

NEWS UPDATES - FOR THE HEALTHCARE PROFESSIONAL

January - December 2009

Copper Deficiency and Neurological Disturbance caused by Denture Cream use

Induced copper deficiency has been reported in a number of patients using denture cream. Symptoms ranged from neurological disorders causing ataxia, sensory loss, paresthesia, myeloneuropathy, and anemia. The patients wore dentures and used denture adhesive for many years. The patient's serum zinc levels were elevated with low copper levels. Their denture cream came under suspicion as a source of zinc when no other source of high zinc intake could be identified. Analysis of the denture creams revealed zinc concentrations from 17,000 to 34,000 mcg. With discontinuation of the creams the serum zinc levels returned to normal. Copper supplementation resulted in neurological improvements. *Spain, RI, et al. When Metals Compete: A Case of Copper-Deficiency Myeloneuropathy and Anemia. Nat.Clin.Pract.Neurol. 5,2, 2009. Nations, SP, et al. Denture Cream: An Unusual Source of Excess Zinc, Leading to Hypocupremia and Neurological Disease. Neurol. 71,9 2008.*

Hair Mineral Patterns in Patients with Schizophrenia

This study was performed to determine the trace element concentration in the hair of schizophrenic patients and the relationship between trace element levels and nutritional status and socioeconomic factors. Thirty patients and thirty controls were used. The findings revealed that in schizophrenic patients, hair concentrations of zinc and calcium were significantly decreased and the concentration of copper and cadmium were significantly increased, compared to controls. Imbalances in the optimum levels of trace elements may adversely affect the biological process and are associated with many disease processes. *Rahman, A. et al. Zinc, Manganese, Calcium, Copper and Cadmium Level in Scalp Hair Samples of Schizophrenic Patients. Biol.Trace Elem. Res. 127,2, 2009.*

Mercury and the Thyroid

Tissue activation and inactivation of thyroid hormone in the brain, liver and other tissues is controlled by the deiodinases. Selenium is essential for deiodinase activity. Selenium is also sensitive to the amount of mercury present in the tissues and when deficient may alter neurodevelopment. Animal studies have shown that mercury accumulates in the thyroid gland and other tissues and binds with selenium. Mercury induced neurotoxicity is contributed to by a number of effects, producing inhibition of DNA, RNA and protein synthesis, increasing intracellular calcium accumulation causing a disturbance in neurotransmitter function, increases in oxidative stress and altering glutamate homeostasis. It can be surmised that mercury inhibits

thyroid hormone synthesis, secretion and metabolism and can lead to deficits in neurodevelopment associated with gestational mercury exposure. *Soldin, OP, et al. Thyroid Hormones and Methylmercury Toxicity. Biol. Trace Elem. Res. 126,1, 2009.*

Arsenic and the Thyroid

Arsenic is known to interfere with normal thyroid function due to inhibition of thyroid peroxidase (TPO) activity in vitro. The minimal amount of arsenic trioxide inhibition of TPO in vitro was found to be between 0.1 and 1 parts per million. *Palazzolo, DL, Jansen, KP. The Minimal Arsenic Concentration Required to Inhibit the Activity of Thyroid Peroxidase Activity In Vitro. Biol. Trace Elem. Res. 126,1,2009.*

Selenium and Autoimmune Thyroiditis

Hashimoto's disease is an autoimmune condition and is associated with increased anti-thyroid peroxidase antibodies (TPOAb). Selenium supplementation in conjunction with L-thyroxine therapy significantly reduced TPOAb levels and did not adversely affect thyroid hormone metabolism. Other studies have shown selenium supplementation also reduced TPOAb activity, thyroid inflammatory activity and decreased the incidence of postpartum hypothyroidism. *Zagrodzki, P, Ratajczak, R. Selenium Supplementation in Autoimmune Thyroiditis Female Patient – Effects on Thyroid and Ovarian Functions (Case Study). Biol. Trace Elem. Res. 126,1 2009.*

Magnesium and Prevention of Cerebral Palsy

Magnesium's neuro-protective effect was demonstrated by the use of magnesium sulfate before preterm birth for the prevention of cerebral palsy. Rouse, et al demonstrated that magnesium significantly reduced the rate of mild, moderate and severe cerebral palsy. *Rouse, DJ, et al. A randomized, controlled trial of magnesium sulfate for the prevention of cerebral palsy. N.E.J.M. 359, 2008.*

Magnesium Deficiency and Cartilage Calcification

The New England Journal of Medicine reported the case of a fifty year old woman who had a history of chronic pain with intermittent acute episodes. Laboratory tests revealed her serum magnesium level to be 0.9 milligram per deciliter, well below the normal range of 1.6 to 2.5. Her urinary magnesium excretion was also elevated. Radiographs showed chondrocalcinosis of the knee and wrist joints. Chronic magnesium deficiency is associated with osteoarthritis due to calcium deposition within the joints and can be treated with magnesium supplementation. *Ellman, MH. Chondrocalcinosis and Hypomagnesaemia. N.E.J.M. 360,1, 2009.*

Lead Toxicity - Five Years Later

Ballardie, et al. reported the case of a war veteran presenting symptoms of abdominal cramps, morning stiffness, fatigue and paraesthesia with myoclonic jerks that progressed over a period of several years. Blood lead levels were not elevated, but symptoms of heavy metal poisoning were present. Biopsies showed abnormal mitochondria in liver and kidney tissues. Analysis of these tissues revealed lead and uranium levels up to one hundred times higher than controls. For this individual, chelation therapy to date has resulted in the removal of twelve milligrams of lead, which is twenty times higher than the amount required for toxicity. This study shows that blood levels of heavy metals after exposure do not adequately reflect tissue concentrations and that symptoms can persist years after an exposure. *Ballardie, FW, et al. A man who brought the war home with him. Lancet, 372,2008.*

Connection Of Bone To The Brain

Yadave, et al. recently discussed the deleterious effect of the neurotransmitter serotonin produced in the intestine by low-density lipoprotein receptor-related protein 5 on bone mass. Animal studies have shown that leptin plays a significant role in bone formation by activation of sympathetic signals through a hypothalamic relay, rather than through endocrine or paracrine pathways in the skeleton. Several studies have suggested that depression may be associated with low bone mass and the use of selective serotonin reuptake inhibitors (SSRI's) is associated with twice the yearly rate of bone loss than compared to other antidepressant drugs. Several studies have demonstrated the neurotransmitter receptors are present in osteoblasts and that beta-adrenergic receptors activity can trigger these receptors and contribute to bone loss.

Other studies have been reported that depression and anxiety can affect bone mass and density in adolescent females. *Rosen, CJ. Serotonin Rising-The Bone, Brain, Bowel Connection. N.E.J.M. 360,10, 2009. Dorn, LD, et al. J.A.M.A. 301,7, 2009.*

Loss Of Sight and Sound. Could It Be The Hip?

A case report of a fifty-eight year old woman who developed hearing loss, blindness and other neurological symptoms was presented in the Lancet. Laboratory results ruled out infectious, neoplastic, metabolic and immunological disease. A diagnosis of multi-neuropathy related to immune-mediated vasculitis was presumed to be the cause. However, no response was noted after two months of treatment. The case was then referred to toxicology for further investigations. Tests found exceedingly high levels of cobalt and chromium in several biological samples including urine, blood, plasma and cerebral spinal fluid. Chelation therapy was initiated but symptomatic improvements were negligible. The patient had undergone hip replacement in 2001 and was revised in 2006 due to rupture of the ceramic head. Therefore, investigators resected the arthroplasty and found extensive metal infiltration in the tissues and muscles around the prosthesis as well as extensive wear of the head neck. The prosthesis was removed and the patient began showing improvement. Levels of cobalt and chromium remained high. Excessive cobalt is known to contribute to neurological conditions and can induce hypoxia-like effects due to disturbing normal mitochondria function. Investigators suggest careful neurological and

toxicological examinations be recommended in patients who have had metallic prosthesis and who complain of visual loss, hearing disturbances, weakness of the extremities and paraesthesia. *Rizzetti, MC, et al. Loss of sight and sound. Could it be the hip? Lancet. 373, 2009.*

Soy Intake and Reduced Sperm Production

High isoflavones intake is known to be related to reduce fertility in animal studies. However, recently a study was undertaken to look at the possible effects in humans. Studies were done at the Massachusetts General Hospital Fertility Center and included ninety-nine men. Their soy-based food intake was assessed over three months following semen analysis. The results found an inverse association between soy food intake and sperm concentrations. Men with the highest soy intake were found to have a reduction in sperm production, 41 million sperm/ml, than men who did not consume a high soy diet. *Chavarro, JG, et al. Human Reproduction. <http://humrep.oxfordjournals.org/cgi/content/abstract/den243v1>. 2008.*

Stress-Induced Control of Hypoglycemia

This case report involves a fifty-nine year old male who would experience periodic symptoms of malaise, fatigue and anxiety with hypoglycemia symptoms including paraesthesia muscular weakness of the extremities. However, the symptoms were intermittent and seemed to only occur when he was away from his work environment. Even though his laboratory tests showed a low blood sugar with serum glucose ranging from 45 to 50 mg/dL, he was not symptomatic. When he took time off from work for other tests his blood sugar dropped to 16 mg/dL, along with a significant rise in insulin and C peptide levels. Eventually a CT scan revealed an insulinoma on the caudal portion of the pancreas. Apparently his high stress work environment provided enough of an increase in cortisol production to compensate and actually acted as a protective mechanism by increasing his resistance to the excess insulin production. When he took time away from work this protective stress-induced hypercortisolism was not activated. *Skorkowska-Telichowska, K, et al. Holiday Insulinoma. The Endocrinol. 19,2, 2009.*

Diabetes Develops Years Before Clinical Diagnosis

Recently, European researchers performed a prospective study involving over 6,000 British civil servants who did not have diabetes. A median follow-up at ten years found over 500 cases of individuals now diagnosed with Type 2 diabetes. It was found that blood glucose levels increased and insulin sensitivity decreased three to six years before the diagnosis. It was also found that beta-cell function increased in order to compensate for increased glucose levels four years before diagnosis. The researchers concluded that prevention would be more effective before the glucose and insulin levels became unstable and that more research is needed to identify those at this early stage of development. *The World in Medicine. Foreshadowing Diabetes. JAMA 302,2, 2009.*

Comment: Many health problems begin years before they become clinical. The early signs and symptoms may be minor or sub-clinical and therefore, go undetected until they fully manifest. As stated by the authors “more research is needed to successfully identify people at an early stage.” The value of HTMA is that it has predictive value for identifying underlying and subclinical trends in nutritional imbalances that are associated with many chronic degenerative health conditions. HTMA can be a significant valuable tool for detecting early changes, as well as provide information for effective prevention.

Diabetes, and ITP Caused by Helicobacter Pylori

This is a very interesting case study involving a gentleman who was admitted to a hospital with cold sweats and shivering. Eventually they found his HbA elevated along with low platelets. Despite treatment with antidiabetic agents his HbA continued to rise and he was experiencing recurring hypoglycemic episodes. Even though antibodies against insulin were not found, they did however detect antibodies against insulin receptors. The patient was eventually diagnosed with Type B insulin resistance syndrome. They also found antibodies against platelets since his platelets continued to drop. Eventually they discovered that the patient had helicobacter pylori (H pylori) infection. Upon appropriate treatment and eradication of the H pylori the patient’s platelet level returned to normal along with a reduction in HbA and normalization of his insulin level. After six months, antibodies against insulin receptors were no longer detectable and the patient no longer required glucose regulating drugs. *Case Report. Eradication of insulin resistance. Imai, J, et al. Lancet 374, 2009.*

Comment: H. pylorus is estimated to affect half the world’s population being more prevalent in less developed countries. However, it is also estimated to affect over twenty-five percent of the population in developed countries. H pylori is related not only to gastritis, ulcers and gastric cancer but may also be related to immunological disorders, such as diabetes and rheumatoid arthritis. HTMA studies have shown that a chronic elevation of the sodium/potassium (Na/K) ratio (greater than or equal to 5:1) is associated with inflammation. Often the inflammation is associated with gastritis and therefore, may be associated with H pylori infection, as H pylorus is known to cause a chronic low-level inflammatory response. Tests for confirming H pylori include; biopsy, carbon urea breath test, blood antibody, or stool antigen tests. H Pylori is commonly found in individuals with low hydrochloric acid production. Recent studies have shown that consumption of broccoli sprouts can reduce H pylori colonies in the stomach by forty percent.

Antacids and Pneumonia

It is interesting that observational studies reported in J.A.M.A. found that the use of acid suppressing medications such as proton pump inhibitors (PPI’s) increased the risk for hospital-acquired pneumonia. Records of about sixty-four thousand patients hospitalized over a three to four day period revealed that hospital-acquired pneumonia was significantly more common in those receiving acid suppressing drugs compared to those not using the drugs. Apparently about half of the patients in the group were receiving acid suppressors. *Acid-Suppressive Medications*

Linked to Increased for Hospital-Acquired Pneumonia. Fairchild, DG. Physician. Physician's First Watch, May 27, 2009.

Comment: Normal HCl is not only necessary for digestion but also acts as a barrier to microorganisms entering the body. It also impacts the pH of the body and when deficient causes a shift of the pH toward the alkaline side. Alkalinity enhances the predisposition for viral susceptibility as well as bacterial colonization in the stomach or small intestine. As stated in the previous paragraph, H Pylori colonization can contribute to autoimmune responses related to diabetes and possibly other health conditions.

Hair Mineral Patterns and Goiter

This study explored the relationship between the local mineral geology of residence and whether these local minerals could be related to thyroid disorders. Researchers found that “The geologic-geomorphological factors of the habitat, such as geological formations (mineral composition, structure, the degree of rock metamorphism), tectonics, the history of geological development, relief, paleorelief, were found to be of considerable importance in the formation of the human trace element status. Both deficiency and excess of trace elements was shown to be of pathogenetic value in the development of thyroid disease.” They found that residences located in areas of carbonate rocks were particularly vulnerable to thyroid disease. *Hair Trace Elements in Patients with Goiter. Farkhutdinova, LM, et al. Klin Lab Diagn. Aug. (8) 2006.*

Comment: From HTMA studies we have also found a relationship between geographical areas around the world that are associated with HTMA patterns and disease susceptibility. Dr.I Rosborg and colleagues from the Department of Occupational and Environmental Medicine at Lund University found in 2003 that the mineral concentrations differed in groups residing in acid and alkaline regions in southern Sweden. They found that hair calcium levels were higher in groups living in alkaline areas compared to those living in acid regions. This helps to support the above study in that it is well known that excess calcium accumulation is associated with hypothyroidism via HTMA studies.

Hair Mineral Patterns and Metabolic Syndrome X

Researchers to the Ajou University in Suwon, South Korea studied the hair mineral patterns of over three-hundred individuals. After performing cross-sectional analysis for the relationship between mineral patterns and metabolic syndrome, they found that hair calcium, magnesium and copper levels were significantly lower in the group with metabolic syndrome compared to levels found in normal groups. Sodium and potassium levels were higher in the affected group. Their report concluded, “As part of the metabolic syndrome, the optimal calcium and magnesium concentrations in hair tissue may reflect decreased risk of metabolic syndrome.” *Hair Tissue Mineral Analysis and Metabolic Syndrome. Park, SB, et al. Biol.Trace Elem.Res. 130,3, 2009.*

Comment: This study adds support to our findings that Sympathetic mineral patterns may be indicative of, and/or increases the risk for the development of metabolic syndrome. For more

information see the TEI Newsletter Vol. 17, 1-2, Jan-Apr.2007, Metabolic Syndrome X – As Defined Through Hair Tissue Mineral Analysis (HTMA) Patterns.

New Retrovirus Is Associated with Chronic Fatigue Syndrome. Could a human retrovirus be one cause of CFS?

Chronic fatigue syndrome (CFS) has often been classified as a psychiatric condition. Yet latent viruses have been shown to be related to the symptoms of the condition including, metabolic abnormalities, as well as neurological and immune disorders.

Various medical institutions in the United States reported that they have identified DNA from a recently discovered human retrovirus, XMRV, in 67% of patients with CFS versus 4% of healthy controls. Many CFS patients, but few healthy controls, had both viral nucleic acid and viral proteins in multiple types of white blood cells, and antibodies to the virus were prevalent in CFS patients. When uninfected human cells were placed in culture with white blood cells from CFS patients, the previously uninfected cells became infected. *A. L. Komaroff, MD Published in Journal Watch General Medicine October 22, 2009*

Comment: Over the years, we have often discussed the role of underlying viruses being associated with a number of health conditions including CFS. Dormant virus can become activated by superimposition of other viruses, stress, nutritional imbalance, disease, etc. As dormant viruses become active, they initiate an increased activity of the cellular immune system, thereby producing a sub-clinical autoimmune response. This in turn brings about changes in the neuro-endocrine web that can contribute to the many symptoms associated with CFS. Viral infections also increase intracellular calcium accumulation. Excess calcium accumulation in the cell will activate dormant virus that may be present.

Diet and Violence

Bernard Gesch is a nutrition and criminology researcher at the University of Oxford. He can certainly be considered a forward thinker and has taken his hypothesis of improving diet to reduce violence into the mainstream by applying his ideas to prison inmates. In 2002 he published the results of a double-blind trial involving over two-hundred prisoners in Aylesbury, England. His study revealed that those who received nutritional supplements had significantly fewer incidences of violent acts compared with a placebo group. In fact, violent acts were reduced thirty-five percent in the supplement group. With more significant funding Gesch has now begun an even larger and more ambitious three year study involving over one-thousand prisoners in three prisons in the U.K. *The Theory? Diet Causes Violence. The Lab? Prison. Bohannon, J. Sci. Vol 325. Sept. 2009.*

Comment: As stated by Gesch, “the idea of a link between diet and antisocial behavior is not new. As far back as 1892, the Italian criminologist Cesare Lombroso reported that many bomb-throwing terrorists suffered from pellagra.” Other researchers such as Pauling, Hoffer, Osmond, Shaus and others have also written about the relationship between nutrients and psychiatric conditions, as well as diet and behavior. However, Gesch’s study is well designed, and extensive.

It has government backing as well as substantial funding for a properly designed trial. His earlier studies have shown the significant importance of nutrition in regards to violent behavior, and which may help bring attention to the poor diets not only found in prisons throughout the world, but in schools, hospitals and disadvantaged young people living in poor neighborhoods.

Cancer and Hair Mineral Patterns

Metallomics can be described as a field that studies bio metals. A metallomic study was published exploring metals or minerals in relationship to cancer risks. The study included tests of twenty-four essential and toxic metals in the scalp hair samples of one hundred twenty-four cancer patients and eighty-six control subjects. The associations of cancer with minerals were statistically analyzed with multiple logistic regression analysis. Results of the study demonstrated that several minerals were significantly correlated to cancer, positively or inversely. The study concluded that their research findings suggested that some minerals such as arsenic, selenium and probably iodine, zinc, sodium and vanadium contribute to the regulation of cancer and that a metallomics study using multiple logistic regression analysis is a useful tool for estimating cancer risks. *Metallomics Study Using Hair Mineral Analysis and Multiple Logistic Regression Analysis: Relationship Between Cancer and Minerals. Yasuda, H, et al. Environ. Health Prev.Med. 24,5, 2009.*

Comment: At TEI we have noted HTMA patterns associated with various types of cancers, as have other researchers. With further research and pattern recognition, HTMA may serve as a significant tool in defining the relationship of mineral patterns and cancer.

What is Osteopenia?

There is rarely a week that goes by that I do not receive a call from a client whose patient has had a bone density scan and were told they have osteopenia. The patient is often very concerned over the findings and many are suggested to begin aggressive drug treatment for bone loss. Many do not understand the term osteopenia and what it means. It should be emphasized that osteopenia is not a diagnosis and should not be confused with osteoporosis. Osteopenia is a term used to describe bone density that is below optimum, even though the actual density may be perfectly normal for most people depending upon their age. Peak bone mass is estimated to be reached at about age thirty. Afterwards, bone density begins to diminish naturally to some degree as we age. The term osteopenia was defined in 1992 by the World Health Organization (WHO). A group of experts came up with the term, based arbitrarily upon bone density being approximately one standard deviation below that of an average thirty-year-old female. The definition has been very controversial since it originated. Dr. Cummings, of the University of California, San Francisco stated, "There is no basis, no biological, social, economic or treatment basis, no basis whatsoever for using one standard deviation." WebMD states "Bones naturally become thinner as people grow older. Some people who have osteopenia may not have bone loss. They may just naturally have a lower bone density." Other experts also state "Expanding the disease to include a new condition, osteopenia, or pre-osteoporosis, with boundaries so broad they include more than half of all women over 50." Further, others have argued that the term osteopenia could be used to incorrectly label individuals as having a disease, thereby making it

easier to treat them with new drugs that they may not need. As a result, millions of women may be exposed to bone drugs at a large expense, with little or no evidence that the drugs are safe or even effective.

Machines for testing bone density have largely been developed and promoted by major drug companies who produce alendronate drugs. There are now approximately eight to ten-thousand bone-measuring devices throughout the US compared to about eight hundred in 1995. Some drug companies promote their use by doctors, by making them available for relatively little cost and often reimbursing the doctors for the scans themselves. Eventually, insurance companies began reimbursing for bone scans as well, along with the expensive prescription bone drugs. Bone density studies are done in different ways by different machines and can produce wide variations. Small portable machines that measure bone density at the wrist are not as reliable. Experts at an FDA hearing agreed that a better way than T-scores was needed to assess a persons risk for fracture and that many women are being prescribed drugs they do not need. Many physicians, scientists and experts in the field of osteoporosis are pushing to scale back bone testing. *Kelleher, S. Seattle Times. June 26, 2005. Bone-Strengthening Drugs May be Overprescribed. Health Day. Jan 18, 2008. Drugs for Pre-osteoporosis: Prevention of Disease Mongering? Alonsi-Coello, P, et al. BMJ. Jan 2008.*

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