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## Evaluating thermotherapy using the amethyst Biobelt and the infrared negative ion amethyst Bio-Mat

George Grant discusses the results of a 3 month study using the BioBelt and Bio-Mat to reduce fat, pain, and stress in 12 patients



## ABSTRACT

The amethyst BioBelt was used by 12 subjects for 1 hour three times per week along with the amethyst Bio-Mat during sleep, daily over a 3-month period. The author used two different biofeedback devices to measure pain reduction, body mass index (BMI) to measure fat reduction, and blood cortisol levels to measure stress reduction. The BioBelt and the far infrared, negative ion amethyst Bio-Mat reduced pain by 18%, reduced BMI by 10%, and reduced stress by 82% in the 12 subjects over 3 months as validated by pre- and post-biofeedback, brain scans, and fasting blood tests to measure the stress hormone cortisol. Thermotherapy was enhanced when the BioBelt was combined with the use of the Bio-Mat during sleep to reduce stress, pain, and abdominal fat.

The BioBelt (Richway International Inc., Honolulu, HI, US) made from amethyst is a small Bio-Mat (Richway International Inc.) wrapped around the abdomen to reduce abdominal fat and around the back to reduce pain and stress. The Bio-Mat technology is a combination of far-infrared rays (FIR), 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 Bio-Mat delivers soothing, deep-penetrating heat while stimulating the regeneration of damaged cells in the body. It's a safe and natural way to achieve optimal health now and maintain a stronger, more resilient, body in the future. The combination of the BioBelt and the Bio-Mat is a highly effective thermotherapy available to medical professionals and home consumers who want to reduce pain, stress, and abdominal fat. The Bio-Mat is approved as a medical device by the FDA.

## Objectives of the study

The study aims to examine the synergistic benefits of the BioBelt and the infrared negative ions amethyst Bio-Mat in reducing stress, pain, and abdominal body fat in 12 subjects over 3 months.

The study intends to examine the effect of using the BioBelt and the Bio-Mat to increase serotonin, which is responsible for reducing stress and cortisol levels — the stress hormone partially responsible for increased abdominal fat — and to measure pain reduction. Biofeedback devices were used to measure the improvement in the 12 subjects before and after using the Bio-Mat and BioBelt.

The main objective of the study is to measure the reduction of inflammation, joint pain, and stiffness, as well as the reduction of abdominal fat and stress for 12 subjects over 3 months. This was achieved by using biofeedback devices and blood cortisol tests that correlate with stress; body mass index (BMI) somewhat correlates with subcutaneous and abdominal fat.

## Methods

Twelve subjects were tested before and after using the BioBelt for 1 hour, three times per week, and during sleep with the Bio-Mat daily, over a duration of 3 months. The biofeedback test for stress was conducted using the ICAP™ Release Meter System (ICAP™ Technologies, Cardiff, CA, US), and the measurement for pain and BMI was done using a bio-resonance magnetic analyser biofeedback device. The results showed a reduction in stress of 82% among subjects tested and an increased sense of wellbeing. Pain was reduced by 18% and BMI was reduced by 10%. All 12 subjects were tested at the author's clinic in North York, ON, Canada.

The psychometric properties of the Depression Anxiety Stress Scales (DASS) were evaluated in a normal sample of 12 ( $n=12$ ); the subjects were also administered 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 by both the exploratory and confirmatory factor analysis. In comparison to the BDI and BAI, the DASS scales showed greater separation in factor loadings. The DASS anxiety scale correlated 0.81 with the BAI, and the DASS depression scale correlated 0.74 with the BDI. Factor analyses 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 were 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 normally<sup>4</sup>. 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.

The ICAP biofeedback device was used to measure stress reduction. The bio-resonance magnetic analyser biofeedback device was used to measure pain, and BMI was used to reflect the reduction in abdominal body fat. Blood cortisol tests were used to measure stress, as it is inversely correlated with serotonin levels.

## Subject selection criteria

Twelve healthy subjects with mild to moderate stress, pain, or obesity were selected to participate in this case study and signed an informed consent form. Subjects with medical or psychiatric conditions and those taking heavy medications were excluded from the study.

Subjects were tested using biofeedback devices before and after using the BioBelt and Bio-Mat each week, and a blood test was also performed to measure cortisol levels from each subject before the study began and then again after 3 months at the completion of the case study.

## How it works

Thermotherapy treatment on a Bio-Mat, as well as applying the BioBelt to the abdominal area, results in an increase in serotonin and heat shock protein production.

Research shows that serotonin, a neurotransmitter that exists in the brain, also exists in the intestines, with as much as 90% of the serotonin being found in the small intestine<sup>2</sup>. As such, our intestine uses the neurotransmitter serotonin to balance the active immune functions of our body.

There are over 500 different types and 100 trillion bacilli living inside our intestines<sup>3</sup>. Among these, there exist beneficial bacteria such as bifidus and lactobacillus, as well as harmful bacteria such as clostridium perfringens, bacillus, and staphylococcus. While the beneficial bacteria help increase our immunity, the increase of harmful bacteria leads to a decrease in our immunity level.

By warming the abdominal region with smooth far-infrared radiation, the beneficial bacteria will become more active, producing heat shock protein and increase our levels of immunity.

The Bio-Mat is a natural heating pad, which lies on top of a massage table or home mattress. It converts electricity through a computerised control panel, produced by Texas Instruments (Dallas, TX, US), into FIR, nature's invisible light. FIR was discovered by NASA to be a safe, beneficial light wave. It reduces pain and swelling, while increasing blood flow and reducing stress by increasing the secretion of serotonin.

The Bio-Mat also produces negative ions, nature's energiser, which deliver a molecular level massage. This accelerates and deepens all healing and cleansing processes. It balances pH by decreasing acidity and is considered the 'master power switch' that activates the body's entire cellular communication system. Negative ions can alleviate allergies, migraines, and sinus problems.

These two components are transferred through amethyst quartz channels that cover the entire Bio-Mat's surface. Amethyst quartz is a super conductor scientifically found to offer a steady delivery of healthy far-infrared light waves and the highest vibrational frequencies into the body.

The core of Bio-Mat technology is a combination of FIR (6–12  $\mu$ ), negative ion effects, and the conductive properties of amethyst channels. These three health stimulators are combined in this single product. The Bio-Mat delivers deep-penetrating heat while stimulating the regeneration of damaged cells in the body. This therapy, based on Nobel prize-winning scientific research pioneered by NASA and developed using natural materials, is available to medical professionals and home consumers who want to improve health and wellbeing.



**Figure 1** The amethyst BioBelt

# Biofeedback devices used to measure stress reduction

## 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 a standard spectrum to detect imbalances and measure stress reduction. This biofeedback device measures the stress of vital key organs and systems. Test results provide a range of mild (0–30), moderate (30–60), and severe stress (70–100). This correlates with DASS and the International Stress Scale.

## ICAP (wireless brain scan EEG)

The ICAP Release Meter System is made up of the electroencephalography (EEG) sensor, the signal transmitter, the USB base station that captures the signal, the proprietary algorithm that translates the raw data from the transmitter (release vector), and the visual representation of that data in the ICAP Release Meter software. The system also incorporates the Release® Technique (The Release Technique, Virginia Beach, VA, US), a method used to retrain the brain's responses. The device provides 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 extremely high stress.

## Blood cortisol test results

A cortisol test is performed to measure the level of cortisol in the blood. Normal results may vary from lab to lab. The average level of cortisol for adults would be 5–23 mcg/dL in the morning, and 3–13 mcg/dL in the evening<sup>4</sup>.

## Discussion

**The following is a summary of the experience of each subject who took part in the study:**

### Subject #1

Male executive in his mid-50s on diabetes medication (metformin). He has improved after using the BioBelt/Bio-Mat for 3 months with noticeable improvement in his blood sugar and a lower stress level as shown in his ICAP brain scan, as well as a reduction in cortisol levels and BMI.

### Subject #2

Male in his mid-60s suffering from pain as a result of a car accident, and taking two pain medications: naproxen and oxycodone. He did notice a difference in pain reduction in the first 3 weeks, and after 6 weeks he reported better sleep as well as less pain and stress. In his third month of using the BioBelt and Bio-Mat he stopped taking the pain medication. He also reported a reduction in weight.

### Subject #3

A healthy female in her mid-40s with no medication. She had mild knee and back pain, which improved after the 3-month study of the BioBelt/Bio-Mat. She also reported less pain and stress as shown in her biofeedback and brain scan, and her BMI improved.

### Subject #4

Healthy female in her mid-40s with no medication, but minor pain and moderate stress. She reported less stress and pain after 4 weeks of using the BioBelt/Bio-Mat, as well as better sleep, increased libido, and reduced BMI.

#### Subject #5

Mid-life woman in early menopause who was involved in a car accident, which left her with severe neck and back pain. Her stress was high but she felt less stress after 6 weeks of using the BioBelt/Bio-Mat. She reported fewer hot flashes, increased libido, less pain, and better sleep. She also reduced her BMI.

#### Subject #6

Young male in his mid-30s with mild stress and pain, but no medication. He reported better sleep and less stress after using the BioBelt/Bio-Mat, but his pain remained mild during the 3 month study.

#### Subject #7

Young female in her mid-30s with high stress that was reduced after using the BioBelt/Bio-Mat. She was using mild painkillers, but stopped taking medication after 5 weeks of using the BioBelt/Bio-Mat. She lost 2 inches from her waist, with a reduction in her BMI after 3 months.

#### Subject #8

Healthy young woman in her early-40s with no medication, but moderate pain and stress. Her stress and sleep habits improved dramatically in her first month of using the BioBelt/Bio-Mat. Her libido increased while her weight was reduced dramatically after 3 months of using the BioBelt/Bio-Mat.

#### Subject #9

Male in his early-40s with high pain and high stress. He lost 10 lb and 3 inches from his waist after using the BioBelt/Bio-Mat for 3 months. His stress level was reduced and he noticed a better sleep pattern, with no need for sleep medication.

#### Subject #10

Female in her mid-60s with significant pain and stress. She was consuming five cups of coffee and two sodas daily. Her stress was high with poor sleeping habits, and she experienced chest and back pain. She made remarkable improvements after 3 months on the BioBelt/Bio-Mat and she was also advised to change her lifestyle habits (such as exercise and sleep), which she did. All chest and back pain was gone and her stress was much lower. She lost a number of pounds and inches from her waist after using the BioBelt/Bio-Mat for 3 months.

#### Subject #11

Healthy male in his early-50s with no medication and a healthy lifestyle, but with very high stress levels and poor sleeping habits. His stress was improved after using the BioBelt/Bio-Mat for 3 months and doing frequent exercise. His sleeping habits improved and he reported increased libido and sexual function with reduction in pain, stress, and BMI.

#### Subject #12

Female in her late-60s with two medications for pain and sleep. After using the BioBelt/Bio-Mat for 3 months and avoiding acid foods, she lost 10 lb and felt better with no medication. Her own physician was pleased with her fast progress and positive outlook. She felt less pain, stress, and an increased sense of wellbeing, including increased libido.

It appears from the above case study that the 12 subjects received above average improvement in pain reduction, stress reduction, better sleep, less cortisol, increased libido, 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.

# Cortisol

The cortisol level may show problems with the adrenal or pituitary glands, as cortisol is made by the adrenal gland. Cortisol levels go up when the pituitary gland releases another hormone called adrenocorticotropic hormone (ACTH)<sup>5</sup>.

Cortisol has many functions. It helps the body use sugar (glucose) and fat for energy, and it helps the body manage stress. Cortisol levels can be affected by many conditions, such as physical or emotional stress, strenuous activity, infection, or injury<sup>5</sup>.

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<sup>4,5</sup>. However, if you sleep during the day and are up 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 physiological demands. 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 useable carbohydrate (glucose) in the liver. Additionally, it can move fat from storage depots and relocate it to fat cell deposits deep in the abdomen<sup>6</sup>. Cortisol also aids adipocytes (baby fat cells) to grow up into mature fat cells. Finally, cortisol may act as an anti-inflammatory agent, suppressing the immune system during times of physical and psychological stress.

Cortisol directly affects 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) tissue<sup>7</sup>. Studies with human visceral fat (fat surrounding the stomach and intestines) and subcutaneous fat tissue have demonstrated that the gene for this enzyme is expressed more by obese people<sup>7</sup>. It has also been demonstrated in research that human visceral fat cells have more of these enzymes compared to subcutaneous fat cells<sup>6</sup>. Therefore, higher levels of these enzymes in deep fat cells surrounding the abdomen may lead to obesity due to greater amounts of cortisol being produced at the tissue level. Furthermore, Hans Selye, a stress physiologist of the 20th century defined stress as 'the nonspecific response of the body to any demand made upon it'<sup>8</sup>. Richard Lazarus, a 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'<sup>8</sup>.

# Stress

In many 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 stress in different ways. For instance, 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<sup>8</sup>. This usually occurs in day-to-day living when an individual perceives a situation as a challenge to control or a loss of control. Although the stress pathways work together, they can each 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 tissues, and suppression of the immune system<sup>10</sup>.



**Figure 2 The amethyst negative ion Bio-Mat**

# Conclusions

As shown from the results of this case study, the Bio-Mat/BioBelt has a synergistic effect and has resulted in both stress and pain reduction. Weight reduction for the 12 subjects was achieved through reducing cortisol, the stress hormone, and increasing serotonin and endorphins known as the happy chemicals in the brain.

The far-infrared Bio-Mat and BioBelt increases blood circulation and oxygen supply to damaged tissues (aiding reduction of chronic joint and muscle pain or sport injuries), promotes relaxation and comfort, induces sleep, and relieves stress as shown in the case study.

Recently there have been reports detailing the hazards of exposure to certain kinds of electromagnetic fields, 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 free of toxic electromagnetic fields. The Swedish Radiation Protection Institute has also concluded that infrared heaters are not dangerous. Rather, Japanese researchers have reported that far-infrared radiant heat antidotes the negative effects of toxic electromagnetic sources.

Further research is needed to clarify the synergistic effect of using the Bio-Mat/BioBelt in a number of biological functions, including the reduction of pain, stress, weight, increased libido, and overall sense of wellbeing owing to increased serotonin, as well as gamma-aminobutyric acid (GABA) and other essential neurotransmitters responsible for better sleep and reducing depression and overall stress.

## Acknowledgements

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

***Figures 1–2 & Table 1** © Dr George Grant*

***More information:** [www.academyofwellness.com](http://www.academyofwellness.com)*

*The Bio-Mat Professional is registered as an FDA Medical Device #2954299*

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