EVALUATION OF HEAVY METAL LEVELS IN RELATION TO IONIC FOOT BATH SESSIONS WITH THE IONCLEANSE®

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ABSTRACT

Ionic footbaths are currently being used as a way to assist the body in eliminating harmful substances such as heavy metals. The current study examined whether whole blood levels of heavy metals declined in individuals receiving ionic foot bath sessions in conjunction with meditation and nutritional supplementation. A non-experimental design with no control group was used. Thirty-one participants received ionic footbaths twice a week for twelve weeks. Whole blood samples were taken prior to starting the sessions and after the twelve week program. During each ionic footbath session, the participants were instructed to meditate. After each ionic footbath, the participants were instructed to take one ounce of intraMAX™. Whole blood samples were analyzed using inductively coupled plasma/mass spectroscopy to test for levels of aluminum, arsenic, cadmium, lead, and mercury. Levels of aluminum and arsenic declined over the study period.

BACKGROUND

Ionic footbaths are one of a growing number of alternative health care products available to consumers through chiropractors and spas. Manufacturers of ionic footbaths believe that footbaths assist the body's natural ability to purge itself of toxins that accumulate in the body over time and potentially diminish the health of the individual. One of the most commercially successful ionic footbaths is the IonCleanse® which is manufactured and distributed by A Major Difference, Inc.

This report examines whether long term use of ionic footbaths, IonCleanse®, along with meditation, and nutritional supplementation, is associated with the release of different toxins from the body. It is hoped that findings from these studies will help practitioners and their customers better understand the potential benefits of assisting the body's natural detoxification process with the Ioncleanse®.

This report focused on five metals humans are commonly exposed to: aluminum, arsenic, cadmium, lead, and mercury. The current study examined levels of each heavy metal in the whole blood of the people participating in the study. Heavy metal levels were measured before and after the 12 week program to observe any changes in blood levels of those heavy metals.

The five metals studied here are present in the normal environment of all humans, but pose some health risks with acute exposure to high dosages or when too much of the metal accumulates in the body. Information about how humans are exposed to these metals and what is known about their potential impact on health is provided in the next sections. We then describe the research methodology and findings from the current study.

Aluminum

Sources of Exposure

Aluminum is a common element found in the natural environment. Everyone has some low level of exposure to aluminum as a result of their exposure to or ingestion of food, water, soil and air (Agency for Toxic Substances and Disease Registry [ATSDR], 2006a). The list of possible exposure sources is lengthy and includes (ATSDR 2006b; Blaurock-Busch & Griffin, 1996; Sholer, Pfeiffer, & Papaioannou, 1981):

Food Sources	Medication Sources	Other Sources
•drinking water	•buffered aspirin	•aluminum pots and pans, cans, and foil packaging
•food additives	•intravenous fluids	•antiperspirants and deodorants
•baking powder	•vaccines	•polluted air
•spices	•antacids	
•Brewed tea		

Established Health Impact

Most aluminum is not absorbed by the human body or if absorbed is excreted from the body through urine and feces. Aluminum can also be stored in human tissues and has been found in the brain, liver, colon, and bone (Blaurock-Busch & Griffin, 1996; Hellstrom, Mjoberg, & Mallmin, 2005). At very high levels of exposure, aluminum has been found to be toxic to the nervous system. This discovery was first made in patients on kidney dialysis who were also given aluminum to control their phosphate levels (ATSDR, 2006b). Toxic effects are typically observed after ingesting large amounts of aluminum as incurred by dialysis or after inhaling aluminum dust as is sometimes observed in workers at aluminum smelting plants.

At lower levels of exposure and accumulation, there is currently no consensus regarding the danger of aluminum to human health (ATSDR, 2006b). Some research has suggested that aluminum exposure may be associated with the development or progression of Alzheimer's disease; however available data are conflicting and no causal link has been established (McLachlan, Bergeron, Smith, Boomer, & Rifat,

1996). A recent research study investigating whether aluminum affected neurological functioning, only found one significant effect across multiple studies. The same study suggested there was poorer performance in aluminum exposed individuals on other outcomes, but those did not reach statistical significance (Myer-Bacon, Schaper, Knapp, & van Thriel, 2007).

Arsenic

Sources of Exposure

Arsenic is part of the natural environment and is contained in soil and rock (Benbrahim-Tallaa & Waalkes, 2008; ATSDR, 2007a). Arsenic in some forms can dissolve in water, potentially contaminating sources of drinking water. Arsenic is also released into the air through mining and smelting activities. As a result, people working in mining, smelting, electronic or wood preservation industries can experience occupational exposure (ATSDR, 2007a). In the past, arsenic was widely used in pesticides and in copper chromate arsenate (CCA) that was used to create pressure treated wood for outdoor construction. While these uses have been discontinued, levels of arsenic may still be elevated in the soil of agricultural areas where arsenic containing pesticides were used. Further, while the use of CCA-treated wood has been discontinued for residential purposes, structures such as play sets, decks, and picnic tables built with CCA treated wood remain and could be a source of arsenic exposure (Zartarian, Xue, Ozkaynak, Dang, Glen, Smith, & Stallings, 2006).

Most people are exposed to arsenic through water or food. Well water is more likely to be contaminated with arsenic, particularly in areas where the soil has elevated levels of arsenic. In terms of food, higher levels of arsenic tend to be found in seafood, rice, grains, and flour. When considering arsenic exposure, it is important to separate organic from inorganic arsenic. Inorganic arsenic is of greater concern for human health. While seafood is the largest dietary source of arsenic in the US, it has relatively low levels of inorganic arsenic (Borak & Hosgood, 2007).

Established Health Impact

Arsenic is a well known cancer-causing agent. In particular, exposure to high levels of arsenic substantially increases the risk of skin, liver, bladder, prostate, and lung cancer (ATSDR, 2007b, Benbrahim-Tallaa & Waalkes, 2008; Lundstrom, Englyst, Gerhardsson, Jin, & Nordberg, 2006). Arsenic is poisonous, so ingestion of relatively large amounts can lead to diarrhea, nausea, vomiting, and even death. Arsenic also impacts the production of blood cells which can lead to symptoms such as fatigue, bruising, and an abnormal heart rhythm (ATSDR, 2007b). Long-term arsenic exposure causes changes to the skin that includes darkened spots, corns and warts; these are often the first signs of exposure and are a warning for the more serious internal cancers that can follow with continued exposure (Argos, Parvez, Chen, Hussain, Momotaj, Howe, et al., 2007; ATSDR, 2007a).

Cadmium

Sources of Exposure

Cadmium is found throughout the natural environment. It can be found in air, soil, rocks, and food to varying degrees. Cadmium is released into the environment in a variety of ways, including forest fires and volcanoes, erosion of rocks, fertilizer use, and burning of fossil fuels and household waste (ATSDR, 1999a). Human exposure to cadmium occurs primarily through food and cigarette smoking, although individuals could also be exposed to cadmium from household dust (Hogervorst, Plusquin, Vangronsveld, Nawrot, Cuypers, van Hecke, et al., 2007), air, or water (ATSDR, 1999b; ATSDR, 1999a). Occupational exposure is also a risk for those involved in the production of batteries, coatings, or plastics or metal welding and soldering (ATSDR, 1999a).

As mentioned previously, food and cigarette exposure are the primarily routes of human exposure. Vegetables, shellfish, cereals, and liver and kidney meats tend to contain higher levels of cadmium relative to other foods (Akesson, Bjellerup, Lundh, Lidfeldt, Nerbrand, Samsioe, et al., 2006; ATSDR, 1999a). Tobacco in cigarettes contains less cadmium, but since the lungs absorb cadmium better than the stomach, there is higher exposure to cadmium from cigarettes than from food. Even low dose exposure to cadmium is a health concern because the human body does not eliminate cadmium very well. As a result, cadmium builds up in tissues, particularly the liver and kidneys, and over time, this long-term accumulation can adversely impact health (Kellen, Zeegers, den Hond, & Buntinx, 2007; Tellez-Plaza, Navas-Acien, Crainiceanu, & Guallar, 2008).

Established Health Impact

Multiple federal and international agencies have concluded that cadmium is reasonably likely to cause cancer (ATSDR,1999a), although data showing a causal link are limited. One problem in definitively establishing the causal link is cigarette exposure. While cigarette smoking exposes the individual to cadmium, it also exposes the individual to other known cancer causing agents. Thus, in many studies it is difficult to rule out the possibility that increases in the risk of cancer are due to exposure to other cancer causing agents.

Besides cancer, cadmium is suspected to have a variety of other health effects. Cadmium can build up in the kidneys and lead to kidney damage (ATSDR, 1999a; Akesson, Lundh, Vahter, Bjellerup, Lidfeldt, Nerbrand, et al., 2005). It can also affect bones leading to decreased

bone density and increase fragility and inhaling cadmium can damage the lungs (ATSDR, 1999a; Akesson, et al., 2006). While research on the effects of cadmium are on-going, the Agency for Toxic Substances and Disease Registry (ATSDR) argues that there is minimal evidence available to allow them to conclusively determine the health impact of cadmium exposure for humans.

Lead

Sources of Exposure

While federal regulations banning the use of lead in a variety of uses have greatly reduced the release of lead into the environment (ATSDR, 2007a), exposure to lead continues to be a significant public health risk (Centers for Disease Control and Prevention [CDC], 2007). During the 20th century, lead was released into the environment through vehicle exhaust because it was used as an additive to gasoline. Lead contamination also occurred because of its use in pesticides, paints, and food cans, and through industrial activities such as mining and the production of lead, lead alloys, and lead compounds (ATSDR). These industrial activities resulted in an accumulation of lead in dust and soil particularly in areas around highways, old agricultural areas, mines, power plants, incinerators, and land fills that can continue to pose health risks today. Older homes also pose a continued risk of lead exposure because lead-based paint used in older homes can be ingested, particularly by children who might eat paint chips or dust contaminated from the lead paint. In addition to ingestion, exposure to lead can also occur through breathing if lead particles in soil or dust become airborne (ATSDR).

Established Health Impact

Large public awareness campaigns as well as outreach efforts have educated the public about the risk of lead exposure to children. Children are particularly sensitive to the effects of lead because only about one-third of the lead that enters their body is eliminated through urine or feces; the rest is stored. In contrast, adults eliminate approximately 99% of the lead that enters their bodies (ATSDR, 2007a). Children can be affected by even low levels of lead exposure. While the Centers for Disease Control (CDC) established 10μg/dL as the blood lead level at which we should be concerned about health effects in children, CDC officials have since recognized that blood lead levels below that are dangerous to children's health and have been associated with lower intelligence (Jusko, Henderson, Lanphear, Cory-Slechta, Parsons, & Canfield, 2008; Lanphear, Hornung, Khoury, Yolton, Baghurst, Bellinger, et al., 2005) as well as other symptoms of nervous system dysfunction (Canfield, Gendle, & Cory-Slechta, 2004; CDC, 2007; Téllez-Rojo, Bellinger, Arroyo-Quiroz, Lamadrid-Figueroa, Mercado-Garcia, Schnaas-Arrieta, et al., 2006). While reductions in intelligence and attention problems are probably the best known consequences of childhood lead exposure, it has also been associated with anemia, muscle weakness, and kidney damage (ATSDR).

In both adults and children, the nervous system is the primary target of lead's health effects. Lead accumulates in the body over time and is primarily stored in the bones and teeth, where it can be stored for many years (ATSDR, 2007a; Campbell & Auinger, 2007). Recent studies and reviews of the literature found that lead exposure in adults was associated with reductions in the size of brain regions, greater declines in the cognitive abilities of older adults (Stewart & Schwartz, 2007), increased blood pressure and increased risk of cardiovascular problems (Navas-Acien, Guallar, Silbergeld, & Rothenberg, 2006).

Mercury

Sources of Exposure

Mercury is a naturally-occurring element in our environment and comes in many forms. The two forms that are known by many people are metallic mercury and methylmercury. Metallic mercury is a silver-colored liquid that used to be routinely used in thermometers and is still used in a variety of applications. When inorganic mercury is present in the water system, microorganisms convert it to methylmercury which then becomes a contaminant in seafood (ATSDR, 1999a; Yokoo, Valente, Grattan, Schmidt, Platt, & Silbergeld, 2003).

Everyone is exposed to some level of mercury which occurs when they inhale vaporized mercury or when they eat or drink something that is contaminated with mercury (Mahaffey, 2005). Mercury is present at what are considered safe levels in the air of urban and non-urban outdoor areas. However, airborne levels of mercury are typically higher in areas near hazardous wastes sites, incinerators, or power plants that burn coal or other fossil fuels (ATSDR, 1999a). It is also more likely to be present in work environments such as plants that manufacture electrical equipment or automobiles, chemical processing plants, medical and dental offices, and in construction (ATSDR, 1999b). Mercury can also become airborne when it is released from broken thermometers, thermostats, or fluorescent light bulbs or from dental amalgams used to fill cavities. Metallic mercury is more likely to be absorbed by the body when it is inhaled than when it is ingested (ATSDR, 1999a).

In contrast to metallic mercury, methylmercury is easily absorbed when ingested. Methylmercury is typically ingested when people eat fish, shellfish, or marine animals. Larger and older fish tend to have higher levels of methylmercury. Mercury levels in fish that are commercially sold are regulated by the FDA, so the seafood we consume is typically considered safe. However, mercury does accumulate so eating large amounts of fish over an extended period of time can lead to a higher than desirable level of mercury in the body. People who eat the fish they catch may also inadvertently expose themselves to mercury if they are fishing in mercury contaminated waters. Mercury can also be passed from pregnant and nursing women to the fetus or child.

Established Health Impact

Mercury is known to be a toxin to the nervous system and the kidneys; at high levels mercury exposure can lead to death (ATSDR, 1999a; Mahaffey, 2005). The effects of mercury exposure depend upon the type of exposure, because some types of mercury can easily pass through to the brain (methylmercury, vaporized mercury), but other types cannot (ATSDR, 1999a). A sensation of pins and needles, referred to as paresthesia, may be the earliest sign of lower level mercury exposure (Mahaffey). At higher levels of exposure or as mercury accumulates in the system over time, symptoms include tremors, irritability and nervousness, a reduction of the visual field, loss of sensation, memory problems, and muscle coordination problems (ATSDR, 1999a; Auger; 2005; Mahaffey; Yokoo, et al., 2003). Kidney damage can also occur because mercury accumulates in the kidneys. Breathing high levels can irritate or damage the lining of the mouth, throat, and lungs. It can also cause nausea, vomiting, diarrhea, and increases in blood pressure and heart rate (ATSDR, 1999a). The level of vapor exposure needed to produce those effect are more likely to be found in industrial settings where levels are much higher than in the air most of the general population breathes.

METHODS

Participants

Participants included 31 adults recruited in Colorado (CO) and North Carolina (NC). They ranged in age from 21 to 77 years, with a mean age of 45.4 years. The majority of participants were from Colorado (see Table 1). A variety of methods were used to recruit participants.

- Metal workers at the CO plant that produces components of the IonCleanse® were invited to participate (n = 8)
- People attending an alternative health clinic in North Carolina for other reasons were invited to participate (n = 8)
- Referrals from current IonCleanse® users in CO (n = 15)

Beyond the free IonCleanse® sessions and free supplementation, participants were not compensated for their participation.

Ionic Foot Bath Session

Participants received two ionic footbaths per week for a total of six months, although this study only details results from the first twelve weeks. The IonCleanse® footbath manufactured by A Major Difference, Inc was used for the study. Participants were instructed to relax and meditate during the ionic foot bath session. There was a minimum of 48 hours between each foot bath session. If participants missed a session, they could reschedule it within the same week as long as there was still a 48 hour lapse between successive sessions. Participants in North Carolina received the sessions at an alternative health clinic. Participants in Colorado received the sessions at the Integrated Health and Energy Center which is a natural health clinic.

Following each session with the IonCleanse®, participants were asked to drink a minimum of eight 8 oz glasses of water within the next 24 hours. They also replaced electrolytes with a 1 oz Intra Max mineral drink.

Blood Analysis

Participants visited a Laboratory Corporation of America (LabCorp) patient service center where blood was drawn using sterile techniques and stored in the royal blue top tube containing a sodium heparin preparation (Metametrix, 2008a). Whole blood samples were sent by LabCorp to Metametrix laboratories which analyzed the samples using inductively coupled plasma/mass spectroscopy (ICP-MS). ICP-MS is a desirable method for analyzing trace elements because of its fast analysis and because of its accuracy and very low detection limits (Worley & Kvech, n.d.). The technology enables the measurement of some elements at the parts per trillion (ppt) level. For example, the threshold for measuring arsenic and lead are 400 – 500 ppt and 50 – 100 ppt respectively.

Metametrix reported outcomes in parts per billion (ppb) and all data presented in this report use that scale. All trace elements were measured in whole blood which according to Metametrix should be interpreted to indicate recent or increased exposure to the tested elements (Metametrix, 2008b).

Questionnaire

All participants completed a background questionnaire developed by The Alternative Health Research Foundation that included questions about age, sex, occupation, common health complaints (e.g., nausea, headaches, and fatigue), cigarette use, potential occupational exposure and major health problems.

Limitations

In the current study, all heavy metals were measured in whole blood. There are a variety of mediums for measuring heavy metal exposure in humans. For example, blood, hair, and urine have all been used to assess levels of exposure (ATSDR, 1999a; ATSDR, 2007a). There is no single medium that is recommended for measuring all heavy metal exposure. In other words, while blood might be the recommended medium for measuring one heavy metal, it is not recommended for measuring all heavy metals due to factors such as the half life of the specific heavy metal in blood (ATSDR, 2007a). According to Metametrix, the laboratory that conducted the analyses, "whole blood generally reflects increased or recent exposure to toxic elements" (Metametrix, 2008b).

When reading this research report, one should keep in mind that a non-experimental design with no control group was utilized. As a result, no causal conclusions can be drawn. Rather, all that can be concluded is that following IonCleanse® sessions levels of each substance measured in whole blood did or did not change. Any observed changes could be due to the IonCleanse® session or could be due to some other factor that was not measured or controlled in this study.

QUESTIONNAIRE DATA

Thirty-one people participated in the study at Colorado or North Carolina sites. General background information on the sample is reported in Tables 1 through 3 below. Prior to initiating session with the IonCleanse®, participants reported a variety of common health complaints. The most frequently reported health complaints in the sample were joint pain, trouble sleeping, fatigue, and allergies.

Table 1. Participant Sex and State of Residence

	N	%
Sex		
Male	15	48.4
Female	16	51.6
Site		
CO	23	74.2
NC	8	25.8

Joint pain and tremors were related to blood levels of cadmium and mercury respectively. Specifically, people with cadmium levels above the median for the sample prior to starting the IonCleanse® sessions reported significantly more frequent joint pain than people with levels below the median, $F(1, 29) = 4.3$, $p < .05$. People with mercury levels above the median for the sample prior to starting the IonCleanse® sessions were significantly more likely to report experiencing tremors than people with levels below the median, $X^2(1, 31) = 7.1$, $p < .01$. A dose reponse relationship between tremors and level of accumulated mercury has been previously reported in the literature (Auger, Kofman, Kosatsky, & Armstrong,2005).

Table 2. Frequency of Self Reported Health Symptoms

Symptom	Never / Rarely	Sometimes	Almost Always / Always
Nausea	83.9	16.1	0.0
Diarrhea	74.2	22.6	3.2
Edema*	80.6	12.9	3.2
Joint Pain	32.3	48.4	19.4
Respiratory Problems	83.9	16.1	0.0
Constipated	67.7	25.8	6.5
Trouble Sleeping	45.2	29.0	25.8
Headaches/Migraines	54.8	35.5	9.7
Fatigue	35.5	48.4	16.1
Allergies	45.2	35.5	19.4

Symptom	Never / Rarely	Sometimes	Almost Always / Always
Irritable	64.5	25.8	9.7
Loss of Appetite	87.1	9.7	3.2
Memory Loss	54.8	41.9	3.2
Dehydrated	64.5	25.8	9.7
Depressed	67.7	29.0	3.2
Metallic Tastes	80.6	19.4	0.0
Itchy Skin	71.0	29.0	0.0
Nervous/ Anxious	54.8	38.7	6.5
Tremors	87.1	9.7	3.2

*3.2% of responses were missing

Table 3. Self Reported Lifestyle Risk, Healthy Eating, and Health Risks

	N	%
Lifestyle/Career Risks		
Smoke Cigarettes	5	16.1
Work with Metals	10	32.3
Work with Plastics	10	32.3
Work with Chemicals	7	22.6
Healthy Eating		
Eat Organic Food	12	38.7
Drink Filtered Water	26	83.9
Health		
Have a Pace Maker	0	0.0
Have a Transplanted Organ	0	0.0
Pregnant or Nursing	0	0.0

ANALYSIS

Before any analyses were conducted, all data were examined to ensure the data met the assumptions of the statistical tests that would be used. When working with small samples, these assumptions are often violated and other methods of statistical analysis must be used. In the current dataset, there were distributional problems. To account for these, the aluminum, arsenic, lead, and mercury data were log transformed and the log transformed variables were used in all analyses. The distributions of the cadmium data could not be corrected, so non-parametric tests were used to test for significance. Raw data are presented in tables for ease of interpretation.

The goal of the statistical analyses was to determine whether levels of heavy metals measured in whole blood changed from the pre to the post-test. Pre-test samples were taken prior to initiating IonCleanse® sessions. Post-test samples were taken after the individuals received two IonCleanse® sessions per week for 12 weeks.

Aluminum Findings

Prior to starting session, aluminum measured in whole blood varied as a function of sex, $F(1, 27) = 7.3$, $p < .01$, and state of residence, $F(1, 27) = 5.9$, $p < .02$. Specifically, men had significantly higher aluminum levels than women (raw values: 93.0 vs. 67.4) and Colorado residents had significantly higher levels than North Carolina residents (raw values: 87.1 vs. 58.6). However, after 12 weeks of the IonCleanse® session there were no differences in measured levels of aluminum between these groups.

A paired-samples t-test examined whether aluminum levels measured in whole blood changed from the pre-test to the post-test. There was a significant change, $t(30) = 6.0$, $p < .001$, indicating that the level of aluminum in the whole blood samples was significantly lower after 12 weeks of session with the IonCleanse® than prior to starting the sessions. Follow-up tests indicated there was a significant change for men and women as well as residents of both states. However, the largest changes were observed in men and residents of Colorado.

Table 4. Mean (and Standard Deviation) Raw Data for Each Metal Measured at Pre and Post Test

Metal Data	Mean	SD
Aluminum		
Pre Test	79.8	29.6
Post Test	43.1	19.4
Arsenic		
Pre Test	4.6	2.3
Post Test	3.5	1.0
Cadmium		
Pre Test	0.5	0.3
Post Test	0.5	0.2

Metal Data	Mean	SD
Lead		
Pre Test	13.7	6.4
Post Test	13.2	5.9
Mercury		
Pre Test	1.8	1.4
Post Test	1.8	1.2

Arsenic Findings

Contrary to the aluminum data, there were no sex or state of residence differences in whole blood levels of arsenic detected in the pre or post-test data. A paired-samples t-test examined whether arsenic levels measured in whole blood changed from the pre-test to the post-test. There was a significant effect, $t(30) = 2.9$, $p < .01$, indicating that the level of arsenic in the whole blood samples was significantly lower after 12 weeks of session with the IonCleanse® than prior to starting session.

Cadmium Findings

Cadmium levels measured in whole blood did not differ as a function of sex or state of residence at the pre- or post-test. Cadmium levels were initially low and there was no significant change in measured levels of cadmium from the pre-test to the post-test.

Lead Findings

Lead levels measured in whole blood did not differ as a function of sex or state of residence at the pre or post test. A paired-samples t-test found no significant difference in levels of lead prior to session compared to after session.

Mercury Findings

There was a significant main effect of sex, $F(1, 27) = 8.3$, $p < .01$, and a significant sex by state of residence interaction, $F(1, 27) = 6.0$, $p < .02$, on pretest levels of mercury. At the pretest, males had higher levels of mercury than females. However, that difference was primarily due to participants from North Carolina. As can be seen in Table 5, pre-test mercury levels did not differ for males and females in Colorado, but males from North Carolina, had higher pre-test mercury levels than all other groups. These effects were no longer present at post-test. Given the small sample size, this interaction should not be over interpreted.

A paired-samples t-test found no significant difference in levels of mercury prior to sessions compared to after sessions.

Table 5. Mean Levels of Mercury Showing the Main Effect of Sex and Sex by State of Residence Interaction at Pre-Test

Sex	Pre	Post
Male	2.2	2.0
Female	1.5	1.6

Sex X State of Residence	Pre	Post
Female CO	1.8	1.7
Female NC	0.9	1.3
Male CO	1.8	1.8
Male NC	3.7	2.7

SUMMARY

Manufacturers of ionic footbaths argue that the devices, along with supplementation and relaxation, assist the body in its normative process of purging itself of toxins such as heavy metals. This research report demonstrates an association between changes in the levels heavy metals present in whole blood and the use of ionic footbaths, specifically the IonCleanse®, in conjuction with mediation and a nutritional supplement.

The current research study utilized a pre-post design with no control group to examine the association between levels of Aluminum, Arsenic, Cadmium, Lead, and Mercury measured in whole blood prior to initiating the sessions with the IonCleanse® and after 12 weeks of sessions. A whole blood measure of these metals typically reflects recent exposure, making it a less than ideal medium for the current study. Future planned studies will utilize urinary or hair samples to track the release of toxins.

Significant differences were found for both Aluminum and Arsenic with measured levels declining from the pre-test to the post-test period. The aluminum findings were complicated by the presence of main effects for sex and state of residence indicating that the initial levels of exposure were higher for males and for residents of Colorado. However, aluminum declined for both males and females as well as residents of both states over the study time period.

Findings from this initial research study can be used as a building block for future studies to explore whether ionic foot bath sessions assist the body in its natural efforts to purge toxins from the system. This initial study was limited by the non-experimental design and the use of only whole blood assays for determining exposure. Future studies can be substantially improved by the addition of a control group and by using alternative or multiple measures of toxins.

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