TRACE ELEMENTS, INC.
Newsletter
1984 20th ANNIVERSARY 2004
VOLUME 15 JULY/AUGUST 2004 NUMBER 3

Fibromyalgia
A Metabolic Profile

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Fibromyalgia (FM) is classified as a musculo-skeletal condition accompanied by extensive aching, stiffness, fatigue, sleep disturbance and pain along with psychological changes including anxiety and depression. The nervous, endocrine and immune systems are thought to be involved. The condition is estimated to affect 3 to 6 million people and is found predominantly in women in the 25-50 year age group.

FM has many symptoms similar to chronic fatigue syndrome (CFS). The notable differences found in patients with FM are localized tender points in certain muscles and their insertion points. Pain in these points can be mild to severe and include approximately 18 points. Individuals are considered to have FM if 11 out of the 18 points are sensitive.

Hair samples from 20 patients who were diagnosed according to the American College of Rheumatology 1990 classification for fibromyalgia were sent to our lab for mineral analysis. Samples were prepared and analyzed according to procedures established at TEI in 1994.

Review of the laboratory results on selected samples revealed the following:

Parasympathetic Mineral Pattern
Average Calcium / Magnesium Ratio = 12 (mean 7)
Average Calcium / Potassium Ratio = 10 (mean 4.2)
Average Zinc / Copper Ratio = 5.7 (mean 8)
Average Sodium / Magnesium Ratio = 2 (Mean 4)

Impression:

The Parasympathetic mineral pattern is associated with a lowered metabolic rate and tendency toward reduced thyroid and adrenal activity as well as a cellular immune response. These findings are very similar to hair tissue mineral analysis patterns (HTMA) found in patients diagnosed with CFS and could account for the overall fatigue and depression commonly found in both conditions.

Magnesium (Mg)

A relative magnesium deficiency exists in relation to calcium. This mineral dis-relationship alone could account for a number of problems related to the manifestation of FM. First, an elevated Ca/Mg ratio in the parasympathetic dominant HTMA pattern is associated with a parathyroid (PTH) dominance. This in turn would affect the tissue distribution of calcium, and particularly affect muscular function. An increase in the tissue concentration of calcium would result in a continuous contraction of the musculature. The result would lead to a local hypoxia and shortening of sarcoplasmic reticulum (SR). A chronic shortening of the SR increases metabolic demand with a resultant increase in lactic acid production. This alone could lead to the painful musculature and tender trigger points. However, studies of FM patients have found an increase in pyruvates which could be a factor causing the muscle tender points in that group. Interestingly, studies of patients with hypothyroidism show a similar finding as in patients with FM.

Zinc / Copper (Zn/Cu) Disturbance

At TEI we have developed the recognition of many health conditions as seen through HTMA patterns. One condition associated with an elevated copper and or a reduced Zn/Cu ratio in the parasympathetic mineral pattern is either a previous viral episode and/or a predisposition toward viral susceptibility. This same pattern is again seen in patients suffering from CFS. Therefore, it is possible that FM, as well as CFS, could be triggered by a virus. This would produce an increased cellular immune response that could become chronic thereby, initiating an auto-immune condition.

Iron (Fe), Manganese (Mn), Chromium (Cr)

Other observations include iron, manganese and chromium deficits in the FM group. Anemia was not a common finding in the FM group and although a low hair iron does not necessarily indicate the presence of clinical iron deficiency such as anemia, a tendency would exist. Symptoms of iron deficiency without anemia (sideropenia) are common and serum indications may not manifest until iron stores are markedly depleted. Iron is involved in a number of biochemical processes other than its incorporation into hemoglobin. Iron's involvement in electron transport through cytochromes in the Krebs cycle, oxidases oxygenases make it an important cellular element. Therefore, sideropenia may contribute to a number of symptoms that are briefly reviewed;

Symptoms of Sideropenia

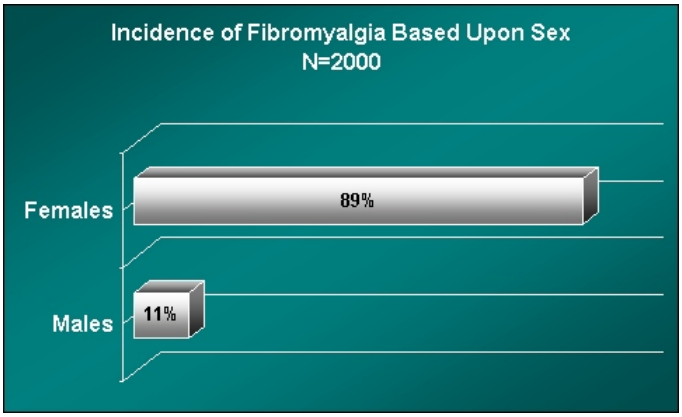
Hypothyroidism – Conversion of L-phenylalanine to L-tyrosine reduced.
Neurological – Reduced MAO with increased dopamine, serotonin and Norephinephrine.
Dysphagia – Plummer Vinson Syndrome.
Immuno-deficiency – Humoral. Viral infections,candidiasis.
Cephalgia - Intercranial pressure.

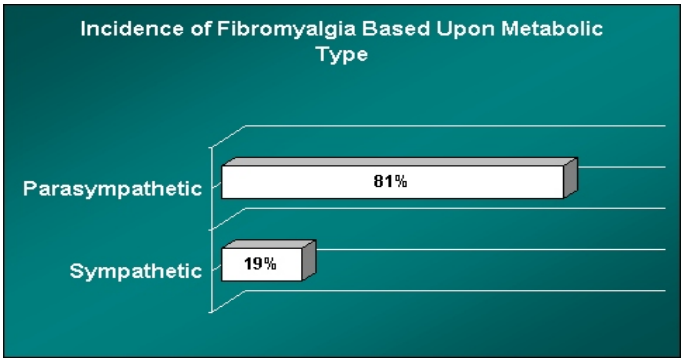
Factors contributing to sideropenia include; physiological losses, parasites, infections, vitamin deficiencies, achlorhydria, heavy metals.

Manganese is also important in cellular function, particularly in the mitochondria, and activates numerous enzymes such as, hydrolases, transferases, kinases, decarboxylases, superoxide dismutase, arginase, and catalyzes the conversion of pyruvates to oxaloacetate. Manganese is also required for normal thyroid function (thyroxin). Disturbance in carbohydrate metabolism is associated with manganese deficiency due to decreased glycosyltransferase activity as well as being involved in collagen disorders.

Chromium is an important constituent in cell membranes, acting as a metaloenzyme receptor for insulin. Low hair chromium levels have been well documented in individuals suffering from carbohydrate metabolism disturbances, as well as diabetes.

HTMA studies from our database performed on patients reported to have fibromyalgia show the following sex and metabolic characteristics;





Conclusion:

Certainly there is more involved in FM than can be discussed in this brief summary. However in viewing HTMA patterns of patients diagnosed with FM we can see the multiple nutritional imbalances as well as view the neuro-endocrine involvement.

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Vitamin D Deficiency and Multiple Sclerosis

It is known that multiple sclerosis (MS) occurs more often in individuals living in areas far from the equator where less sunlight is available. It has also been found in other studies that people who develop MS are low or deficient in vitamin D. A large study involving over 187,000 women spanning a 20-year period has now been found to reinforce these earlier findings as more women developed MS in the low vitamin D group compared to those adequate in vitamin D intake. Vitamin D and Multiple Sclerosis. Sci. News. 165,5 2004.

Over the years, our HTMA studies have shown that in one form of MS, there is an increased need for vitamin D and not only a deficiency of vitamin D, but a calcium deficit as well. In fact, typically in groups diagnosed with MS, a corresponding copper deficiency is also present. For further information see TEI Newsletter, Multiple Sclerosis True Or False. Vol.6,1, 1993.

Fructose, Weight Gain, Diabetes

Fructose is preferentially metabolized to lipids in the liver and is known to contribute to insulin resistance and therefore, may contribute to Metabolic Syndrome X. High fructose diets have been shown to produce hypertension in animals while reducing the production of leptin and insulin. Fructose, Weight Gain, And The Insulin Resistance Syndrome. Elliott, S., et al. Am.J.Clin.Nutr. 76,5, 2002

The metabolic effect of fructose in humans is unclear. However, HTMA studies may shed light on how high fructose intake can be detrimental for some individuals and not for others. Typically, we recommend the avoidance of fructose in Fast Metabolic Types. The reason for this is that fructose is well known to antagonize the mineral copper that is typically low in sympathetic types. Sympathetic types have the "apple-shaped" body structure indicating increased central adipose deposition, which is associated with high adrenal hormone (cortisol) production. It is also associated with increased thyroid activity contributing to an accelerated metabolic rate. Both the adrenal cortical steroids and the thyroid hormones have an antagonistic effect upon insulin production. Copper deficiency is associated with this metabolic pattern and in fact can help lower an accelerated metabolic rate by the minerals' effect upon thyroid and adrenal function, calcium retention, and vitamin D metabolism. Fructose can exaggerate a copper deficiency contributing to increased adrenal and thyroid activity resulting in insulin resistance and can contribute to central obesity due to increased levels of active cortisol.

Infections and Obesity

Researchers at the University of Wisconsin in Madison analyzed the blood of almost 200 individuals for antibodies to the adenovirus (AD-36), a virus known to cause obesity in animal models. Forty-five of the participants were lean and the other 154 were obese. Antibodies to the AD-36 virus were not found in any of the lean individuals, but approximately fifteen percent of the obese individuals were positive. How the virus contributes to obesity is unknown, but data from animal studies show that obesity associated with the virus is not associated with any apparent increase in food intake. Fat Is An Infectious Issue, Say Researchers. Lancet, 349, 1997.

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