

# NEWS UPDATES



MARCH – APRIL 2017

## Hair Mineral Levels in Children with Malnutrition and Poor Growth

Han, et al, performed hair mineral studies on a group of children presenting with malnourishment and experiencing poor growth and development, appetite and GI disorders. Serum mineral levels were also performed on the group. The study focused particularly on the mineral zinc due to the importance of this essential mineral on immunity, growth and development, and neurodevelopment in children. Hair samples were sent to Trace Elements, Inc, (TEI), via TEI-Korea. Zinc deficiency was found in the hair of eighty-eight percent of the study group. Serum zinc was found low in fifty-five percent of the affected group. Zinc therapy resulted in improvement in clinical signs and symptoms in most of the children including increase in body weight, appetite and growth. *Hair Zinc Level Analysis and Correlative Micronutrients in Children Presenting with Malnutrition and Poor Growth. TH Ha, J Lee, YJ Kim. Pediatr. Gastroenterol. Hepatol, Nutr. 19, 4, 2016.*

Comment: This study confirms the use of HTMA as a credible screening tool for assessing nutritional needs, especially in children. Since serum zinc does not reliably indicate zinc storage the use of HTMA as an adjunct to other clinical tests can be used to detect a potential for increased zinc requirements and provide evidence for nutritional support needed in early childhood.

Krebs, also published findings that risk of zinc deficiency can occur in breastfed infants. Even though breast milk is an excellent source of bioavailable zinc, after about six months of age there is an increased need for zinc which requires non-human sources. Cereals, fruit and vegetables do not provide a great deal of zinc and due to high phytate intake from cereals, zinc bioavailability may be low compared to animal food sources. *Zinc and Breastfed Infants: If and When is There a Risk of Deficiency? Krebs, NF, Westcott, J. Ad. Exp.Med. Biol> 503, 2002.*

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## Hair Mineral levels of Infants and Mothers

Ozden, et al, initiated this study to evaluate changes in micronutrient status of children and their mothers during the first year of life. In particular, they focused on zinc, copper and iron. The study included thirty-five healthy breastfed infants and mothers who were tested at two, six and twelve months after birth. They found that hair zinc levels and serum iron levels decreased significantly toward the end of the first year. The maternal hair copper and serum iron also decreased. The study concluded that infants appear to require an increase in zinc intake after six months of age. *Copper, Zinc and Iron Levels in Infants and Their Mothers During the First Year of Life: A prospective Study. Ozden, TA, et al. BMC Pediatr. 15,157, 2015.*

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## Hair Mineral Levels in Children In Polluted Environments

Hair and whole blood mineral tests were performed on children living near a copper smelter and two control areas. Results revealed children living near the pollution from the smelter had significantly higher levels of arsenic, lead and iron in both blood and hair results compared to controls. Hair copper was higher in the study group. They also found that children in the study group had maximal hair phosphorus and decreased hair calcium and magnesium. Their findings show that adverse health effects of individuals living near or in a polluted environment is not only associated with heavy metals exposure, but

altered mineral homeostasis as well. *Whole Blood and Hair Trace Elements and Minerals in Children Living in Metal-Polluted Area Near Copper Smelter in Karabash, Chelyabinsk Region, Russia.* Skalny, AV, et al. *Environ. Sci. Pollut. Res. Int.* 2016.

Comment: HTMA has long been a valuable tool in assessing heavy metals and toxic elements in individuals who may be exposed from their environment. It is especially valuable in screening children since due to their unique physiology and metabolic mineral characteristics have an increased propensity to retain heavy metals that they may be exposed to which can have a long-term impact on health and normal development. HTMA is ideal for detecting imbalances in the important mineral interrelationships that when severe can also adversely impact development in children.

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### **Hair, Calcium and Coronary Calcification**

With age and changes in metabolic characteristics, calcium shifts among different body pools. Lee, and colleagues studied the relationship of different body compartments of calcium including hair, bone and blood vessels in women. Hair samples were analyzed in fifty women along with their coronary calcium scores, and bone mineral density. They found that coronary calcium scores were negatively correlated with bone mineral density and hair calcium levels. *Coronary Calcification is Reversely Related with Bone and Hair Calcium: The Relationship Among Different Calcium Pools in Body.* Lee, SH, et al. *J. Bone Metabol.* 23, 4, 2016

Comment: Coronary calcification and decreasing bone mineral density have dozens of development mechanisms. This study reveals that demineralization of bone is related to an increased shift of calcium from primary reservoirs to extra skeletal tissues, in particular arteries. However, other soft tissue are also permeated by this calcium shift including skin, joints, lymph, etc. HTMA can be used to reveal these many different and distinct mechanisms contributing to this calcium shift in individuals based upon their unique metabolic characteristics and mineral patterns.

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### **Excess intake of Biotin can Masquerade as Graves ' Disease**

A paper in the New England Journal of Medicine reported six cases of children developing signs of Graves' disease due to the use of high biotin intake for treatment of metabolic disorders. The laboratory testing revealed elevated free thyroxine and total triiodothyronine and low levels of thyrotropin and elevated anti-thyrotropin antibodies. A literature search lead them to find that biotin can interfere with the commonly used thyrotropin and thyroid hormone assays. Discontinuation of biotin resulted in normalization of tests after twenty-four to forty-eight hours, but normalization of receptor antibodies took seven days. *Sebastian, K, et al. Biotin Treatment Mimicking Grave's Disease. N. Eng. J. Med.* 375, 7, 2016.

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### **Low Blood Sodium and Antidepressants**

Antidepressant medications (second generation) have been found to be related to hyponatremia in older patients. A Canadian study found a significantly higher incidence of low blood sodium in patients taking antidepressants compared to those not taking antidepressants. Risk of hospitalization due to hyponatremia was increased during the first month of drug therapy. *Hyponatremia in Older Patients Who Begin Second-Generation Antidepressants* Allan S. Brett, MD Reviewing Gandhi S et al., *Am J Kidney Dis* 2017 Jan 69:87

Comment: This is an interesting article in that other studies have shown the incidence of falls causing fractures is often due to elderly individuals having low blood pressure or orthostatic hypotension, causing dizziness. The low blood sodium could certainly contribute to these symptoms, but adrenal insufficiency or orthostatic hypotension could also be further exacerbated by these medications thus contributing to a drop in blood pressure and increased sodium loss.