MEASURING STRESS REDUCTION USING THE INFRARED NEGATIVE IONS AMETHYST BIOMAT

George Grant xxxxxxxxxx

DR GEORGE GRANT is a Canadian Pioneer of Quantum Integrative Medicine.

email: drgrant@rogers.com

KEYWORDS
stress, cortisol, wellbeing, sleep

ABSTRACT

Background:
Twelve subjects were tested before and after using the BioMat for 1 hour daily over a 3-month period using three different biofeedback devices and blood cortisol levels to measure stress reduction. Far infrared/negative ion amethyst BioMat reduces stress by 78%, as validated by pre- and post-biofeedback brain scans, as well as fasting blood test to measure the stress hormone cortisol. The core of the BioMat technology is a combination of far infrared rays, negative ion effects and the conductive properties of amethyst channels. These powerful health stimulators are combined in a single, easy-to-use product with remarkable healing properties. The BioMat delivers soothing, deep-penetrating heat, while stimulating the regeneration of damaged cells in the body. It is a safe and natural way to achieve optimal health now, and maintain a stronger, more resilient body in the future. This effective therapy is now available to medical professionals and home consumers who want to improve health and wellbeing with products based on Nobel prize-winning scientific research pioneered by NASA and developed using pure, natural materials. The BioMat is an approved medical device by Food and Drug Administration (FDA).

Objectives of the study:
Examine the key benefits of the infrared negative ion amethyst BioMat for stress reduction and fatigue, relieving anxiety and promoting relaxation, improving sleep patterns, reducing inflammation, easing joint pain and stiffness, and eliminating toxins in from body.

Subject selection criteria:
Twelve healthy subjects with mild-to-moderate stress were selected to participate in this case study and signed an informed consent. Subjects with medical, psychiatric conditions, and those taking heavy medication were excluded from the study. Subjects were tested using biofeedback devices before and after using the BioMat daily every week, and a blood test to measure cortisol levels was obtained from each subject before and after 3 months at the completion of the case study.

Methods:
Twelve subjects were tested before and after using the Bio Mat for 1 hour daily over 2 months using the ICAP brain scan, heart rate variability (HRV) heart scan, and the magnetic resonance bio-analyser. The results were a reduction in stress by 78% among subjects tested and an increased sense of wellbeing. All 12 subjects were tested in Toronto, ON Canada. The psychometric properties of the Depression Anxiety Stress Scale (DASS) were evaluated in a normal sample (n=12), who were also assessed using the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI). The DASS was shown to possess satisfactory psychometric properties, and the factor structure was substantiated both by exploratory and confirmatory factor analysis. In comparison to the BDI and BAI, the DASS showed greater separation in factor loadings. The DASS anxiety scale correlated to 0.81 with the BAI, and the DASS depression scale correlated to 0.74 with the BDI. Factor analysis suggested that the BDI differs from the DASS depression scale primarily in that the BDI includes items such as weight loss, insomnia, somatic preoccupation and irritability, which fail to discriminate between depression and other affective states. The factor structure of the combined BDI and BAI items was virtually identical to that reported by Beck for a sample of diagnosed depressed and anxious patients, supporting the view that these clinical states are more severe expressions of the same states that may be discerned in 'normals'. Implications of the results for the conceptualisation of depression, anxiety and tension/stress are considered, and the utility of the DASS scales in discriminating between these constructs is discussed.

> Stress can interfere with deep sleep, which can increase stress. While sleep medication provides temporary symptomatic relief, it does not always improve the quality of sleep.

THE CORE OF BIOMAT TECHNOLOGY IS a combination of far infrared rays (6–12 microns), negative ion effects and the conductive properties of amethyst channels. These three powerful health stimulators are combined in a single, easy-to-use product with remarkable healing properties. The BioMat, manufactured and distributed by Richway International Inc., delivers soothing, deep-penetrating heat while stimulating the regeneration of damaged cells in the body. This highly effective therapy is now available to medical professionals and home consumers who want to improve health and wellbeing with products based on scientific research A and developed using pure, natural materials.

Stress can interfere with deep sleep, which can increase stress. While sleep medication provides temporary symptomatic relief, it does not always improve the quality of sleep.. The BioMat is designed for the patient to sleep on to provide true therapeutic deep sleep, with a range of temperature settings from 95 degrees to 158 degrees [AQ1: is this celcius or farenheit?] of therapeutic infrared heat. Deep sleep is attained by far infra red and negative ions as well as the healing effect of Amethyst precious stones.

Biofeedback devices used to measure stress reduction

Quantum resonance magnetic analyser

A quantum resonance magnetic analyser (QRMA) measures electromagnetic waves emitted by human bodies, which represent the condition of cells, tissues and organs. The data is compared with standard spectrums to detect imbalances and measure stress reduction. This biofeedback device provides information on the stress of vital organs and systems. Test results provide a range of mild (0–30), moderate (30–60), and severe stress (70–100), correlating with the Depression Anxiety Stress Scale (DASS) (i.e. the Bioresonance Scale simulates the DASS in measuring the intensity of stress from mild to severe).

ICAP

The ICAP is used to monitor brain imbalance and blockages, as well as levels of stress. The results also correlate with the DASS. The ICAP release meter system is made up of an electroencephalography (EEG) sensor, signal transmitter, a USB base station to capture the signal, a proprietary algorithm that translates the raw data from the transmitter (release vector), and a visual representation of that data in the ICAP software. The system also incorporates the 'Release Technique', a method used to retrain the brain's responses. The device identifies three distinct stress zones, as well as an average stress score at the end of the measurement. A value of less than 500 indicates manageable stress, 500–700 medium stress, and 700–900 high stress. A value over 950 indicates an extremely high level of stress.

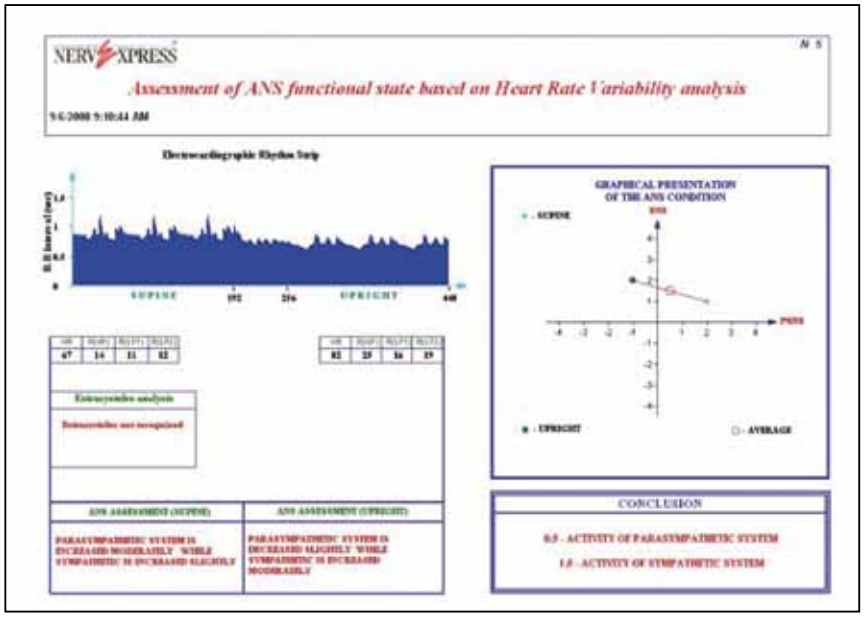

Figure 1 Heart scan diagram to measure cardiovascular physiology [x axis] & fitness [y axis]

Heart rate variability

The heart rate variability (HRV) test (wireless heart electrocardiography (ECG) scan) implements a battery of three tests as the most comprehensive and informative combination of tests for autonomic nervous system (ANS) purposes in the measurement of stress:

- Orthostatic test as the initial method for ANS provocation
- Valsalva manoeuvre combined with deep breathing as the optimal method for revealing the hidden abilities of the autonomic function and distinguishing between chronic and temporary abnormalities
- Real-time nerve-monitor test as the ultimate method for ANS assessment in long-term therapy, with continuous monitoring.

The test results highlight three cardiovascular zones (*Figure 1*):

- Red—high risk of heart disease in the lower right zone (low fitness + low physiology) (0–3)
- White—medium risk in the middle zone (medium fitness + medium physiology) (3–7)
- Blue—low risk in the upper left zone for athletes (high fitness + high physiology) (7–10).

Blood cortisol test results

A cortisol blood test is carried out to measure the level of the cortisol in the blood. Normal results may vary from lab to lab. However, in an adult, for example, morning cortisol levels are normally 5–23 mcg/dL, and 3–13 mcg/dL in the afternoon.

Results

Subject 1 was a retired female executive taking high blood pressure medication (ramipril), diuretics (hydrochlorothiazide), and medium-dose thyroid medication (levothyroxine). Her health improved after using the BioMat for 3 months, with noticeable improvement in blood pressure and lower stress levels,

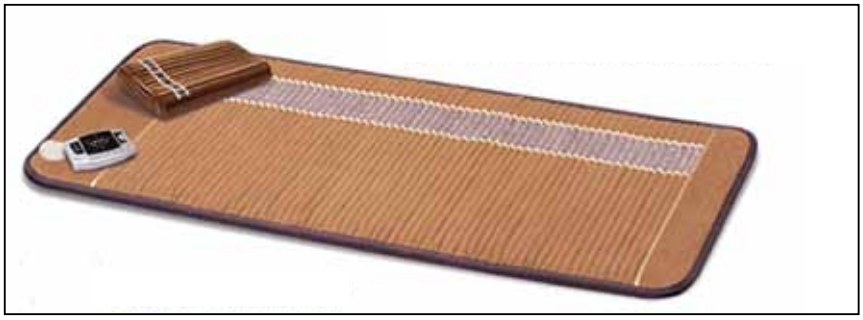

Figure 2 The amethyst BioMat and the Time/Temp control

as revealed in the ICAP brain scan and heart scan, as well as a reduction in cortisol levels.

Subject 2 was a male in his mid-60s recovering from heart bypass surgery and taking four medications: blood thinner (clopidogrel), atorvastatin for high cholesterol, pantoprazole for gastro-oesophageal reflux disease (GORD), and diazepam for sleep problems. He did not notice any difference during the first 3 weeks, but after 5 weeks he reported better sleep and less chest pain as a result of angina. In the third month, he stopped taking diazepam and his doctor took him off atorvastatin owing to improved high-density lipoprotein (HDL) cholesterol, and lower low-density lipoprotein (LDL) cholesterol and cortisol. His international normalised ratio (INR) was stable and his dose of clopidogrel was reduced. His heart rate improved by 20%, even though he did not exercise during the 3-month test, other than walking twice per week as recommended.

Subject 3 was a middle-aged healthy female who was not taking any medication. She had mild knee and back pain, which improved after the 3-month test using the BioMat. She also reported less stress, as revealed in her biofeedback scan, brain scan and heart scan.

Subject 4 was a healthy young male taking no medication, but experiencing minor pain and moderate stress. He reported less stress and pain after only 2 weeks of using the BioMat.

Subject 5 was a middle-aged woman who had had a car accident, experiencing severe neck and back pain as a result. Her stress was high, but she felt less stress after 4 weeks of using the BioMat.

Subject 6 was a young male experiencing mild stress and pain, but who was not taking any medication. He has reported better sleep and less stress after using the BioMat, but his pain still lingered during the 3-month study.

Subject 7 was a young female experiencing premenstrual syndrome, cramps and high stress that were ameliorated after using the BioMat. She was using mild pain killers but stopped taking medication after 5 weeks.

Subject 8 was a healthy young woman who had five children and very high levels of stress. Her stress and sleeping habits improved dramatically in the second month of the study.

Subject 9 was an older male taking six medications and experiencing high levels of stress. He cut back on his medications and also lost 10 lb after using the BioMat for 3 months. His stress levels were reduced and he noticed a better sleep pattern with no need for sleep medication.

Subject 10 was an older female with poor dietary habits. She consumed five cups of coffee and two sodas daily. Her stress levels were high and she had poor sleeping habits. She experienced chest pain and her score in the HRV was in the red zone. She had made remarkable improvement after 2 months of using the BioMat, and she was also told to change her lifestyle habits. She initially scored very low in the author's wellness assessment tool (www.academyofwellness.com), but doubled her score after modifying her lifestyle habits. All chest pain subsided and her ECG score was much better.

Subject 11 was a young, healthy male who was not taking any medication and had a healthy lifestyle, but very high stress levels and poor sleeping habits. Stress levels were improved after using the BioMat for 3 months and undertaking frequent exercise. His sleeping habits did not improve as he works night shifts.

Subject 12 was an older female taking five medications for arthritis (celecoxib), blood pressure (amlodipine), cholesterol (rosuvastatin), sleeping (lorazepam) and GORD (esomeprazole). After using the BioMat for 3 months and avoiding acidic foods, she lost 20 lb, felt much better, and had stopped her medication. Her physician was pleased with her fast progress and positive

Table 1 Summary of results

	QRMA (0–100)	ICAP (100–1000)	HRV (1–10)	Blood cortisol level (mcg/dcl) (5–25)
Subject 1 [pre]	55	625	2	19
Subject 1 [post]	42	475	4	13
Subject 2 [pre]	78	845	3	20
Subject 2 [post]	56	615	5	17
Subject 3 [pre]	56	435	5	13
Subject 3 [post]	68	375	6	10
Subject 4 [pre]	75	670	4	16
Subject 4 [post]	40	425	6	12
Subject 5 [pre]	76	835	1	20
Subject 5 [post]	65	645	3	14
Subject 6 [pre]	40	425	5	16
Subject 6 [post]	31	315	6	14
Subject 7 [pre]	42	476	7	11
Subject 7 [post]	28	355	7	10
Subject 8 [pre]	66	560	2	16
Subject 8 [post]	38	475	6	13
Subject 9 [pre]	68	575	4	11
Subject 9 [post]	44	385	6	9
Subject 10 [pre]	78	960	1	22
Subject 10 [post]	55	710	3	15
Subject 11 [pre]	85	925	2	18
Subject 11 [post]	60	640	4	12
Subject 12 [pre]	55	425	5	16
Subject 12 [post]	35	310	7	12

HRV=heart rate variability; QRMA=quantum resonance magnetic analyser

outlook.

Discussion

From the case studies, it is clear that the 12 subjects received an average of 78% improvement in stress reduction, better sleep, less cortisol and overall improvement—particularly when they also changed their lifestyle habits. The test results from the biofeedback devices correlated well with each other, as well as with the cortisol blood test results. The cortisol level may show problems with the adrenal or pituitary glands. Cortisol is made by the adrenal gland. Cortisol levels increase when the pituitary gland releases another hormone, adrenocorticotropic hormone (ACTH).

Cortisol has many functions. It helps the body use sugar (glucose) and fat for energy, and it helps the body to manage stress. Cortisol levels can be affected by many conditions, such as physical or emotional stress, strenuous activity, infection, or injury.

Normally, cortisol levels rise during the early morning hours and are highest at approximately 7 am. They drop very low in the evening and during the early phase of sleep. However, if the patient sleeps during the day and is awake at night, this pattern may be reversed. Cortisol regulates energy by selecting the right type and amount of substrate (carbohydrate, fat or protein) that is needed by the body to meet the physiological demands placed on it. Cortisol mobilises energy by tapping into the body's fat stores (in the form of triglycerides) and moving it from one location to another, or delivering it to hungry tissues such as working muscle. Under stressful conditions cortisol can provide the body with protein for energy production through gluconeogenesis, the process of converting amino acids into usable carbohydrates (glucose) in the liver. Additionally, it can move fat from storage depots and relocate it to fat cell deposits deep in the abdomen. Cortisol also allows adipocytes to mature into fat cells. Finally, cortisol may act as an anti-inflammatory agent, suppressing the immune system during times of physical and psychological stress.

Cortisol directly effects fat storage and weight gain in stressed individuals. Tissue cortisol concentrations are controlled by a specific enzyme that converts inactive cortisone to active cortisol. This particular enzyme is located in adipose (fat) tissues. Studies with human visceral (fat surrounding the stomach and intestines) and subcutaneous fat tissue have demonstrated that the gene for this enzyme is expressed more by obese conditions. It has also been demonstrated in research that human visceral fat cells have more of these enzymes compared with subcutaneous fat cells. Therefore, higher levels of these enzymes in these deep fat cells surrounding the abdomen may lead to obesity owing to greater amounts of cortisol being produced at the tissue level. Furthermore, deep abdominal fat has greater blood flow and four times more cortisol receptors compared with subcutaneous fat. This may also increase the fat accumulating and fat cell size-enlarging effects of cortisol.

Stress versus eustress

Hans Selye, a prominent stress physiologist of the 20th century, defined stress as 'the nonspecific response of the body to any demand made upon it'[3]. Richard Lazarus, another highly regarded psychologist, adds that stress is 'any event in which environmental demands, internal demands, or both, tax or exceed the adaptive resources of an individual, social system, or tissue system'[3].

In many different societies, stress is a common term that is often associated with negative situations and settings. Yet, a stress-free life may also be harmful, because an individual will lose his/her ability to react to the different challenges of life. Every person has an optimal positive stress level referred to as eustress, while stress that is harmful is noted to be distress.

People can react to a stressor in different ways. For example, if an individual perceives the stressor as a challenge to his/her control of a situation, noradrenaline, the 'fight' hormone, is predominantly released. And, if the stress arousal increases and a possible loss of control is felt by the individual, then adrenaline, another 'flight/anxiety' hormone is released.

When the stress is prolonged and seen as hopeless, the individual becomes more distressed and feels defeated. This activates the hypothalamus in the brain. What follows is a cascade of hormonal pathways resulting in the final release of cortisol from the adrenal cortex (of the kidney).

The brain has the ability to selectively activate the fight, flight, or defeat responses. This usually occurs in day-to-day living when an individual perceives his/her hassles as a challenge to control or a loss of control. Although the stress pathways work together, they can uniquely affect the function of bodily processes. For instance, the 'fight' or 'flight' stress responses cause the heart to beat faster and harder, as well as release more free fatty acids (disassembled triglycerides) into the blood. The 'defeat' response stress pathway can lead to enhanced lipogenesis (fat creation), visceral obesity (deep abdominal obesity), breakdown of tissue, and suppression of the immune system.

It appears that the far infrared, negative ions and amethyst BioMat ameliorate the effect of stress, sleep, pain and overall sense of well being for all subjects tested regardless of their age, gender or medications used. The accuracy of the study results is limited to those results obtained by the biofeedback devices and the completed questionnaires from the subjects who were tested. Future studies should examine a larger population of 50 or more subjects for 4 months or longer, to clearly elucidate clearly the quantitative effect of the BioMat as related to stress, sleep and pain.

Conclusions

As shown from the results of this case study, the BioMat has resulted in the stress reduction for the 12 subjects by reducing cortisol, the stress hormone, and increasing serotonin and endorphins known as the 'happy messengers' in our brain. The far infrared BioMat increases blood circulation and oxygen supply to damaged tissues (aiding reduction of chronic joint and

muscle pain or sport injuries), promoting relaxation and comfort, inducing sleep, and relieving stress.

There have been reports detailing the hazards of exposure to certain kinds of electromagnetic fields[6], such as those from high-tension power lines, cell phones, or from computer display terminals. Far infrared heating systems have been tested in Japan and found to be free of toxic electromagnetic fields. The Swedish National Institute of Radiation Protection has also concluded that infrared heaters are not dangerous[6]. Rather, Japanese researchers have reported that far infrared radiant heat antidotes the negative effects of toxic electromagnetic sources[6].

Declaration of interest: *The author is not employed nor compensated by Richway International or Fuji Bio Sciences, the manufacture and distributor of the BioMat. The company provided the BioMat at no charge to conduct the case study for 12 subjects at the author's clinic in Toronto, ON Canada. The author has no financial interests in the company.*

Key points

[AQ2: reference 2: please provide url]

References

1. Alberts B. The Molecular Biology of the Cell. 2nd edn. New York: Garland Press, 1990
2. Kaltsas H (2009) What is ionization? Retrieved February 14, 2010.
3. Grant G. Stress factors affecting college educators. PhD [dissertation]. Toronto: University of Toronto; 1995
4. Grant G. Measuring stress affecting college professors. MEd [dissertation]. Ontario: Brock University; 1992
5. Jones DP. Redefining oxidative stress. Antioxid Redox Signal 2006; 8(9–10): 1865–79
6. Kyuo S. The Scientific Basis and Therapeutic Benefits of Far Infrared Ray Therapy. Canada: Health Food Association, 2001
7. Richardson, W. Spiritual Values and Gemstones. Marina Del Ray: Devorest Company, 1998
8. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. Behav Res Ther 1995; 33(3): 335–43