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Review Article

Understanding Diabesity and Possibly Reversing Metabolic Syndrome (Insulin Resistance) In 12 Subjects Over 3 Months

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Abstract

The objective of this study is to find an alternative approach to reduce and possibly reverse any or all metabolic syndrome disorders: diabetes, cholesterol, blood pressure and obesity in 12 subjects over 3 months using pre/post AO scan and lab results, wellness IQ questionnaire https://academyofwellness.com and CBC blood test results including HBA1C, lipid panel, CBC, and urine tests. Overall results were positive which suggests possible reduction and reversal of metabolic syndrome using AO scan and holistic alternatives.

Keywords: Metabolic Syndrome; Insulin Resistance; Type 2 Diabetes; Hypertension; AO Scan

Abbreviations

CBC: Complete Body Count; HbA1c: Hemoglobin A1c; HDL: High Density Lipoprotein; LDL: low Density Lipoprotein; CRP: C Reactive Protein; SEFI: Subtle Energy Frequency Imprinter

Introduction

Insulin Resistance

Insulin is a metabolic hormone your pancreas makes to regulate blood glucose and helps transport it from the bloodstream to cells for energy. Insulin resistance is a complex condition in which your body cells don't respond to insulin as it should and can't take sugar from the blood and produce more insulin to keep up with higher blood sugar levels as the main driver to metabolic syndrome [1]. In normal circumstances; insulin stimulates glucose uptake into skeletal muscle, inhibits hepatic gluconeogenesis, and decreases adipose-tissue lipolysis and hepatic production of very-low-density lipoproteins [2]. Insulin signaling in the brain to decrease appetite and prevents glucose production by the liver, in contrast when Insulin resistance develops due to genetics and lifestyle reasons end into the release of free fatty acids from adipose tissue, increased hepatic production of very-low-density lipoproteins and decreased high-density lipoproteins, build up of triglycerides in the liver and fat cells. The increased production of free fatty acids, inflammatory toxic chemicals cytokines, and adipokines and mitochondrial dysfunction contribute to impaired insulin signaling, decreased skeletal muscle glucose uptake, increased hepatic gluconeogenesis, and β cell dysfunction leading to hyperinsulinemia and sugar stored as fat. In addition, insulin resistance impairs vasodilation induced by nitric oxide, excessive sodium and water retention in the kidneys to the development of hypertension and obesity as well chronic inflammation [3]. As for a variety of reasons, the body's cells don't respond to insulin as they should and can't easily take sugar from the blood, the pancreas begins to release more insulin to try to keep up with higher blood sugar levels. If the cells become too resistant to insulin, it can result in elevated blood sugar levels, which can lead to weight gain [4] prediabetes and type 2 diabetes, liver dysfunction. Losing weight with insulin resistance will become more difficult because the body stores excess blood sugar as fat. Keep in mind the liver plays a crucial role in insulin resistance mechanism with over 500 body functions to name a few as in hormone regulations, fat, carbohydrates and protein metabolism, cholesterol metabolism, blood sugar regulation, filtering blood from toxins, glycogen storage, production of cholesterol and special proteins and finally detoxification [5,6].

Understanding the relationship between these diseases is crucial to developing effective prevention and management strategies [7,8].

Results

Subject	HBA1C		Cholesterol		Triglycerides		C-RP		BMI		Wellness IQ	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	8.0	6.4	5.1	4.7	5.3	4.9	9.4	9.1	38.4	36.2	60	70
2	5.9	5.6	4.2	3.9	1.6	1.3	5.8	6.0	38.7	35.1	30	55
3	5.7	5.5	5.2	4.9	1.1	1.0	0.6	0.5	24.0	22.7	80	85
4	5.3	5.0	5.4	4.9	0.8	0.6	2.2	2.1	17.4	17.9	45	60
5	5.2	5.0	6.4	6.3	2.5	2.4	5.2	5.4	28.7	27.1	60	75
6	5.4	5.2	6.3	5.7	1.6	1.2	3.2	2.9	26.2	25.9	45	70
7	5.7	5.4	6.1	5.6	1.9	1.7	22.4	20.1	42.8	38.4	30	55
8	7.4	6.9	7.1	6.3	4.3	4.1	5.6	5.4	28.3	25.0	50	70
9	8.2	7.1	3.1	2.6	2.3	2.0	6.8	6.4	39.0	34.1	35	65
10	8.0	6.0	4.1	4.4	1.4	1.5	6.3	6.2	31.6	29.9	50	75
11	9.7	5.7	5.4	4.9	1.2	0.9	68.7	45.0	36.3	35.1	65	70
12	8.4	8.0	5.4	5.0	1.9	1.4	6.9	6.7	39.8	36.2	60	65

Table a

*AO scan gave an indication of whether these biomarkers for the subjects were in range using ↑ or ↓ arrows and a normal indication. All the subjects showing HBA1C

,Hs-C-RP,cholesterol and triglycerides in section chemistry of the body system program show the same outcome as in lab work.*

Discussion

Twelve subjects were randomly selected in Griesbach Physiotherapy in Edmonton, AB, Canada. Subjects were asked to commit to nutritional and lifestyle changes for 3 months.

Subjects through lab work results and the AO scan device were tested on 11 programs that correlate with CBC, lipid panels, HA1C and fasting on imbalances of organs, tissues, and body systems.

The IQ wellness test demonstrates the subject of well being. Wellness IQ tests can measure: lifestyle, food habits, oxygenation, hydration, stress, sleep, supplement intake and usage of medications. The overall score ranges from 0 to 100%, a higher score indicating better overall health. Subjects under 50% may indicate health issues including excessive levels of stress. Meanwhile, subjects over 80% are in great overall health and ideally should maintain it.

The AO scan detects imbalances of body organs and emotional state using frequencies based on the work of scientists Tesla and Rife who shared the principle that everything is energy, frequency and vibration.

Finally, the lab results measure figures and numbers for CBC, lipid panel, A1C and glucose.

CBC blood test includes HBA1C, which is the measure of the average of blood sugar over a 3 month period. Lipid panels indicate the liver's health, with 6.5% or higher indicating diabetes, 5.7% to 6.4% showing prediabetes, and lower than 5.7% confirming normal.

It is shown in the results that after using AO scan and lifestyle changes, subjects receive a significant improvement in overall health by doing simple changes that reduce and even reverse the symptoms of Diabesity, hyperlipidemia and hypertension.

Literature Review

Metabolic syndrome affects more than a third of the US population, predisposing to the development of type 2 diabetes and cardiovascular disease[12].The term metabolism refers to a whole sum of chemical and physical reactions that take place within each cell of the body to continue its growth and functioning. A syndrome is a cluster of symptoms and conditions that characterize the presence of a specific disease or an increased chance of developing a disease or a condition. A metabolic syndrome or syndrome X [27] is a cluster of 3 or all of the following elements: abdominal obesity, hypertension [16], hyperglycemia and hyperlipidemia [6].

Signs and symptoms: metabolic syndrome manifests a wide range of symptoms evident on the individual's condition. Symptoms of blurred vision, increased thirst and urination, slow healing, dry skin and fatigue are due to high blood sugar [17]. Next, chest pain, severe headaches, shortness of breath, nose bleeds, and dizziness are indications of high blood pressure. Dysilipedmia is shown through fatty skin deposits, chest pain, rapid breathing, and memory issues. Lastly, breathlessness, increased sweating, snoring and trouble sleeping, weight gain specifically on the waist section are symptoms of being overweight or obese [9].

Causes: An individual's excess weight and insulin resistance are central to the syndrome. Fat cells in your abdomen can raise free fatty acids resulting in the inability of the body to control blood sugars. This leaves excess chemicals that lead to increased inflammation, plaque build up inside blood vessels and result in high blood pressure and triglyceride. In addition, the pancreas, in order to produce energy in the muscle and liver cells, has to increase its insulin hormone secretions and sugar intake levels to above the normal range which can result in pre and type2 diabetes [21]. Aging can play into causing the syndrome in individuals over 45 who also have genetic predisposition with family history in diabetes and blood pressure. These factors are well interconnected directly with inactive lifestyle habits, poor dietary habits, and not enough sleep concluding in higher chances of insulin resistance and weight gain [27].

Criteria and risk factors

According to the National Heart, Lung and Blood Institute (NHLBI) and the National Cholesterol Education Program, there are multiple diseases that connect to metabolic syndrome which have to include at least three of the following risks [28]. An abdominal waist circumference of more than 40 inches in males and 35 inches in females can lead to higher risks of coronary vascular disease. Triglyceride levels at or above 150 mg/dL will result in fatty liver disease and hypertriglyceridemia. Having HDL cholesterol lower than 40 mg/dL in males or 50 mg/dL in females is another risk of disease. If while fasting, blood sugar levels between 100 to 125 mg/dL risk prediabetes and above 125 mg/dL risks type 2 diabetes. Finally, systolic blood pressure values at or above 130 mmHg (the top number) and/or diastolic values at or above 85 mmHg(the bottom number) can cause cardiovascular diseases. Other risk factors might be considered: hormonal changes and Polycystic Ovary Syndrome(PCOS), smoking, sleep apnea, and ethnicity regarding African American, Asian American, Hispanic, and Indigenous groups [14]. Preventing these risk factors is not always possible, but individual awareness is helpful for maintaining their ideal health. For this reason, doctors encourage people to adopt lifestyle measures that can help reduce the risk of the condition.

Diagnosis and Testing: Metabolic syndrome is commonly diagnosed by a number of medical professionals [13]. A general practitioner, cardiologist, or endocrinologist will assess by a clinical evaluation on whether you have diabetes, hyperlipidemia, hypertension or obesity. Typically, these are the diagnosis and tests for each metabolic syndrome condition.

High blood sugar level

The A1C test measures the average blood sugar level over the past 3 months.

- **Normal:** below 5.7%
- **Prediabetes:** 5.7-6.4%
- **Diabetes:** 6.5% or above

The blood glucose test does measurements after fasting for 8 hours or more.

Figure a: https://www.researchgate.net/figure/Current-diagnostic-criteria-for-metabolic-syndrome-according-to-the-2009-joint-statement_fig2_380969798.

- **Normal:** Less than 100 mg/dL normal
- **Prediabetes:** 100-125 mg/dL
- **Diabetes:** 126 mg/dL or above

An oral glucose tolerance test(OGTT) measures how quick and efficient the body processes glucose after overnight fasting following blood tests and after glucose drinks in 1-3 hours intervals.

- **Normal:** 140 mg/dL or below
- **Prediabetes:** 140-199 mg/dL
- **Diabetes:** 200 mg/dL or above [10]

Lipid panel measures blood lipids to indicate the risk of CVD, heart attack and stroke. Total Cholesterol (TC) Levels

- Less than 200 mg/dL: desirable
- 200-239 mg/dL 240 and above: borderline high
- 240 mg/dL and above: high HDL Cholesterol Levels
- High: 60 mg/dL (desired level; higher is better)
- Low: Less than 40 mg/d LDL Cholesterol Levels
- Ideal: Less than 70 mg/dL
- Normal: 70-100 mg/dL
- Borderline high:100-130 mg/dL
- High: 130-160 mg/dL
- Very high: greater than 160 mg/dL Triglyceride Levels
- Normal: Less than 150 mg/dL
- High: 150-199 mg/dL
- Very high: 200-499 mg/dL
- Extremely high: greater than 500 mg/dL
- Danger of pancreatitis: greater than 1000 mg/d
- Blood Pressure: measures in upper number (systolic)/ lower number(diastolic) and performed by blood pressure cuff (sphygmomanometer) in mm/Hg.

Blood Pressure Levels

- **Normal:** below 120/80
- **Prehypertension:** 120-139/80-89
- **Stage 1 hypertension:** 140-159/90-99
- **Stage 2 hypertension:** 160 and higher/100 and higher

Lab tests include blood and urine tests to determine kidney, liver, thyroid functions. Electrocardiogram (ECG or EKG) measures the heart's electrical activity Echocardiogram is a sound waves exam giving detailed images of blood movements in the heart.

Obesity

Body Mass Index(BMI) measures one's percentage of body fat. It is a ratio between one's weight and one's height.

- **Underweight:** Less than 18.5
- **Normal:** 18.5-24.9
- **Overweight:** 25-29.9
- **Class I obesity:** 30-34.9
- **Class II obesity:** 35-39.9
- **Class III obesity:** Greater than 40
- **Super-obesity:** Greater than 60

Waist circumference measures ratio between hip and waist circumference

- For women hip to waist ratio of 0.8 or less: safe
- For men hip to waist ratio of 0.9 or less: safe
- Greater than 1.0: high risk
- DEXA determines body fat percentage [11].

Related diagnosing testing: Testing for Inflammation.

1.A C-reactive Protein test examines the blood levels of CRP in blood. It is used in lipid panel tests to predict future cardiovascular events in healthy individuals [26]. High CRP indicates an inflammation in the lining of the blood vessels linked to metabolic syndrome, especially obesity, insulin resistance and CVD. This protein responds when the body experiences injury, infection, or inflammation. Elevated levels of this protein indicate a greater degree of inflammation.

- **Low risk:** Less than 1.0mg/L or 0.3mg/dL to 1.0mg/dL
- **Average risk:** 1.0 to 3.0mg/L or 1.0mg/dL to 10.0mg/dL
- **High risk:** Greater than 3.0mg/L or greater than 10 mg/dL to 50 mg/dL 2.Homocysteine test measures the amount of homocysteine in blood.

Homocysteine is an amino acid in the blood to make proteins. High levels are toxic and have been linked to an increased risk of cardiovascular disease and blood clots. Elevated homocysteine levels may damage the lining of blood vessels which lead to cardiovascular problems and impair insulin sensitivity. It can be the result of a deficiency of vitamin B9, folic acid and low vitamin B6 and B12 levels.

Normal: 0.54 to 2.3 mg/L

Treatment and Prevention

Reversing and overcoming metabolic syndrome is possible with the support of health care providers through a combination of dietary and supplementation recommendations, as well lifestyle modifications. Losing 5-10% of excess weight [2] will increase insulin sensitivity, lower blood pressure and cholesterol levels. As well, being active [14] will have a positive effect on lipid and glucose levels, improve mood, sleep and muscle performance and finally boost immunity. It is important to focus on whole, plant based food and developing a good eating habits by starting your day with Dr. Grant recipe of ½ tsp lemon, baking powder, apple cider vinegar, ginger, turmeric cinnamon, cayenne pepper before each meal to burn stored fat and digestion support [33]. Next, eat a high protein diet with fresh, good and natural quality food and a variety of vegetables and fruits. Make sure to add avocado and olive oil to your salad while eliminating the highly inflammatory hydrogenated canola and corn oil. Keeping away from dairy and gluten products will enhance the digestive system. Eliminate processed food full of refined sugar and fats and replace it with complex carbohydrates and leafy greens. Avoid coffee and stimulants and substitute it with green and herbal teas to get rid of toxins.

For more lifestyle related notes

- Drinking filtered water 2-3 liters daily keeps the body well hydrated and toxins eliminated. Wash food thoroughly with vinegar and water to remove glyphosates and toxins.
- Mindful eating by chewing and eating food slowly will assist in digestion and fullness, eating the last meal 2 hours before bedtime will help the body burn fat at night. Intermittent fasting for 12 to 16 hours 2-3 times a week will reduce risk of disease and cellular repair
- It is essential to train the body in deep breathing techniques and meditation to increase oxygenation and blood flow to the heart.

It is highly recommended to support metabolic syndrome with a variety of supplements to name a few ones including berberine [1], milk thistle, vitamin D with K2, CoenzymeQ10, probiotics, fiber and omega3 as a great and speedy way in the healing process.

Insulin resistance

Insulin is a metabolic hormone your pancreas makes to regulate blood glucose and helps transport it from the bloodstream to cells for energy. Insulin resistance is a complex condition in which your body cells don't respond to insulin as it should and can't take sugar from the blood and produce more insulin to keep up with higher blood sugar levels as the main driver to metabolic syndrome [20]. In normal circumstances; insulin stimulates glucose uptake into skeletal muscle, inhibits hepatic gluconeogenesis, and decreases adipose-tissue lipolysis and hepatic production of very-low-density lipoproteins [15]. Insulin signaling in the brain to decrease appetite and prevents glucose production by the liver, in contrast when Insulin resistance develops due to genetics and lifestyle reasons end into the release of free fatty acids from adipose tissue, increased hepatic production of very-low-density lipoproteins and decreased high-density lipoproteins, build up of triglycerides in the liver and fat cells. The increased production of free fatty acids, inflammatory toxic chemicals cytokines, and adipokines and mitochondrial dysfunction contribute to impaired insulin signaling, decreased skeletal muscle glucose uptake, increased hepatic gluconeogenesis, and β cell dysfunction leading to hyperinsulinemia and sugar stored as fat. In addition, insulin resistance impairs vasodilation induced by nitric oxide, excessive sodium and water retention in the kidneys to the development of hypertension and obesity as well chronic inflammation [22]. As for a variety of reasons, the body's cells don't respond to insulin as they should and can't easily take sugar from the blood, the pancreas begins to release more insulin to try to keep up with higher blood sugar levels. If the cells become too resistant to insulin, it can result in elevated blood sugar levels, which can lead to weight gain [19] prediabetes and type 2 diabetes, liver dysfunction. Losing weight with insulin resistance will become more difficult because the body stores excess blood sugar as fat. Keep in mind the liver plays a crucial role in insulin resistance mechanism with over 500 body functions to name a few as in hormone regulations, fat, carbohydrates and protein metabolism, cholesterol metabolism, blood sugar regulation, filtering blood from toxins, glycogen storage, production of cholesterol and special proteins and finally detoxification [23,24].

Understanding the relationship between these diseases is crucial to developing effective prevention and management strategies [5,7,8,23,25,32].

Summary

Patience is the key; metabolic syndrome didn't happen overnight but with commitment and dedication of 3-6 months you will see a noticeable improvement in insulin resistance, inflammation and sugar level. Monitor your results with AO scan and lab work as an evidence to your health improvement. Make a plan to commit to regular exercise [3], a nutrition plan and your body will start to heal and gradually, reduce medications as you treat it from the root cause of the conditions.

AO Scan Device

AO SCAN

AO SCAN is an amazing tool that scans the entire body, restores out of balance body frequencies back to their normal state. It gives you a detailed look inside your body without the need for blood tests, image machines or even fasting.

- AO SCAN is an educational device that teaches us about our body, imbalances and frequencies. However it DOES NOT diagnose, treat, cure or replace your medical tests.
- AO SCAN provides instant results that allows practitioners to make the necessary adjustments on the spot.

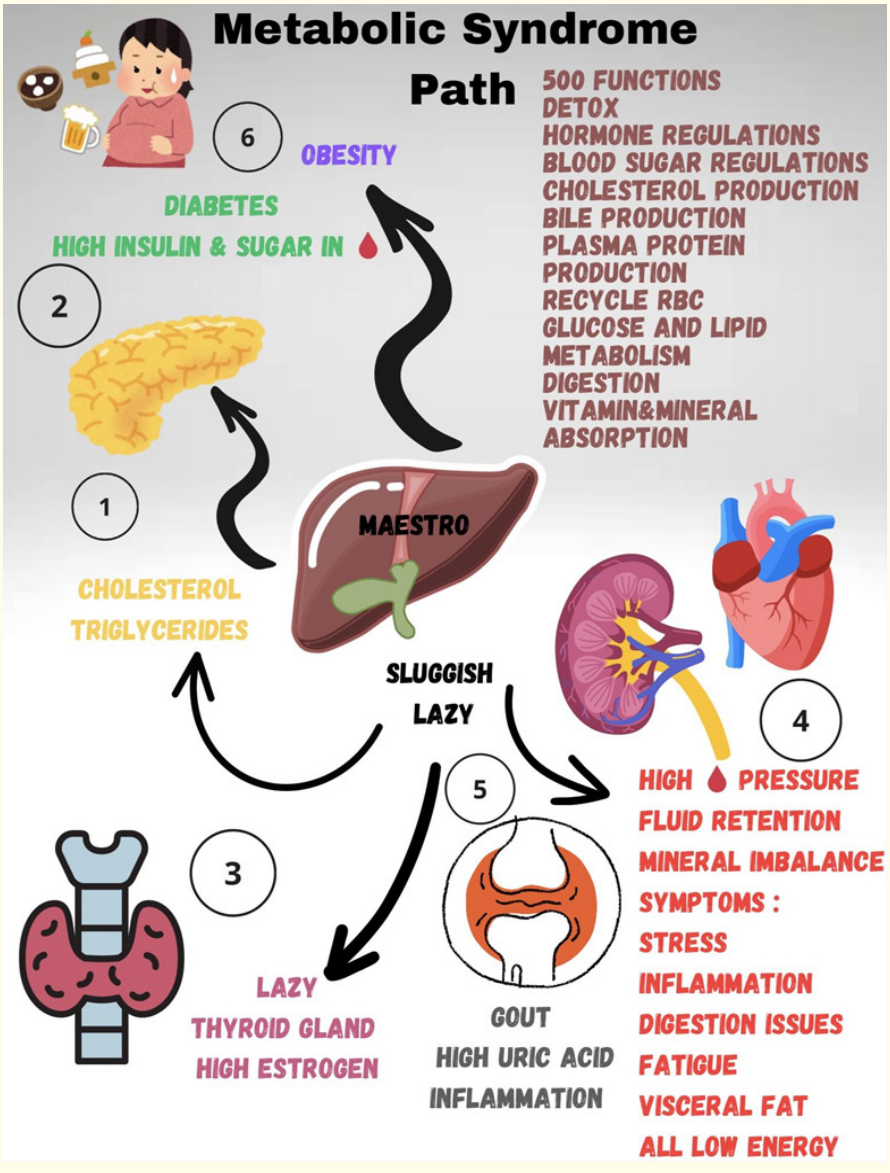
Metabolic Syndrome
Path
500 FUNCTIONS
DETOX
HORMONE REGULATIONS
BLOOD SUGAR REGULATIONS
CHOLESTEROL PRODUCTION
BILE PRODUCTION
PLASMA PROTEIN
PRODUCTION
RECYCLE RBC
GLUCOSE AND LIPID
METABOLISM
DIGESTION
VITAMIN&MINERAL
ABSORPTION
6
OBESITY
DIABETES
HIGH INSULIN & SUGAR IN
2
1
MAESTRO
CHOLESTEROL
TRIGLYCERIDES
SLUGGISH
LAZY
4
5
3
HIGH PRESSURE
FLUID RETENTION
MINERAL IMBALANCE
SYMPTOMS :
STRESS
INFLAMMATION
DIGESTION ISSUES
FATIGUE
VISCERAL FAT
ALL LOW ENERGY
LAZY
THYROID GLAND
HIGH ESTROGEN
GOUT
HIGH URIC ACID
INFLAMMATION

Figure b

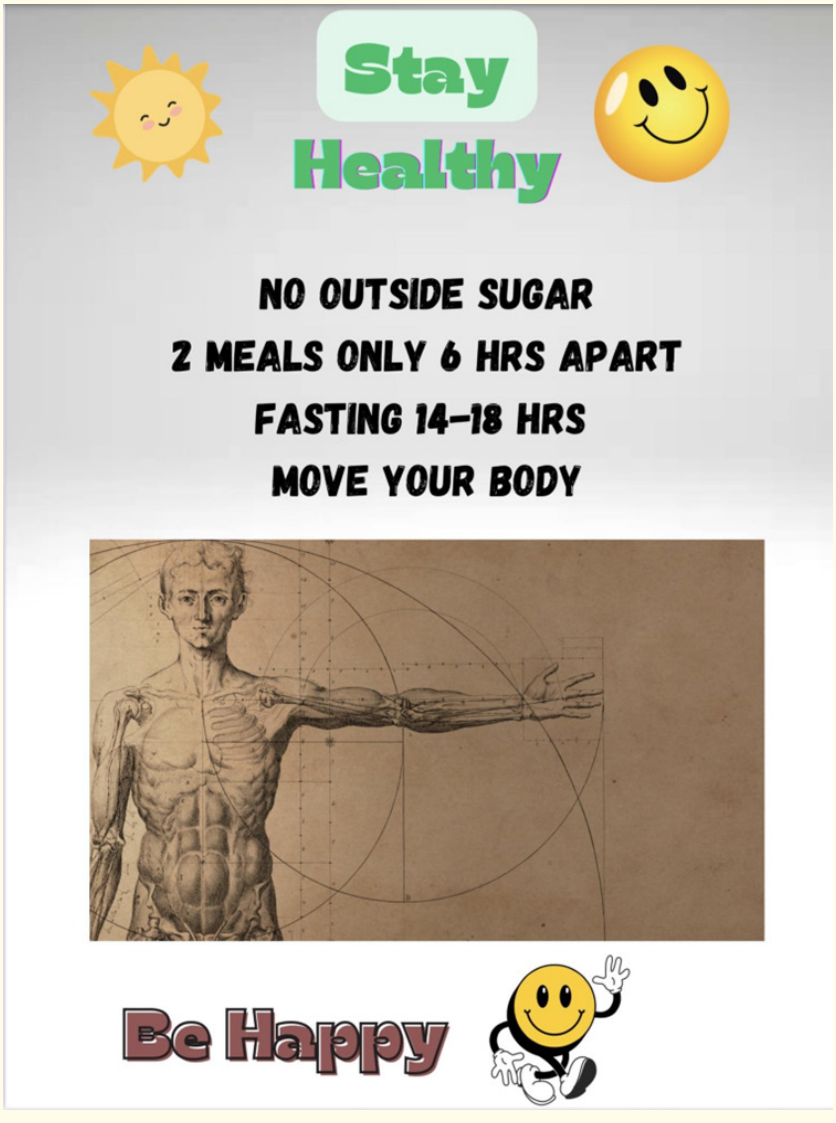
Stay
Healthy
NO OUTSIDE SUGAR
2 MEALS ONLY 6 HRS APART
FASTING 14-18 HRS
MOVE YOUR BODY
Be Happy

Figure c

- AO SCAN scans everything from body organs to emotional state. It helps you understand why body frequencies may be out of balance.
- AO SCAN detects imbalances before they turn to a serious issue.
- AO SCAN science is based on the work of scientists Nikola Tesla, Albert Einstein, Raymond Rife, Marie Curie and other scientists who all shared the same principle: Everything is energy, frequency, and vibration.
- Some practitioners claim the AO scan gives as high as 85% accuracy when compared to standard medical tests. It quickly detects imbalance before symptoms appear.

AO scan features

AO SCAN includes 11 programs producing reports on imbalances in organs, tissues, and body systems

Figure d

Inner voice

- 10 second scan of frequencies of your voice
- Sound harmonizing techniques
- Analyze 8000 frequencies
- Identifies top 4 emotional imbalance
- Generates personalized sound therapy music to help you manage stress, sleep better, breath deeply, decrease pain, creativity, improve mood and concentration
- Mind sync vibrational sound wave therapy
- Custom (I Am)affirmations in your own voice
- Custom music
- Improve mental health, mental focus and cognitive performance
- Binaural playback guides you to transcend troughs
- Reprogram beliefs to imagine what you could achieve [32].

Vitals Scan

Complete scan similar to blood testing covering over 550 blueprint frequencies associated with body function showing ranges of low, medium, and high performance analysis in under 1 minute 24 page data report generated with scan results

- A wide range of items are scanned throughout the body e.g. food allergies, amino acids, vitamins, minerals, collagen, parasites, mood, stress, sleep, metals, thyroid, chakras, and so much more Food Sensitivities Report
- Scanning in and out of range for food sensitivities such as dairy, fruits, grains and so on Blood Report
- Covers a number of blood measurements for CBC, Lipids, and Fatty acids Chakras Report
- Energy centres in the body. Results show in or out of harmony Meridians Report
- 12 Main lines and 2 Centrelines. TCM describes physical and emotional relationships either high/normal/low in functioning
- Acupuncturists will love this report

Gastrointestinal analysis report

shows balance or imbalance in digestive, inflammation, insulin resistance, and many more

Nutritional Analysis Report

- Displays bodies'' amino acids, digestive enzymes, macro and micro minerals, vitamins and genetics frequencies

Physical Function Report

- Frequency of bone, nerves, cardiovascular, collagen, endocrine, eyes and most of body immunity and organs

Toxicities Report

- Recording of negative or positive frequencies on environmental allergies, human toxins, heavy metals, molds, bacteria, fungi, parasites and viruses

SEFI

- Subtle Energy Frequency Imprinter: vibrational frequencies imprinted to a target to help restore energy, conditions, detox , flower remedies and many more
- It is based on technology of Tesla, Rife, Einstein
- It imprints in areas of Quantum reach, flowers, affirmations, chakras and many more
- It gives you emotional well-being and relaxation
- Comprehensive Report
- Comprehensive anatomy and physiology scan
- Detailed scan of frequencies over 130 organs, cells, chromosomes, ear, eye, lymphatic, muscles, nerves
- Provides a visionary report that displays variances ranging from 1-9 before and after optimization to bring it back to homeostasis
- It scans pets [31].

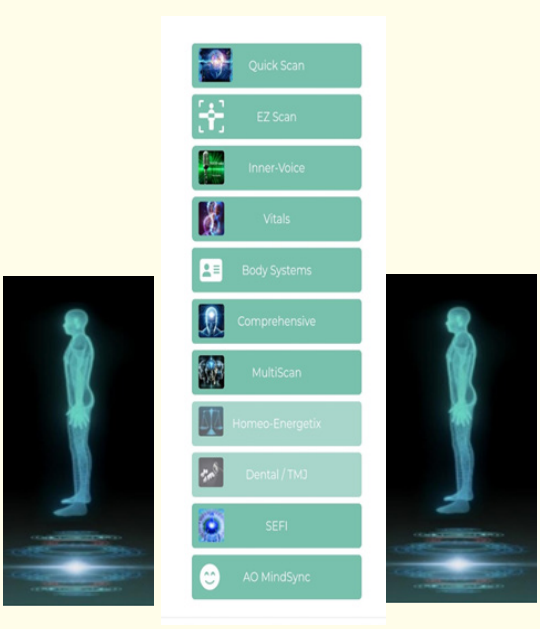

Figure e

Example of results

"Results

Blood Tests and Analysis on Analog Astronauts

On February 12, the first blood tests were conducted on the six analog astronauts. Blood test kits, analysis, and results were provided by DIAGNOSTYKA, a polish-based organisation established in Kraków in 1998 that employs over 7, 000 specialists throughout 170 laboratories in Poland. The second round of blood tests were conducted the morning of February 26 a few hours before breakfast. For data analysis, validation, and interpretation, it is important to consider that single blood tests often demand follow up tests to better gauge the actual value of each complete blood count (CBC) biomarker.

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AO Scans (GMT+1) Blood Tests (GMT+1) Time Difference Astronaut code Feb 13 Feb 26 Feb 12 Feb 26 Feb 12 Feb 26 A1 2:24AM 2:28PM N/A N/A N/A N/A A2 2:41AM 2:42PM 7:44AM 6:08 AM 17 hrs, 3min 15hrs, 26min A3 2:51AM 8:50PM 7:36AM 6:10AM 16hrs, 45 min 14 hrs, 40min A4 3:03AM 8:52PM 7:31AM 6:09AM 16hrs, 28min 14 hrs, 43min A5 1:32PM 8:51PM 7:17AM 6:12 AM 29 hrs, 43min 14 hrs, 39min A6 1:23PM 7:14PM 7:40AM 6:11 PM 30 hrs, 16min 13 hr, 3min

Blood tests were taken during preflight and postflight, ie. before and after the 2-week isolation mission. Blood samples were analysed and graphed for five of the six analog crew members on February 12 and26. Analog astronaut A1 was excluded from the data analysis due to failure to deliver blood tests on time. Five biomarkers: Eosinophils, Monocytes, Neutrophils, Mean platelet volume (MPV), and White Blood Cells (WBC) deviated around 75% or higher from the maximum healthy range for the CBC biomarkers.

Blood tests were then compared with scan results from CBC biomarkers monitored with AO Scan from February 12 to 14 and February 24 to 26. There were similarities and differences between the biomarkers

out of balance from blood tests and AO Scan. Both methods registered imbalances for Lymphocytes, Blood Platelets, WBC, Basophils, Neutrophils, and Monocytes. Although AO Scan registered less biomarkers out of balance for Neutrophil and Eosinophils with higher imbalances for Hematocrit and Hemoglobin across crew members even though these biomarkers were not outside of the healthy range in blood tests.

The 15 CBC biomarkers analysed in the study comprise around 2.5 percent of biomarkers in each Vitals scan, which contains 600 biomarkers per report. 450 CBC vitals biomarkers were manually analysed from 30 scans over two three-day time periods. CBC biomarkers included in the pilot study comprise .833 percent of the 54, 000 biomarkers generated from the Vitals Scan and excludes all of the 67, 000+ biomarkers generated from the Comprehensive scans during the 16-day study time period. With six analog astronauts, 3, 600 biomarkers were generated from Vitals each day and around 4, 500 biomarkers were generated from each Comprehensive scan per day for a total of 8, 100 biomarkers generated per day for the six-man crew.

Data analysis

The objective of the data analysis was to quantify the significance and accuracy of the red and green dots in the CBC Vitals section. Data analysis on the CBC section of the Vitals Report included the following 14 CBC biomarkers from the blood tests: Basophils, Eosinophils, Hematocrit, Hemoglobin, Lymphocytes, CH, MCHC, MCV, Monocytes, Neutrophil, Platelets, RBC (Red Blood Cells), RDW (red cell distribution width), and WBC (White blood cells). As outlined in Table 1, Blood tests were sampled on the morning GMT +1 of February 12 and February 26 and scans occurred approximately 16-30 hours after blood was sampled.

Data analysis 1

The CBC biomarkers from the AO scans were compared to those in the blood. For every biomarker in the CBC, a match or mismatch was noted. A total of 14 biomarkers were compared for each astronaut, on both February 12 and 26, for a dataset composed of 140 datums. To calculate the accuracy, the true positives and true negatives were added and then divided by the total. True positives (TP) are when AO scan indicates that the biomarker in question is within the normal range (healthy - green dot), and the blood test shows that the latter is actually true. True negatives (TN) mean that AO scan indicates a red dot (biomarker out of range), and that being in reality true as seen in the blood test.

On the other hand, false negatives (FN) occur when the scan shows a biomarker is out of range (red dot) while the blood test deems it healthy. Incidentally, false positives (FP) mean that the AO scan mistakenly indicates the biomarker is within the healthy range when it was actually not.

Data analysis 2

In applying a similar approach, the aim for Data Analysis II was to better determine the sensitivity and accuracy of AO Scan. The second data analysis determined how many red and green dots in CBC biomarkers of AO Scan deviated under 30 or over 70 percent from the maximum healthy CBC biomarker range registered in the blood tests. First, we determined the percentage of how far each of the 14 biomarkers deviated from the maximum or minimum healthy blood test range. The sum of standard deviations for the healthy range of CBC biomarker was used to determine how far the actual CBC biomarker value from blood tests deviated from the maximum or minimum health range. Results indicating less than 0% were above the maximum healthy range and the values greater than 100% indicated below the minimum healthy range for the CBC biomarker.

Each CBC biomarker was replaced and analysed with the red dots (1s) and green dots (0s) from AO Scan. The percent from maximum or minimum approach holds the potential to enable greater understanding into the sensitivity, accuracy, and significance of the single red dots, and repeated red dots, or biomarkers out of balance for longer periods of time."

Discussion

Data accuracy and validation data analysis 1.

The accuracy of the AO scan was found to be 65% in correctly describing both healthy and unhealthy biomarkers (green and red) with a misclassification or error rate of 35%. The sensitivity or recall (true positive rate) was calculated and is 69.3%. This gives information on how often the AO scan correctly detects healthy

biomarkers. The false positive rate, meaning how often the AO scan indicates the biomarker to be healthy when in reality it is not, is 76.9%. The AO scan specificity (true negative rate) is 23.07%, which gives information on how often it is able to correctly indicate a biomarker that is out of range.

Finally, we found that the AO scan precision in correctly predicting healthy biomarkers is 89.8%, with a prevalence of 90.7% (majority of biomarkers are healthy).

Data analysis 2.

If a red dot was closer to the minimum or maximum healthy range, it is theorised there is a greater likelihood that biomarkers would register a single red dot and be vibrating at frequencies farther away from the natural resonance. With the deviation from the maximum healthy CBC biomarker range, 51% of the green and red dots were found to correctly determine if each CBC biomarker was in the diminished healthy range between 30 to 70% from the maximum.

The second data analysis observed 136 total datum's with a true positive rate of 22%, true negative rate of 29%, false positive rate of 38%, and false negative rate of 10%. The discrepancy and reduced accuracy could be attributed to a 60% reduced healthy range of the blood tests.

Data interpretation and justification

A science and evidence-based approach with a critical non-bias perspective is imperative in evaluating the efficacy, accuracy, and validity of emerging biotechnology and bioresonance software. The results from the LunAres February 2021 pilot study were largely inconclusive and require further studies and testing to determine the significance and accuracy of AO Scan Vitals. The accuracy and misclassification rate is a function of how many green and red dots are considered in the data analysis. The data analysis in this pilot study assumes a relatively low instrument sensitivity even though it has been reported the instrument has a high sensitivity.

Another justification for the discrepancy between AO Scan results and CBC blood biomarkers could be attributed to blood test samples taken on an empty stomach in the morning as well as the time differences between the blood test sampling and scans. For example, scans on February 13 occurred in the middle of the night GMT +1 around 17 to 30 hours after blood test sampling. Environmental factors affecting blood test results and CBC biomarkers include stress from traveling, radiation exposure on airplanes, sleep circadian rhythm, and an empty stomach. Scans on February 26 were conducted one to four hours after blood test sampling. Other potential correlations and reasoning contributing to the high false positives and negative rates include frequency optimization on February 26, food consumption, time of day, environmental factors and stressors. The resonant frequencies of the human body, or the inflamed or underused status of AO Scan biomarkers (green and red dots), consistently fluctuate over time. Additionally, it should be expected that single red dots in the Vitals section fall within the healthy range of blood tests and other instruments. The double red dots, or red dots that persist over extended periods of time, were not studied in data analysis and are of greater concern than the biomarkers that quickly shift closer to healthy range. In summary, AO Scan is a sensitive instrument and conclusive results necessitate proper analysis tracking hundreds and thousands of out of balance biomarkers over larger data samples and extended time windows.

Conclusion

This research study attempts to examine the accuracy of over 450 complete blood count (CBC) biomarkers remotely generated from the AO Scan voice and body analysis software by comparing scan results with two blood tests from the six people during February 2021. The results from the LunAres February 2021 pilot study were largely inconclusive in determining the accuracy of AO Scan Vitals considering a variety of reasons including instrument sensitivity, time differences, small sample size, diet, and environmental factors. The accuracy and misclassification rate is a function of how many green and red dots are considered in the data analysis. This early stage biotechnology is believed to hold the potential to improve human understanding of physical and mental health. This

pilot study establishes the first peer-reviewed experiment to use bioresonance software AO Scan and outlines a path forward for continued research studies."

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