

HTMA - Useful as a Metabolic Indicator

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Hair tissue mineral analysis (HTMA) is commonly recognized as a nutritional and heavy metal screening test. However, while it is an excellent tool for this purpose, its usefulness extends far beyond this initial utility. Trace Elements has long recognized that HTMA can be a reflection of metabolic activity as well. Nutritional imbalances can obviously contribute to adverse health conditions, but it should be noted that most adverse health conditions have underlying metabolic disturbances involving the neuro-endocrine system that conversely, contributes to nutritional imbalances. This recognition of HTMA as an overall metabolic indicator is not well understood and often unappreciated, yet there is considerable support for our views. Some examples are found below.

Diabetes and Endocrine Disturbance

TEI's View... 1988

The physiology and pathology of diabetes is complex and poorly understood. However, through HTMA studies TEI has been able to recognize the many multiple factors associated with this condition. Diabetes is related to an underlying neuro-endocrine imbalance rather than simply a poor diet. The various neuro-endocrine disturbances lead to nutritional imbalances that will eventually affect glucose - control. Although diet is important in helping to controlling blood sugar disorders, unless the underlying neuro-endocrine and nutritional imbalances are specifically addressed it will be

difficult to stabilize and control blood sugar and insulin levels.

Watts, DL. **Glycemic Response and Calcium.**

The Newsletter. TEI, 2,2, 1988.

Watts, DL. **Hypoglycemia-Type I and Type II.**

The Newsletter. TEI, 3,1, 1989.

Watts, DL. **Trace Elements and Glucose Disorders.**

The Newsletter. TEI, 11,2, 1999.

Now Supporting TEI's View...

Today there are studies that support our assertion of the underlying neuro-endocrine involvement in individuals with diabetes. In fact the entire endocrine system is involved with this condition.

Gerl, H. et al: **Improvement of Diabetes Mellitus After Excision of a Parathyroid Adenoma.** Wein Lin Wochenschr. 110,23, 1999.

Alrefai, H, et al: **The Endocrine System in Diabetes Mellitus.** Endocrine.18,2, 2002

Rochon, C., et al: **Response of Glucose Disposal to Hyperinsulinism in Human Hypothyroidism.** Clin. Sci. 104, 2003.

Obesity And Endocrine Disturbance

TEI's View... 1990

In 1990 TEI formally reported our findings of obesity or overweight conditions being associated with an endocrine imbalance more than just high caloric intake. We discussed endocrine involvement including the pancreas, thyroid, estrogen and parathyroid as well as the nutritional imbalance associated with this endocrine disturbance. In the past, weight control, or weight loss has largely been directed toward limiting caloric intake and increasing energy expenditure. Although this is an important part of losing weight, it has not been significantly effective. Obviously, more attention should be



directed toward the metabolic side of the weight loss equation.

Watts, DL. **Weight Control Through Metabolic Control.** Digest of Chiro. Econ. Sept/Oct. 1990.

Now Supporting TEI's View...

Kikkoris, et al reported in 2003 that the development of obesity was related to endocrine abnormalities. Endocrine involvement includes the thyroid, adrenal, estrogen and parathyroid glands.

Kikkoris, P, et al. **Obesity and Endocrine Disease.** Endocrinol. Metab. Clin. North Am. 32,4, 2003.

McCarty, MF, Thomas, CA. **PTH Excess May Promote Weight gain by Impeding Catecholamine-Induced Lypolysis-Implications For the Impact of Calcium, Vitamin D and Alcohol on Body Weight.** Med. Hypoth. 61,5, 2003.

Insulin and Thyroid Suppression

TEI's View... 1989

In the past, based upon HTMA studies, we have reported on the antagonistic relationship between hormones. In 1989 we reported on the insulin-thyroid antagonism. In addition, estrogen and parathyroid hormone (PTH) are also antagonistic to the expression of normal thyroid activity when elevated. These mechanisms as seen from HTMA studies are related to the minerals that are affected by these hormones, specifically calcium and calcium co-factors such as, vitamin D. An elevation of tissue calcium is associated with increased insulin secretion. Insulin requires calcium for release from the pancreas. PTH increases tissue calcium retention that aids this process of increasing insulin secretion and may in fact be a synergistic effect. Estrogen by enhancing copper retention also synergistically raises tissue calcium concentrations. These factors increase the activity of vitamin D as well, further enhancing tissue calcium retention. As tissue calcium levels rise the mineral antagonizes others and even blocks the effects of other vitamins and hormones. For example, calcium antagonizes magnesium, potassium, iron selenium, zinc chromium and phosphorus. This antagonism extends to vitamins as well, including vitamins A and B6, B3, etc. Excess calcium can block not only the effects of the thyroid, but some adrenal hormones as well, thereby contributing to a reduction

in the metabolic rate as well as thermogenesis.

Watts, DL. **The Nutritional Relationship of the Thyroid.** J. Orthomol. Med. 4,3, 1989

Now Supporting TEI's View...

Other studies have also shown and are continuing to support the view of the antagonistic relationship between insulin, and the thyroid adrenal hormones. These studies stress the importance of assessing overall endocrine activity when treating individuals who may have a reduction in their metabolic rate. Doing so will aid in improving the resting metabolic rate, improve glucose control as well as aid in weight loss.

Thermogenic Effect of Thyroid Homones: Interactions with Epinephrine and Insulin. Piolino, V, et al. Am.J. Physiol. 259, 1990.

Insulin Resistance in Pituitary, Thyroid and Adrenal Disease. Iitaka, M., et al. Nippon Rinsho 58, 2000

Unilateral Adrenalectomy Improves Insulin Resistance and Diabetes Mellitus in a Patient with ACTH-Independent Macronodular Adrenal Hyperplasia. Oguru, M., et al. Endocrin. J. 50, 2003.

Osteoporosis and Endocrine Disturbance

TEI's View...1986

Osteoporosis is an ever-growing health problem affecting millions of people worldwide. This condition is conventionally viewed as a simple calcium and/or vitamin D deficiency. Therapy is often based upon modifying lifestyle with the recommendations of increasing exercise and eating a high calcium diet along with calcium and vitamin D supplementation. However, thousands of HTMA tests of individuals revealed two distinctive categories of mineral patterns related to osteoporosis. These individual HTMA patterns reveal the complex underlying metabolic, endocrine and nutritional imbalances involvement of this condition showing that it is more than simply a calcium and vitamin D deficiency. In fact as we have stated so often, there are over thirty different factors associated with the development of bone loss. It is known that populations who consume low-calcium diets have fewer fractures than Western societies who consume high-calcium diets. Even though high calcium intake is recommended widely in the United States for the

prevention of osteoporosis, there is simply little evidence that high calcium intake actually prevents fractures.

Watts, DL, **Determining Osteoporosis Tendencies From Tissue Mineral Analysis of Human Hair Type I and Type II.** Townsend Letter for Doctors. Aug/Sept. 1986.

Watts, D.L. **Hypercalcemia.** The Newsletter. TEI. 1, 11. 1987.

Watts, DL. **Indications of Parathyroid Activity in Hair Tissue Mineral Patterns.** Townsend Letter for Drs. Oct. 1989.

Watts, DL. **The Endocrine-Neuromusculoskeletal-Biochemical Systems.** Dig. Chiro. Econ. Mar/Apr 1989.

Watts, DL. **Nutrient Interrelationships, Minerals-Vitamins-Endocrines.** J. of Orthomol. Med. 5,1, 1990.

Watts, DL. **Neurological Effects Upon Nutritional Status.** Dig. Chiro. Econ. May/Jun, 1991.

Watts, DL. **Mineral Imbalance, Endocrines and Hair Tissue Mineral Analysis.** The Newsletter, TEI. 6,2, 1993.

Now Supporting TEI's View...

A study involving postmenopausal women found that postmenopausal osteoporosis was more related to hormonal imbalance than lifestyle factors. Also, Miekeley, et al reported in 2001 that their studies revealed that hair analysis was found to be an effective tool in revealing endocrine disturbances associated with calcium and bone metabolism.

Landin-Wilhelmsen, K, et al: **Postmenopausal Osteoporosis is More Related to Hormonal Aberrations Than to Lifestyle Factors.** Clin. Endocrinol. 51,4, 1999.

Miekeley, N, et al. **Elemental Anomalies in Hair as Indicators of Endocrinologic Pathologies and Deficiencies in Calcium and Bone Metabolism.** J. Trace Elem. Med. Biol. 15,1 2001

Hegsted, M. **Fractures, Calcium and the Modern Diet.** Am. J. Clin. Nutr. 74, 2001

Osteoporosis and Protein Intake

TEI's View... 1986

For many, many years we have also recommended increased protein intake for those with Type II osteoporosis, the most common form of this condition. This recommendation however, has often been met with resistance from many practitioners. This is surprising as protein comprises approximately thirty percent of bone and its status usually receives little attention in its relationship to osteoporosis. This organic matrix is made up largely of collagen fibers in which mineral salts are deposited. Without this protein structure the bone cannot begin to retain calcium adequately to provide structural strength and integrity.

Now Supporting TEI's View...

Much of the controversy of protein diets and osteoporosis comes from animal studies fed only a highly purified liquid protein in which an increase in urinary calcium was found. These experimental studies do not relate to "real life" situations in that the purified diets lacked the normal constituents found in foods, such as phosphorus and other essential nutrients. More recent studies using common food such as meat did not induce excess urinary calcium excretion, did not reduce calcium retention or adversely affect bone metabolism. In fact, recent studies are now finding that high protein diets helped in preserving bone density. Whereas low protein diets reduced calcium absorption and increased rates of bone loss, in addition to inducing secondary hyperparathyroidism.

Kerstetter, JE, et al. **Low Protein Intake: The Impact on Calcium and Bone Homeostasis in Humans.** J. Nutr. 133,3, 2003.

Roughead, AK. **Controlled High Meat Diets Do Not Affect Calcium Retention or Indices of Bone Status in Healthy Postmenopausal Women.** J.Nutr. 133, 2003.

Subclinical Hypothyroidism

TEI's View... 1989

In 1989 we reported the prevalence of the sub-clinical hypothyroid condition. Overt hypothyroidism is a clinical entity that can be easily assessed. However, a sub-clinical condition may not manifest itself in most clinical tests and yet produce an array of metabolic dysfunction and syndromes that may respond readily to a specific nutritionally targeted approach based upon HTMA patterns.

Watts, DL. **The Nutritional Relationships of the Thyroid.** J. Orthomol. Med. 4,3 1989.

Now Supporting TEI's View...

Cabral, et al reported that overt hypothyroidism affects one to four percent of the population. However, the prevalence of subclinical hypothyroidism affects five to ten percent of the population.

Cabral, MD, et al: **Lipid Profile Alterations in Subclinical Hypothyroidism.** The Endocrinol. 14,3, 2004.

Magnesium and Blood Pressure

TEI's View... 1985

HTMA studies have shown increased magnesium requirements in individuals experiencing some forms of hypertension. As can be expected, this is not the only mineral deficit found in people with high blood pressure and therefore, the overall HTMA pattern should be assessed when approaching this condition.

Watts, DL. **The Assessment of Hypertensive Tendencies From Hair Trace Element Analysis.** Dig. Of Chiro. Econ. 1985.

Now Supporting TEI's View...

A 1994 double-blind control study of ninety-one women with mild to moderate hypertension was randomly assigned treatment with magnesium supplementation. Individuals taking magnesium supplements experienced a reduction of systolic and

diastolic pressure compared to the placebo group.

Whitteman, JC, et al: **Reduction of Blood Pressure with Oral Magnesium Supplementation in Women with Mild to Moderate Hypertension.** Am.J.Clin. Nutr. 60,1, 1994.

The purpose of this issue of *The Newsletter* has been two-fold. First, we hope that this information helps you to understand more of the complexity involved in utilizing HTMA, and also that you would begin to have even more confidence in its' proper clinical application. As HTMA is an important screening tool in modern health care, proper utilization can aid in formulating a more specific nutritional approach to therapy for individuals with metabolic disturbances.

