

CASE REPORT

Treatment of Anxiety and Stress With Biofeedback

利用生物反馈治疗焦虑和压力

Tratamiento de la ansiedad y el estrés con Biofeedback

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Author Affiliation

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BACKGROUND INFORMATION

Psychosocial History

"Kate" is a thin, attractive 50-year-old perimenopausal woman who considers herself "basically healthy" but feels she needs help with stress management in her life. She is educated, married, and the mother of 4 children ranging in age from 11 to 22 years. In addition to managing her household, she has a full-time job as an administrative assistant and also works a part-time job from home. She states she needs to do this so the family can "get back on our feet" as her husband was unemployed for a number of months and they currently have 2 children in college. In addition, they relocated a year ago to Pittsburgh, Pennsylvania, for her husband's job and now have a higher mortgage payment. "Family" is Kate's top priority, but she does not receive much assistance from her husband on the home front and feels "there is not enough time in a day." Family members outside the home are supportive (as she is of them); however, her closest family member lives about 7 hours away. She visits family on most holidays but also has the additional burden of needing to come back to the area often since her father has been ill and will require major cardiac surgery at Yale. She has made new friends in Pittsburgh and occasionally engages in a "girls' night out." Otherwise, she tends to shuttle the 2 younger children to events, friends' houses, etc.

Many days she finds herself feeling "frazzled" and is currently experiencing anxiety, fatigue, sleep disruption, occasional "mental fogginess," palpitations, and an increase in mitral valve prolapse (MVP) symptoms. "Self regulation" is minimal, with no regular practice except for aerobic exercise. Family vacations are taken twice a year, totaling 2 to 3 weeks.

Medical History

Kate's medical history includes MVP, migraine headaches, kidney stones, and mild depression. The onset of the migraine headaches was during her teen years and related to her menstrual cycle. Food allergies/sensitivities were ruled out through testing.

The migraines have decreased in frequency but are intense when they occur, leaving her intolerant of noise and light, nauseous, and unable to attend to activities of daily living.

The MVP was diagnosed when Kate was in her 20s, and symptoms seem to increase with cyclic changes and stress. These symptoms typically include palpitations, light-headedness, and a "funny feeling in my mid-chest area." A recent echocardiogram revealed no changes with

the MVP and cardiac assessment within normal limits. The onset of the depression was insidious, but Kate first noticed signs in her mid 30s and has been on and off of selective serotonin reuptake inhibitors since. She currently is not taking medication for this and prefers not to as she believes it was associated with weight gain and she would like to learn how to handle it on her own. She presented with dark under-eye circles and is slightly pale. Kate's overall affect is a little "hyper" but positive and she stated she often feels "tired but wired."

Kate feels that certain dietary changes she instituted about 2 years ago have helped somewhat with her overall health. The changes include reducing processed foods, sugar, and wine (she now has about 2-3 glasses of wine/week), eliminating "bad oils," and increasing whole grains, fruits, vegetables, nuts, healthy oils, and general hydration. Kate is a nonsmoker. Exercise typically consists of using an elliptical machine and/or treadmill at home for about 30 minutes 4 times per week.

Kate is being followed primarily by her gynecologist. Recent lab work indicates reproductive hormone fluctuations associated with perimenopause, and Kate confirmed changes in her menstrual cycle (more frequent, heavier). They also show low DHEA and mid-range cortisol levels (fasting, morning sample). I recommended asking her doctor for a complete blood count and thyroid work-up (to rule out anemia and thyroid issues) and possible further adrenal testing.

Current medications/supplements: Kate is taking no medication. Supplements include EPA/DHA, a multivitamin for women, calcium/magnesium, and vitamin D.

With regard to spiritual health, Kate was raised as a Roman Catholic but currently finds herself questioning many things. She does not attend church on a regular basis or feel a part of a spiritual community. She considers herself spiritual but would like to feel more grounded in faith and community.

Kate lists her goals as self-regulation, reduced anxiety, restorative sleep, increased energy, and improved health and well-being.

SESSION 1 (9/3/10)

Length of session: 1.25 hours

Initial observations: Last night's sleep was poor (she had difficulty falling asleep and awakened at 4 AM). A few palpitations noted. She reported having no alcohol and taking no medications within the last 12 hours. She did no aerobic exercise in the last hour. She had 2 cups of caffeinated coffee approximately 8 hours ago

and a cup of black tea about 3 hours ago. Her mood appears fairly upbeat, although she sighed a few times; she stated she is excited about learning this.

- Blood pressure: 132/84
- Pulse: 86
- Respiration: 16

An initial baseline heart rate variability (HRV) assessment (of resting coherence level ratios) was done at the low challenge level for 3 minutes using the emWave PC Stress Relief System with the ear sensor and the sound on. Kate sat in an upholstered chair with a good back support and was not directly viewing the screen.

Results of Test 1

- Erratic HRP with a number of “sympathetic spikes,” which are typically caused by a strong emotion(s)—or cough or laughter, neither of which was the case here.
- Average HR of 84; HRV: 6 to 20 beats per minute (BPM)
- HRV Coherence Score: %Low: 87; %Medium: 9; %High: 3^a

As I always do in a first session, I discussed general stress physiology with Kate using basic diagrams of the autonomic nervous system (ANS), as I have found patients to be more receptive when they actually understand what is going on internally. I explained the HeartMath (HM) system, emWave PC technology, HRV and psychophysiological coherence using forms provided by HeartMath LLC, including examples of heart rhythm patterns (HRPs) as a reflection of emotional states and heart-brain communication. This was followed by running a 5-minute test on the emWave Desktop. Initially, Kate’s HRV coherence score remained low; however, the sympathetic spikes were reduced. Each time Kate moved into higher coherence, she immediately sank back to low coherence. When I asked what she was thinking/feeling, she had difficulty putting it into words. She appeared to be slightly tense, especially in the shoulder/neck area. It appeared that she might be “in competition with herself,” so I suggested that she take a deep breath, close her eyes, and “tune in” with her thoughts and feelings while I turned the volume off.

Results of Test 2

Average HR: 80; HRV: 7-22 BPM

HRV Coherence Score: %Low: 79; %Medium: 12; %High: 9

I briefly showed Kate a way of releasing the tension in her neck and shoulders through gentle tensing fol-

lowed by “releasing.” This enabled her to recognize the difference between the tension and the relaxation and helped her to relax. We ran a final strip using the Coherence Coach, a program that paces breathing with the movement of a ball, with the volume off and Kate facing the screen. I set the breathing pacer to 6 breaths per minute, which enabled Kate to utilize the “Six Breaths Protocol” (count of 5 with each inspiration and expiration) while having a visual focus to help eliminate distracting thoughts. I taught her deep, diaphragmatic breathing (DDB), and she followed the rising/falling of the ball. I left the Coherence Coach screen up for the entire strip, which I hoped would facilitate relaxation as she would be unable to judge herself. At the completion, we reviewed the results, and she was amazed by the improvement in both her HRP and her coherence levels. Her HRP gradually turned smooth and harmonious within approximately 1 minute of starting the strip.

Kate admitted that she has always been a bit of a perfectionist and that it helped to focus on something like the Breath Pacer without knowing the status of her coherence. She was excited to see just how much control she had over her actions/reactions and her overall physiology.

Results of Test 3

Average HR: 84; HRV: 8 to 22 BPM

HRV Coherence Score: %Low: 41; %Medium: 3; %High: 56

For homework, Kate was given an information sheet on the DDB exercise and encouraged to practice frequently throughout the day until our follow-up visit (at the very least for 3-5 minutes before sleep, upon awakening, and preferably twice at work). We briefly discussed the definition and practice of “mindfulness,” and I requested that Kate immediately begin “checking in” with herself on a regular basis—especially when she was feeling anxious, scattered, or unable to sleep, reminding her of the negative “mind chatter” that we can be unaware of yet can dominate our lives. Self-awareness is the key to change, and creating calmness enables us to be more self-aware. I also suggested that if Kate finds that at the end of her day she did not take time to do that, she should not judge or berate herself but simply reflect on her day, learn from it, forgive herself, and move on.

I encouraged Kate to also be mindful of her body tension and use the “tense/release” technique she learned today when necessary. Since Kate also expressed an appreciation of nature and loves how she feels and sleeps after spending a day at the beach in the summer, I encouraged her to get outside more—maybe taking a 15-minute walk during 2 or 3 lunch hours per week and making time to be outside on weekends (especially while the weather is still amenable to it).

SESSION 2 (9/24/11)

Length of session: 1 hour.

Initial observations: Kate appears tired but fairly

^a Psychophysiological coherence is a state of synchronization between the heart, brain, and nervous system. It is a measurable physiological state and the foundation of peak performance and optimal health. These states are indicated by color, audio tone, and percentage on the emWave PC. The benefits of coherence include the following: physiological systems function better; enhanced mental clarity; emotional stability and improved cognitive function.

upbeat. She stated that she has found it comforting to know that she has more control than she realized with managing stress. We reviewed homework. Kate states she has been practicing DDB every morning and night but often forgot during the day at work. However, she believes the night practice is helping her to sleep better, and she said she feels a noticeable difference mentally and physically after each practice. She described a warm feeling and a feeling of “lightness” after completing the DDB exercises. She states it is very calming, and while she is attempting to practice mindfulness throughout the day, practicing introspection at night by reviewing her day—during and after practicing DDB—has been revealing for her. She now recognizes the negative self-chatter that she used to be unaware of and its effects on her mood, energy, emotions, etc. She also has used the DDB when palpitations have occurred, and she feels it helped to stop them.

Kate’s father recently had major cardiac surgery (“to patch a hole in his heart”) and is recovering, but it will be a while before the doctors will know how successful it really was. Meanwhile, her family is eager for her to return to Pittsburgh and she is feeling “torn.” She also finds herself worrying about her job and the fact that she is exhausting her vacation time.

At this evaluation, Kate reported no medications, no exercise in the last 2 hours, and no caffeine in the last 5 hours.

- Blood pressure: 128/80
- Pulse: 82
- Respiration: 14

An initial baseline HRV assessment (of resting coherence level ratios) was done at the low challenge level (there are 4 challenge levels to help one raise his or her baseline coherence levels) for 5 minutes using the ear sensor—without Kate facing the screen and with no volume with the following results:

- HRP erratic with sympathetic spikes
- Average HR: 80; HRV: 5 to 18 BPM
- HRV Coherence Score: %Low: 83; %Medium: 10; %High: 7

The highest peak in the power spectrum was in the very low frequency (VLF) area, indicating sympathetic dominant activity while the lowest was in the high frequency (HF) area, which indicates parasympathetic activity.

Kate quickly recognized the fact that she was not in psychophysiology coherence and “did not even come close to being in the zone.” She knew she could have gone to her breath but she wanted to see “where I’m at without trying.” She was fascinated by the power spectrum that I brought up after we stopped the strip. I explained what the different frequencies represent and promised that I would bring up the power spectrum while conducting the next test, so she could see in color

and in real time the changes occurring depending on her internal state.

First, we reviewed the “Depletion to Renewal Plan.” (We had a brief discussion about the hypothalamic-pituitary-adrenal axis and the roles of DHEA and cortisol in the body.)

Step 1: Kate hopes to reduce stress and anxiety, improve sleep and overall health, and increase energy.

Step 2: Kate documented her emotions from the last few days. On the Renewal side, there were none in the right lower quadrant (RLQ), 2 in the right middle quadrant (RMQ), and 2 in the right upper quadrant (RUQ).^b

On the Depletion side, there were 4 emotions in the left upper quadrant (LUQ), 1 in the left middle quadrant (LMQ), and 2 in the left lower quadrant (LLQ).^c It was obvious to Kate that she was spending more time than she’d like in the depletion area, draining any energy reserves.

Steps 3 and 4: Kate wrote “Now” in the LUQ and “Goal” in the RLQ.

Step 5: Emotions and behaviors typically getting in her way include worry, anxiety, perfectionism, frustration, guilt, and occasional procrastination.

Step 6: Thoughts, attitudes, behaviors, or emotions that can assist her included positive thoughts/attitudes such as “No one is perfect”; “It’s only natural to worry about my dad, but I will choose to focus on the fact that he is recovering well”; and “I am fortunate to have a job and a boss who understands my family situation.” Emotions targeted included recognizing what she is truly grateful for and allowing herself to truly feel that appreciation.

Neutral Tool

I gave the HM “Neutral Tool” sheet to Kate and explained that this tool can stop the impact of stress on her mind and body, thereby stopping the energy depletion. I refer to it as a “time out” during which she can take a step back from her racing mind, recognize what is occurring, and neutralize emotionally charged thoughts/feelings in the moment, so they do not continue to drain her and lead to further negative thoughts/feelings. This will disrupt the body’s stress response and allow her to return to equilibrium.

We began a second strip as I guided Kate through the 3 steps (time out and go to the heart area; try to disengage from stressful thoughts/feelings; continue until neutralizing the charge). When she did not see immediate results, I advised Kate to start by breathing slowly and deeply to a count of 5 or 6. I explained that with daily practice, the exercise will become second nature to her and she will eventually need only 2 steps

^b The Renewal area signifies positive emotions that are exciting (RUQ), uplifting (RMQ), or calming (right lower quadrant, or RLQ) indicating whether or not one is tending toward sympathetic dominance, parasympathetic dominance, or somewhere in the middle. All of these can contribute to energy renewal in the body and mind.

^c Similar to the above, except these types of emotions are typically “negative” and energy-depleting.

(heart focus and heart breathing). Kate was able to raise her coherence level with “neutral” and slightly improve her HRP. When I asked her to offer an example of an “everyday depleting situation,” she immediately said, “weekday mornings at home” (getting the kids to school and herself to work on time). It was evident it struck a chord as her HRP became more chaotic and she reverted to low coherence. We continued to practice the Neutral Tool until she felt the emotional charge was gone (also reflected in her HRP and coherence level) with the following results:

- Average HR: 78; HRV: 5 to 20 BPM
- HRV Coherence Score: %Low: 45; %Medium: 31; %High: 24

Since we had enough time, I decided to take the Neutral Tool to the next level by adding the power of a positive emotion. While we ran a third strip, I guided Kate through the Neutral Tool once again (Heart Focus, Heart Breathing) and added Heart Feeling at the end. I asked Kate to think of something or someone she deeply appreciated and not just think about it but allow herself to truly feel it from her heart. Kate did not need to close her eyes but immediately thought of something and quickly went into high coherence with a smoother HRP. I switched to the screen with the HRP on top and the HRV power spectrum on the bottom, as I had promised Kate I would earlier so she could see the 3 frequency bands distinguished by 3 colors: orange, VLF area; yellow, LF area; and pink, the HF area. When the highest peak was around 0.10 Hz in the yellow area, she noticed the harmonious HRP on top, and when we switched back to the main screen, it was verified that she was in high coherence. This reinforced the power of thoughts/emotions for Kate, but she found she needed to close her eyes to sustain the positive heart feeling and therefore sustain high coherence. I explained that that was fine for now but that with daily practice she would not need to close her eyes and would be able to “flip the switch” immediately as needed. That’s why this tool is called the Quick Coherence Technique (QCT): Heart Focus, Heart Breathing, Heart Feeling. The results were as follows:

- Average HR: 77; HRV: 5 to 20 BPM
- HRV Coherence Score: %Low: 45; %Medium: 12; %High: 43

The highest peak in the power spectrum was just to the left of 0.10 Hz and the bulk of activity was between 0.00 and 0.14. This is indicative of chronic anxiety in someone who is not completely depleted and able to pull out of it.

For homework, I gave the HM sheet on the QCT to Kate after ensuring that she understood what it was and how to practice it. I advised that she continue to practice DDB and add daily practice of the Neutral Tool and the QCT for at least 3 minutes twice a day. I encour-

aged her to continue listing on the worksheets depleting everyday situations and how going to neutral and/or the QCT can help. I reminded her to be gentle with herself (no self-judging) and remember that this is not a competition but a learning experience that will lead to better life skills and better health. Since Kate is in and out of town, I told her to give me a call if she has any questions or runs into any “blocks.” She is planning to return for an appointment around Columbus Day weekend. I also encouraged Kate to avoid watching the news at night (a regular habit), to consider an earlier bedtime if her family situation will allow it and to consider inspirational reading, soothing music, humorous TV shows and movies, etc. She will continue to incorporate the practice of mindfulness into her life.

SESSION 3: 10/8/10

Length of session: 1 hour

Initial observations: Kate appears upbeat and is grateful that her father is doing well and her daughter has settled in well as a freshman in college. She is trying to focus on her feelings of gratitude for these and other things in her life with the hopes of improving her coherence and health. She states that practicing mindfulness continues to be “revealing” to her and that she continues to work on incorporating it into her life. Mindfulness, combined with the neutral tool, has been helpful to her especially in the morning and at work. She added that she has also been able to immediately use the QCT and said, “I count my blessings every day.” She is avoiding watching the news at night but still experiences some difficulty falling asleep and frequently wakes up around 3 or 4 AM.

Palpitations have been occurring less often. I asked Kate to observe in the future if they seem to occur/increase with pre-menses.

Kate reported that she had taken no medication, she had had caffeine (coffee) about 2 hours ago, and she had not exercised in the last 2 hours. Her nutrition was good, but she needs to improve hydration.

- Blood pressure: 126/80
- Pulse: 90
- Respiration: 12

I ran a 6-minute strip, keeping the challenge level at low, to determine Kate’s baseline

- HRV assessment (while we chatted)
- HRP erratic with sympathetic spikes
- Average HR: 85; HRV: 4 to 18 BPM
- HRV Coherence Score: %Low: 69; %Medium: 15; %High: 15
- In the HRV power spectrum, the highest peak was actually in the 0.10 Hz region; however, the second highest peak (a close second) was at approximately 0.03 Hz.

Kate was expecting better results, but I reminded

her that the chronic anxiety, current ANS state, and HRV status did not happen overnight and will take consistent practice for sustained improvements. I shared some HM research/case studies with her and it seemed to alleviate some of her concern. I also encouraged her to “check in,” go to her heart and appreciate the positive changes that have occurred, the knowledge she has gained, and the spirit she has put behind her intentions. In addition, I explained that HM is primarily tracking changes in the NS/ANS and heart-brain communication and will not directly show some of the physiological benefits that are beginning to occur. She seemed relieved to hear this.

We began running a second strip (10 minutes) as I explained to Kate that I would teach her another tool that would help her learn to sustain coherence and all the benefits that accompany it. I mentioned that this tool, the Heart Lock-In technique, would help her settle down at night and most likely improve sleep. Since Kate’s HRP appeared erratic and she started in low coherence, we began by having her go to “neutral.” She was able to quickly go to the QCT and see how that not only improved her HRP and coherence level but also how the turquoise bars in the HRV power spectrum moved from primarily being in the orange area (VLF) to the yellow area (LF). I began to guide her in the Heart Lock-In (HLI) technique: she shifted her attention back to her heart area while breathing slowly and deeply—elicited and tried to sustain a genuine feeling of love/appreciation—and then allowed this feeling to radiate out into her body and to others. She stated she actually found this to be easier than she expected. (It seems that, as with many, it is easier for her to love others than to love herself.)

Results

- Improved HRP
- Average HR: 82; HRV: 5 to 20 BPM
- HRV Coherence Score: %Low: 43; %Medium: 14; %High: 43
- In the HRV power spectrum, the bulk of activity and the highest peak were in the 0.10 Hz (LF) region.

This led to an interesting conversation about electromagnetic fields (EMFs), especially with regard to the heart, and I referred Kate to the HeartMath Institute website. Kate found HLI to be her favorite technique thus far, and I encouraged her to practice it often as it is one of the best techniques to use to sustain coherence and increase energy. I gave Kate an instruction sheet on this technique to add to her folder and told her that with daily practice, it will get to the point where she will only need to think the words *focus*, *appreciate*, and *sustain* to improve/sustain coherence.

We concluded with an HM “game”—the garden. During this 3-minute strip, Kate was able to achieve medium-high coherence and appreciated the “soothing scene” and watching the garden come alive. She also appreciated the nature sounds and allowed herself to truly feel and not just think about it. She was “blown away” with the results:

- Greatly improved HRP
- Average HR: 80; HRV: 5 to 20 BPM
- HRV Coherence Score: %Low: 6; %Medium: 20; %High: 74
- In the HRV power spectrum, the bulk of activity and the highest peaks were in the 0.10 Hz (LF) region.
- She was “in the zone” the entire time (a first for her).

I asked Kate what she thought/felt during this time and she replied that she primarily felt immense appreciation for the beauty in nature and felt grateful for the creator behind it.

For homework, I encouraged Kate to practice the HLI technique daily. I told her to begin practicing it for 3 to 5 minutes and to build on the amount of time spent on it to 15 minutes over the next month. The goal is to incorporate it into her daily routine as much as possible for the rest of her life—especially since it resonates so well with her and can help her body “re-wire” so coherence becomes her “norm” again. She is also to continue with the other practices and try to “connect” with nature more since she finds it to be so soothing and healing. She has not taken the time to begin walking outside during breaks at work but has begun walking more on weekends. I asked her to continue to note what seems to “throw her out of balance” the most and address it and reminded her to go easy on herself and congratulate herself for the strides she has made in addition to being grateful for them.

SESSION 4: 11/11/10

Length of session: 30 minutes

Initial observations: Kate appeared upbeat and energetic with more pink in her cheeks and a brightness to her eyes. Under-eye circles were not as prominent. She reports that the palpitations are not occurring much lately and she has been practicing the HLI tool every day; she has not reached 15 minutes yet but enjoys practicing it. Her sleep has improved, but she’s looking forward to it improving even more. She doesn’t feel as though she is “running on empty” as much when she starts her day, and the anxiety seems to be subsiding. Father and family are well, and she is beginning to hydrate better each day as well as get outside more for walks. She finds that her biggest challenges occur first thing in the morning and at work. The stress at work (dealing with a difficult coworker) is somewhat reduced as she is now viewing the situation with more compassion by recognizing that the coworker’s behavior might stem from poor self-esteem, fear, or insecurity.

Kate reported taking no medications. Her nutrition and supplements remained unchanged. She had not exercised in last 2 hours and had no caffeine in the last 4 hours.

- Blood pressure: 118/76
- Pulse: 80
- Respiration: 12

I ran a 4-minute strip, keeping the challenge level at low, to determine Kate's baseline HRV assessment with the following results:

- HRP harmonious (with no sympathetic spikes)
- Average HR: 81; HRV: 5 to 20 BPM
- HRV Coherence Score: %Low: 0; %Medium: 0; %High: 100
- In the HRV power spectrum, there was minimal activity in the VLF and HF bands with most of the activity and the highest peak in the 0.10 Hz region.
- Remained "in the zone" the entire time

Kate was thrilled with the results. I raised the challenge level (to "normal" or "2"). She kept her eyes open, as with the last session, and we alternated the screen between the "view coherence" and "HRV power spectrum." She started in 100% medium coherence, but I noticed that she "got in her own way" a little when the coherence ratio showed that she went into LC. I encouraged her to activate the QCT and/or HLI. She had some momentary difficulty and then closed her eyes and was able to improve both her HRP and coherence.

Results of the 15-minute strip:

- HRP fairly erratic
- Average HR: 82; HRV: 4 to 18 BPM
- HRV Coherence Score: %Low: 52; %Medium: 29; %High: 19
- In the HRV power spectrum, the bulk of activity was between the 0.00 and 0.13 Hz frequency bands, and the highest peak was directly over 0.10 Hz.
- Not "in the zone"

I reminded Kate of her initial strip with 100% HC, etc, and the strides she has made with accompanying psychological and physiological benefits. When we discussed what might have occurred to "get in her way" she acknowledged that as soon as she saw that she was not doing as well, she felt both disappointed and frustrated. She went to neutral but expected instantaneous results. When that did not occur, she went to the QCT but felt the need to close her eyes. She also stated that when her eyes are open, she prefers looking at the HRV power spectrum most of the time as she thinks the red/tone of LC is a "trigger" for her. I complimented her perceptiveness and stated that with continued practice of the HM techniques, even the "triggers" will not be able to throw her off balance so easily and that she will quickly return to coherence when they do.

We ran out of time and were unable to do a third strip.

Kate's homework assignment was to continue to practice the HM techniques and increase the practice time for the HLI tool to 15 minutes at least once a day and to practice mindfulness not only to "count her blessings" but to recognize her triggers. She was to return for an appointment during the Thanksgiving break.

SESSION 5: 11/26/10

Length of session: 30 minutes

Initial observations: Kate appeared healthy and relaxed; she said her entire family was in town for the Thanksgiving holiday, and as crazy as it was, it made her very happy. She said she is not looking forward to returning to Pittsburgh and wishes they could move back to this area. We reviewed the homework, and she stated that she has increased the HLI practice but not to 15 minutes yet. She added that she had not been practicing much with any of the techniques over the 5 to 6 days, possibly because she was out of her routine with packing and traveling with her family, visiting with relatives, etc. She did state that she felt supremely content at the Thanksgiving dinner table with everyone and allowed herself to be immersed in that feeling.

Kate has experienced a few palpitations the last week (and noted that she is premenstrual) but feels that anxiety and sleep have improved and that there has been less "mental fog" at work. Nutrition has been good with the exception of the last week (increased sugar, fat, wine). Her hydration is improved. She had 2 cups of coffee 2 hours before arriving and took a brisk walk with her sister before coming in.

- Blood pressure: 132/78
- Pulse: 96
- Respiration: 15

Ran a 5-minute strip, keeping the challenge level at "normal" (2), to determine Kate's baseline HRV assessment with the following results:

- HRP chaotic
- Average HR: 91; HRV: 4 to 20 BPM
- HRV Coherence Score: %Low: 94; %Medium: 6; %High: 0

In the HRV power spectrum, the bulk of activity was between the 0.00 and 0.06 Hz frequency bands, and the highest peak was about 0.02 Hz. Kate explained that it bothered her to see her HR staying in the 90s, and it frustrated her even more when she could not get it down or "get out of low coherence." She added that she thought she was doing so well and actually feels better overall, so this is surprising and disappointing for her. She is more at ease viewing the HRV power spectrum than she is with the coherence ratio screen. I explained that neither was necessary and that she might want to face the window while the HM strips were running, but she stated that she also finds it all fascinating and feels it helps her to learn.

I told her she is "ahead of the game" as she quickly recognizes and acknowledges her thoughts and feelings now. I asked her how she could reframe some of those thoughts and alter her intention and feelings. She offered a few examples and was right on target with them.

We further discussed how both the exercise and the coffee could have affected her BP, HR, and HRV. I remind-

ed her of the wisdom behind incorporating her new practices into her daily life no matter what the circumstances, and we chatted for a few minutes about the neuroplasticity of the brain, the effects of certain habits, etc.

Normally I would not try a game unless my patient has been in 50% or greater of MC and HC, but I made an exception in this case. Thinking that Kate might need a healthy distraction and knowing that she feels “connected” with nature and that she might need confirmation of her ability to transform stress in the moment, we tried the “garden game,” this time in the second challenge level. Once again, Kate was pleasantly surprised and very relieved to see the following results:

- Improved HRP; much smoother, like a sine wave
- Average HR: 90; HRV: 6 to 20 BPM
- HRV Coherence Score: %Low: 3; %Medium: 49; %High: 49
- In the HRV power spectrum, the bulk of activity was in the LF band, with a wide peak over the 0.10 Hz frequency.
- Completely “in the zone”

This was also encouraging to see as it helped Kate realize that even when she alters her ADLs or has too much caffeine (and exercises before an appointment), she can still be in coherence, despite a rapid heart rate. We concluded by speaking about balance in life and discussed spirituality. Kate expressed an interest in learning more about EMFs, energy, and the body. I recommended a few books by various authors and a few CD instruction programs.

For homework, I asked Kate to renew her commitment and efforts to practice the HM tools daily and work on sustaining a positive emotional state/coherence by practicing the HLI up to 15 minutes at least once a day. We discussed the difference between emotional shifting and emotional restructuring. I advised Kate to consider using the HM practice log or a “mini journal,” especially as she will not be able to RTC until the Christmas holidays.

We also discussed the possibility of her purchasing the emWave PC as she will not be coming east as often in the near future. I emphasized how the entire family could benefit from it—occupationally, academically, athletically, and personally.

SESSION 6: 12/27/10

Length of session: 30+ minutes

Initial observations: Kate appears upbeat but somewhat pale and tired. I noted redness around the nostrils and that her under-eye circles are more prominent. Her skin is very dry, and she states she has a cold but that she enjoyed the holidays with family. She noted that her palpitations do seem to be related to her menstrual cycle and that is also when she has the most difficulty with sleep. I asked if she has spoken to her gynecologist about the lab work we discussed in the first session, and she has not. I encouraged her to do so

as her symptoms may be related to hormonal changes. She said she feels her best between menses and ovulation but that overall, she feels better in general since starting to practice the HM techniques. She has been practicing them daily and has practiced the HLI technique for a full 15 minutes a few times but not daily. She has not kept a log or journal but continues to try to be mindful throughout each day. She did not have time to read until coming back east for the holidays and is reading a book by Louise Hay that she is enjoying. She also purchased a book by Larry Dossey and said she is excited about restarting her spiritual journey.

- Medications: Guaifenesin (decongestant)
- Nutrition/supplements: Same except for holiday indulgences
- Caffeine: 1.5 cups of coffee 2 to 3 hours ago
- Exercise: None today
- Blood pressure: 126/76
- Pulse: 84
- Respiration: 12

I ran a 5-minute strip, keeping the challenge level at “normal” (2) to determine Kate’s baseline HRV assessment (with Kate looking away from the screen) with the following results:

- HRP slightly erratic but improved overall
- Average HR: 82; HRV: 5 to 18 BPM
- HRV Coherence Score: %Low: 37; %Medium: 43; %High: 20
- In the HRV power spectrum, the bulk of activity was between the frequencies of 0.04 and 0.13, with a wide peak over and to the right of the 0.10 Hz frequency.
- Kate was “outside the zone.”

Kate recognized that as much as she likes to look at the screen, she tends to do better if she does not—she feels disappointed and tries too hard to rectify things if she is in low coherence.

We ran a second strip at the same challenge level for 8 to 9 minutes while chatting about Kate’s “triggers and triumphs” without Kate looking at the screen. It was interesting how quickly Kate slipped from HC to LC when bringing up triggers but also how quickly she was able to return to MC and HC. She started with deep breathing and then turned to the QCT, followed by trying to stay with the HLI with the following results:

- HRP initially a little erratic but then smooth/harmonious overall
- Average heart rate: 85; HRV: 5 to 20 BPM
- HRV Coherence Score: %Low: 26; %Medium: 22; %High: 51
- In the HRV power spectrum, the bulk of activity was between the frequencies of 0.03 and 0.12, with a wide peak over and to the left of the 0.10 HZ frequency.

- Kate did not start off “in the zone” but was able to get there and stay there throughout most of the strip.

Kate was pleased with her progress. Because she was not sure when she is coming back east, we reviewed everything before she left. Kate said she would continue to practice these techniques every day and that some of them are starting to become almost second nature for her. She understands where her biggest triggers are, and we brainstormed about how she can be more proactive with some of her concerns (such as getting her husband to help out more at home). She was hoping to purchase the emWave PC and said she would like to have her husband try it. I recommended purchasing the HM book *Transforming Stress*, and she bought it before she left. I reiterated the importance of checking in with her doctor. Kate expressed an interest in scheduling an appointment for the next time she is in town, saying she wants to “up the challenge level.” I replied that she will be able to do so at home if she purchases the system and encouraged her to call me with any questions.

Chronic anxiety can become “habitual” in the body. It does not occur overnight and takes time, skills (with regular practice to set up a better “habit”), and sometimes medication to remedy the situation. One’s HRV status is not just a reflection of what is happening in the moment but what has been occurring overall for some time. Kate understood this and recognized that it will take consistent application and practice of what she has learned to achieve additional healing and to sustain improvements.

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