments and eat different diets. It is becoming widely recognised that alterations in these bacteria can influence our health. This is because bacteria in our digestive tract produce many types of vitamins and nutrients/chemicals that help our bodies to remain healthy. On the other hand it is possible that if these bacteria are not normally distributed, chemicals that are not helpful to maintaining our health might be produced in larger amounts and have a detrimental influence on us. That is why so many bacterial supplements are now available, like *Lactobacillus acidophilus* and *Bifidobacterium*, in order to try and keep our intestinal tract healthy when under stress or suffering from particular illnesses.

Aerobic and anaerobic bacteria

There are two main classes of bacteria in our large intestines: aerobic bacteria, which need some oxygen to survive, and anaerobic bacteria, which will die in the presence of oxygen. The most common aerobic bacteria, or aerobe, found in healthy individuals is *Escherichia coli* (*E.coli*) and it accounts for around 80-90% of all the aerobic bacteria. The second most common aerobe is *Enterococcus*, although it is a lot less common than *E.coli* at an average of 5% in the Gut. In Genova's study of dyslexia the average amount of *E.coli* was found to be quite low at approx. 56% compared to the normal 90-95%. In about 22% of the children the amount of *E.coli* was actually less than 10% which is quite an incredible finding if you are a microbiology scientist.

There were also abnormal elevations in the amount of *Enterococcus* found in the faeces. This was found to be as high as 40% in children with dyslexia compared to the average of 5% in normal, healthy individuals. In approx. 19% of the children the *Enterococcus* had almost completely swapped places with *E.coli*, being present at more than 95% of the aerobic bacteria.

Changes to the anaerobes, or bacteria that don't like oxygen, were evident. Normally, *Bacteroides* and *Bifidobacteria* are the most abundant anaerobic bacteria in our large bowel. What the study found was a significant decrease in *Bacteroides*, and an increase in the number of *Bifidobacteria* in the children's intestines compared to healthy control subjects

What does this mean for the treatment of children with dyslexia?

Health practitioners can utilise the amino acid Urine test and the Genova Diagnostics faecal tests to help identify alterations in microbiology and digestive capacity. The nature of tests results can provide avenues for the identification of treatment protocols that may involve; (a) normalisation of the gastrointestinal bacteria through use of specific antibiotics, replacement bacteria and nutritional supplementation (e.g. very specific probiotics and prebiotics); (b) supplementation with individualised amino-acid supplements based on deficiencies of amino acids found in the urine test and; (c) supplementation with digestive enzymes, electrolytes, and essential elements to help impaired digestion and metabolism.

A fatty acid profile is also available where we can look at the exact ratio of fatty acids in each child.

Tests repeated over time can build a picture of changes that might occur with treatment and whether any significant improvements are seen in the bodily state. Doctors involved in the management of children with dyslexia utilising the testing expertise of Genova Diagnostics for clinical treatments are reporting positive gains in both behavioural and other symptom complaints.