

The Use of Hair Tissue Mineral Analysis in Clinical Decision-Making Regarding Heavy Metal Chelation

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Pre-Post Provocation Testing

Most practitioners of natural or integrated medicine that have an interest in heavy metal toxicity often use urine or feces pre-post provocation tests to determine toxic metal loads. Usually chemical chelators such as DMSA or EDTA are used to provoke the mobilization and elimination of toxic metals from the body tissues – these have unwanted disadvantages in that, they may strip essential minerals from the body as well as mobilize more metals than the person can eliminate, causing a variety of side effects as well as the rapid re-absorption of metals back into storage organs and tissues with consequent side-effects.

Let's stop to think for a minute what these tests are actually telling us? Let's say we have a urine level of mercury in the baseline sample of 3 ppm. We then take a second sample 24 hours later, after provoking with the chemical chelator DMSA. The post sample shows 6 ppm of mercury. What does this mean? It is simply telling us that the person has a certain amount of mercury stored in the body tissues and organs and that the DMSA has chelated through the urinary tract. It will not tell us what is being eliminated through the biliary route (this is a feces test) and it cannot determine the total amount of mercury stored in the body.

Seeing these results, the practitioner will usually recommend a chemical chelator before suggesting retesting in 2-3 months time. So the patient gives more urine, receives the provocation agent, and this time the results show 1.5 ppm mercury in the baseline and 3 ppm in the post-urine sample. What does this mean? Again, it simply shows that mercury is still being mobilized due to the chelation process – it cannot tell us how much mercury has been eliminated in the past 2-3 months, nor can it give us any indication of how much mercury is left in the body. One cannot subtract the first test results from the post-test results, something that I have seen many practitioners do,

concluding that “there is a 50% decrease in mercury in the body.” These are arbitrary figures and are not comparable.

What clinical decision can be taken based on this information? Given that the urine and feces test is a snap-shot of the body's metabolic activity over the last 24 hours, we can only conclude that mercury is being mobilized from storage sites and being eliminated, therefore the patient can continue to take their chelating protocol.

In summary, the urine provocation tests are a ‘snap-shot’ of how the body eliminates toxic metals at any one point in time. These figures, therefore, are arbitrary and not absolute figures, and the figures for one provocation test cannot be compared with another one repeated 3 months down the line. It simply means that if metals are still being eliminated after provocation with the chelating agent, then there are metals stored in the body. It really gives us no more information than this.

If the detoxification organs are compromised, as is often the case with autistic spectrum disorders, then there may be very few metals actually eliminated after provocation. What does this tell us? Can we conclude categorically that there are no metals stored in the body tissues and organs? What clinical decision do we make when we are confronted with these results?

Do we simply say to the patient that as there is no percentage increase in metals in the post-urine sample that they do not need to take a chelation protocol? This decision based on these urine tests warrants considerable caution as an extremely toxic and ill person could end up getting a lot worse if left without a chelation protocol.

Based on the abovementioned arguments, as a clinician actively involved in heavy metal chelation using natural chelators, I decided to avoid the possible adverse effects of chemical chelators by using a Hair Tissue Mineral Analysis sample – let me share some of my own observations with this.

Hair Tissue Mineral Analysis (HTMA)

The hair protocol that I have been working with for some time now has more advantages than urine or feces pre-post provocation testing. Here are some of the benefits^{1,2,3,4,5}:

1. It is a 'gentle' way to proceed as there is no aggressive mobilization and release of large quantities of metals with the chemical chelators – this can greatly exacerbate symptoms in neurological problems such as MS, cancer, autism, cardiovascular diseases and others.
2. The history of progress can be mapped over time as the decline in toxic metals on the HTMA is an indication that the storage sites in the body are also diminishing. If the levels are still high on the HTMA, then this is an indication that the storage sites are still loaded and metals still are being mobilized, a clinical indication that the chelator should be continued.
3. It is not the 'snap-shot' picture provided by the urine tests that are difficult to interpret over time. It reflects metabolic changes of the elements over a long period of time – usually two months as two months growth of hair is usually taken.
4. The HTMA is far more cost effective than the urine tests – costing the patient less than \$70-80 every two months.
5. The HTMA is very quick and easy to carry out and easily implemented by an assistant in any clinical setting. It also takes away the compliance problems often faced by practitioners when they ask the patient to collect urine over a 24-hour period.
6. Easy to use by all health practitioners, (even the patients themselves can collect and send hair from a distance, if supervised by their practitioner).
7. It measures the levels of essential minerals as well as toxic metals. It is really a screening test that can play a critical role in both prevention and early detection of physical and mental disorders.
8. Hair is a stable biopsy material as it requires no special handling and will remain viable for many years – even Horatio Nelson's hair has been analyzed fairly recently.
9. Mineral levels are about ten times that in blood making them easy to detect in the hair.
10. Advancements in technology have rendered hair mineral analysis very accurate and reliable.
11. Hair testing can provide tendencies for over 30 common health conditions, often before the

condition develops. These would also include psychological conditions such as depression, hyperkinesia, anxiety and mood swings.

Dr. Laurence Wilson, M.D. in his book entitled *Nutritional Balancing and Hair Mineral Analysis* makes reference to hair analysis as a *soft tissue mineral biopsy*. A biopsy is an analysis of a body tissue, in this case to detect mineral levels. Hair analysis provides a reading of the mineral deposition in the cells and interstitial spaces of the hair over a 2-3 month period.

What are we measuring from hair and why? When the body has toxic metals circulating in the blood, the first thing that it tries to do is remove them from circulation as they are prone to do a lot of damage to different cells of the body through their vicious free radical activity. The first place that the body stores these metals is in the inert tissues such as hair and nails. When these storage sites are full, then it will start distributing and storing in other less inert tissues and organs such as fat, liver, kidneys, thyroid, brain and other organs.

Hair is sent to the laboratory where it is cut, dissolved in acid where the metals and minerals are released and are measured accurately to parts per billion levels using an Inductively Coupled Plasma Mass Spectrometer (ICP-MS).

The hair sample taken is about a two month 'history' of what has been circulating in the blood and therefore stored in these inert tissues. We usually cut about 1 - 1 ½ inches (3-4 cm) of hair from the back of the scalp, which takes about two months to grow. Therefore, the levels of metals in the hair correlate quite well with the levels in circulating blood over a two-month period – if there are no metals circulating in the blood during the last two months, and then they probably will not appear in the hair at all. The test really reflects the metabolic activity of the body during the last two months which is more meaningful than a snap-shot picture from blood or urine.

Zero levels of toxic metals in a hair analysis do not mean that there are zero metals stored in the body! The Hair Tissue Mineral Analysis is distinctly measuring the amount of metals that have been circulating in the blood the last couple of months, but does not tell us much about how many metals are stored in the body tissues and organs. So how can a clinician use this in practice?

How Do We Use the HTMA in Clinical Practice?

Firstly, the clinician takes a baseline hair sample from the patient. Whether there are metals showing on the hair test or not, it is wise to start the patient on a natural heavy metal chelator such as the HMD™ protocol⁶ and then repeat the hair analysis in 2 months – this will allow the

¹ Watts, D.L. Trace Elements and Other Essential Nutrients: Clinical Applications of Tissue Mineral Analysis, B-L-O-C-K, 1995. ² Wilson, L. Nutritional Balancing and Hair Mineral Analysis, USA: L.D. Wilson Consultants, Inc, 2005. ³ Malter, R. The Strands of Health: A Guide to Understanding Hair Mineral Analysis, USA: Education and Health Resources of Arizona, Inc., 2003. ⁴ Cutler, AH. Hair Testing Interpretation: Finding Hidden Toxicities: Toxicity Causes Health Problems, www.noamalgam.com, 2004. ⁵ Bland, J. Hair Tissue Mineral Analysis: An Emergent Diagnostic Technique, UK: Thorsons Publishers, 1984. ⁶ See www.detoxmetals.com for more details of the HMD™ protocol used in this research.

hair to grow out and you will collect hair that will reflect the metabolic activity of the body during the two months that the HMD™ was taken.

If metals are present in the storage organs, as HMD™ begins to mobilize them, then the probability is that there will be a dramatic INCREASE in the toxic metals compared to baseline - this indicates that the HMD™ is pulling heavy metals out of storage sites into the blood and then into the hair. This is a sure indication that the person has metals stored in the body and the clinical decision is to continue taking the HMD™ for a further two months until a further hair test sheds further light.

There are a couple of examples of this in Diagram 1 and Diagram 2. Diagram 1 shows a young 3-year old boy - the test on the left is the baseline (before taking any chelator) and the test on the right is after taking the HMD™ protocol for 2 months - there is a dramatic increase in the metal cadmium from 0.022 to 115 mg%, this is over a 5,000% increase - this was traced to the mother who also had extremely high levels and very probably passed this to the embryo through the placenta. Admittedly this is a very high percentage increase just to illustrate the point - the mean percentage increase in all the metals tested is shown in Table 1.

Table 1. Mean percentage increases in toxic metals between baseline and post-hair sample while taking the HMD™ Ultimate Detox Protocol

Mean % increase of heavy metals between pre and post-hair samples							
Toxic Metals	Uranium	Arsenic	Beryllium	Mercury	Cadmium	Lead	Aluminium
Mean % increase	252.34%	306.80%	0	205.09%	333.33%	200%	155.52%

N.B. The levels of Beryllium were very insignificant in this sample of patients, in both the baseline and post samples.

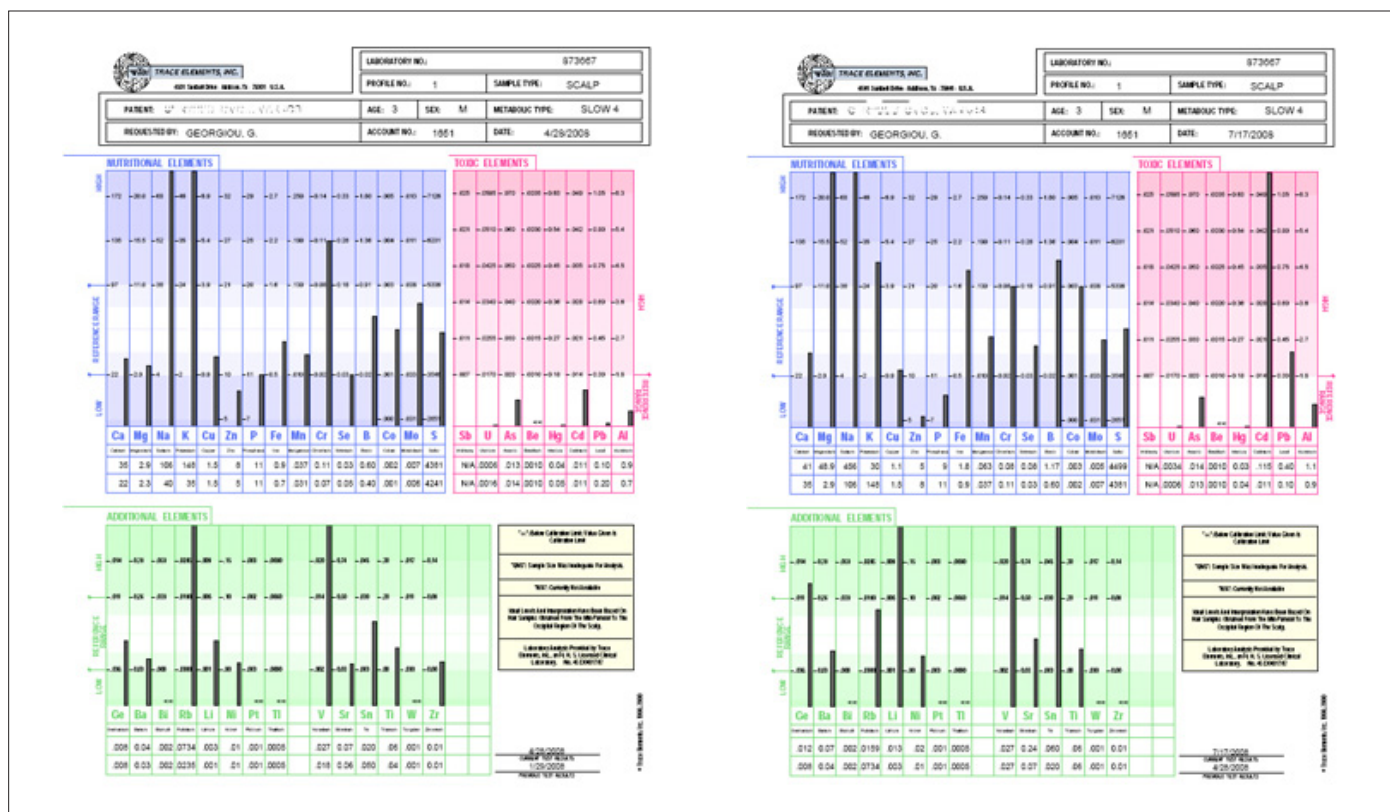


Diagram 1. Pre-test (left) and post-test (right) showing high level of toxic metals in a 3-year old child, after being on the HMD™ oral chelation protocol

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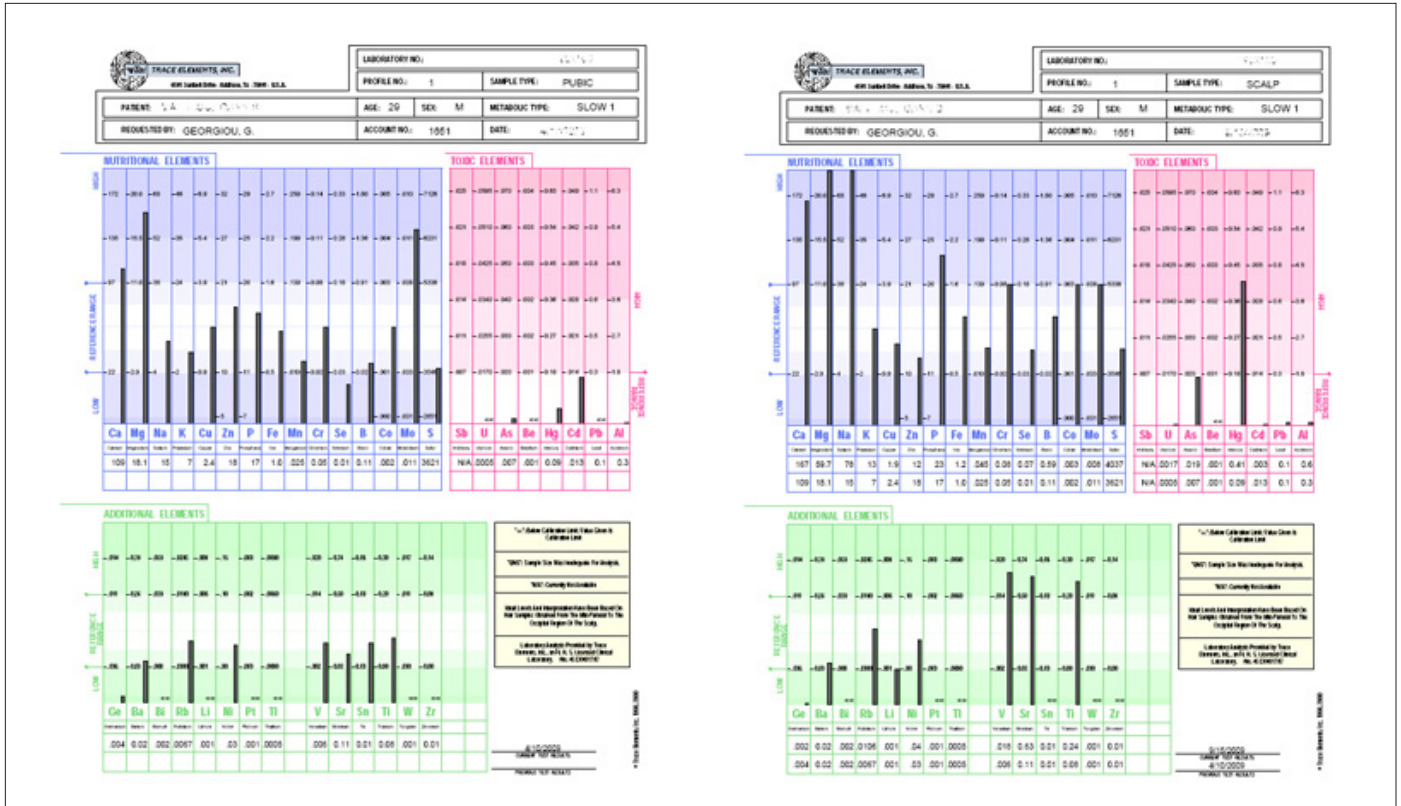


Diagram 2. Pre-test (left) and post-test (right) showing high level of mercury in a 29-year old male, after being on the HMD™ oral chelation protocol

Diagram 2 shows a similar picture with the level of mercury rising after taking the HMD™ protocol for 2 months; from 0.06 to 0.41 mg% – a 680% increase.

The hair test can be repeated again after a further two months but always while the patient is still taking the HMD™ - a reduction in metals shows that the person is on the right track and the storage sites are diminishing. You can keep repeating this until there are negligible metals on the HTMA, which is a reflection of negligible metals in storage sites of the body.

This is a far more clinically significant test that facilitates the practitioner’s clinical decision-making as it is showing a time-line or history of progress, not simply a snapshot.

The results of a hair tissue mineral analysis are typically reported in a numerical form, i.e. parts per million (ppm) or milligrams percent (mg%) that can easily be converted to a graph. Mg% is ppm divided by 10. The graphic representation is important as it helps us to see the basic patterns and relationships between nutrient minerals in the hair results.

Diagram 3 looks at the results of the HTMA from one patient who was on the HMD™ protocol throughout these months. The first test on the left shows the baseline level before taking any chelation protocol – the level of heavy metals showing are relatively low – he began taking the HMD™ protocol immediately after taking the first hair sample. Two months later a second hair test was performed and this clearly shows a very significant increase in the metal aluminium, which was mobilized from the tissues and organs where it was stored and began circulating in the blood and the excess stored in the hair (he was an aluminium window manufacturer). He continued taking the HMD™ protocol a further two months and another hair sample showed the levels of aluminium dropping significantly. A further two months on the HMD Protocol and a final test showed the level of metals significantly dropping to very low levels. This is a typical picture that is being seen in the many patients being tested using the HTMA while taking the HMD™ protocol.



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Diagram 3 – The HTMA results taken every 2 months from one patient who began the HMD™ protocol and continued for 6 months

Pilot Study Using Hair Tissue Mineral Analysis & HMD™ Protocol

Recently, a pilot study with 50 patients attending the DaVinci Holistic Health Center in Larnaca, Cyprus⁷ was conducted using Hair Tissue Mineral Analysis.

Initially, upon first appointment a baseline sample of hair was sent to a reputable US laboratory with many years experience in analyzing hair samples. As soon as the hair was collected, the patient began taking the HMD™ Ultimate Detoxification Protocol – this comprises of a natural, oral

⁷ www.docgeorge.com

heavy metal chelator called HMD™ (50 drops TDS) that has undergone double-blind, placebo controlled trials with 350 people and has a worldwide patent pending, as well as a 'drainage' remedy comprising of a variety of herbs in tincture form called *HMD Lavage* (25 drops TDS) that helps to open-up detoxification channels such as liver, kidneys, lymphatics and cleans the blood. *Chlorella pyrenoidosa* (500mg TDS) is also taken to help absorb metals from the mesenchyme and prevent their reabsorption through the gut too.⁸

Two months after taking the first hair sample and beginning the HMD™ protocol another sample of hair is taken and the pre-post results compared.

Table 1 shows the results for the 50 patients sampled. The means indicated are the mean percentage increase in the specific heavy metal between the baseline hair test and the post-test 2 months later, while taking the HMD™ protocol.

When a T-Test for paired samples was run on the data using SPSS⁹ the results showed that the mean percentage increase in the post sample was statistically significant for most of the metals tested (2-tailed test). The results for these are summarized below.

Conclusions

This is an interesting pilot study that will continue to grow and will be reassessed as the sample of patients grow. It is clear from the results that hair mineral analysis can be used in place of urine as a screening test for heavy metals. The main purpose of this pilot study is to bring this to the attention of practitioners who may want to undergo a paradigm shift from the classical urine tests to the hair test with all its benefits. It can off course be combined with urine testing if one wanted more information on the elimination of metals through the kidneys during provocation testing.

It is also interesting to see that uranium-238 is being eliminated in the hair using the HMD™ protocol (p=.001), as to date there is no natural chelating agent known to mobilize and eliminate uranium-238 from body tissues. This is a big problem in the world where depleted uranium missiles are being used more and more for modern warfare.

There is also a statistically significant percentage increase in mercury which is another big problem with many people having amalgam fillings, vaccinations, eating mercury polluted fish and other sources. The HMD™ protocol has been used with autism spectrum disorders by many health practitioners and parents with excellent results – it has been dubbed “The Gentle Chelator” as there are usually no side effects and it does not strip the essential minerals from the body. 🌿

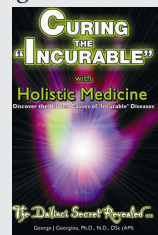
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Dr. George J. Georgiou has been an active clinician for 26 years, and Director Founder of the DaVinci Holistic Health Center, Larnaca, Cyprus (www.docgeorge.com) which specializes in the treatment of chronic diseases. He is an active researcher and was the principal investigator of the HMD™ research (www.detoxmetals.com) and worldwide patent-pending holder; Director of the DaVinci Life Sciences Research Center, in Larnaca, Cyprus where he conducts further laboratory and clinical research on heavy metal and xenobiotic chelation. He has nine degrees and diplomas in Holistic Medicine from the U.K. and U.S., including the Biological Sciences, Clinical Nutrition, Naturopathy, Herbal Medicine, Iridology, Homeopathy, Su Jok Acupuncture, Clinical Psychology and Clinical Sexology as well as specialized training in VEGA bio-dermal screening, bioresonance, Live Blood Analysis, Thermography, ART, HRV, Heavy Metal testing using spectrometers, and other modalities. He is also the founder Director of the Da Vinci College of Holistic Medicine (www.collegenaturalmedicine.com) and the author of a recent 610-page book on Holistic Medicine entitled “Curing the Incurable with Holistic Medicine: The Da Vinci Secret Revealed.” Amazon.com, \$35.00, ISBN: 978-9963840113



EDITORS NOTE:

This is a well run study that shows a single point of view on the excretory ability of hair to show heavy metal elimination. Other practitioners believe opposite points of view that with hair being a poor excretory organ for heavy metals that the only true long term approach is to carefully measure urine and fecal samples as the author suggests and discounts. There are expensive tests available that can measure heavy metals stored in Bone tissue that normally take ten years to excrete their heavy metal stores, which tests are impractical for current clinical practice.

T-Test for Paired Samples Between the Pre and Post-sample Hair Tests for Different Heavy Metals

Heavy Metals	N	Pre-test Mean	Post-test Mean	Mean % increase	T =	Significance (2-tailed)
Uranium	50	.000894	.002256	252.34%	-4.088	.001
Arsenic	50	.006125	.018792	306.80%	-1.551	0.134
Mercury	50	.093722	.192222	205.09%	-2.213	0.031
Cadmium	50	.003375	.011250	333.33%	-1.304	0.231
Lead	50	.133333	.266667	200.00%	-4.000	0.057
Aluminium	50	.715652	1.113043	155.52%	-5.854	0.000

⁸ See www.detoxmetals.com ⁹ SPSS = Statistical Package for the Social Sciences, version 16.0