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FEATURE ARTICLE

Vulvodynia Treated Successfully with Breathing Biofeedback and Integrated Stress Reduction: A Case Report

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Millions of women experience substantial pain and suffering from vulvodynia, which is pain around the entrance to the vagina (vulva). A common treatment is surgical removal of the tissue (vestibulectomy). This case report describes the detailed process of a holistic biofeedback-based intervention that successfully resolved the vulvodynia in a 23-year-old woman. The four-session treatment interventions included teaching diaphragmatic breathing to transform shallow thoracic breathing into slower diaphragmatic breathing. Treatment transformed her feeling of powerlessness, a belief that there was nothing she could do, into empowerment and a hope that she could reduce her symptoms and optimize her health. She also practiced self-healing imagery and learned to change her posture from collapsed to erect/empowered. Each time she felt discomfort or was fearful, her lower abdomen tended to tighten. After treatment, she used this sensation as a reminder to breathe lower and slower and sit or stand erect. After 6 weeks, she once again could initiate and enjoy intercourse and has been symptom free during the 8 month follow-up.

I went home for the Christmas holidays, and the vaginal burning just got worse. I could not enjoy my family or the food—I just wanted to curl up in bed all day. I felt hopeless, confused, and depressed, and I could not care less about graduating in 6 months or my new apartment. My boyfriend and I were unable to have intercourse. I visited a vulvar specialist, he gave me drugs, which did not ease the discomfort, and he mentioned surgical removal of the affected tissue as the most effective cure.

Today, I feel totally well. I realize that I have successfully resolved vulvodynia by changing my lifestyle and attitude towards my illness and life.

—23-year-old female student who reversed vulvodynia

Introduction

Millions of women experience substantial pain and suffering from vulvodynia, which is pain around the entrance to the vagina (vulva). This disorder is underdiagnosed, is often inadequately treated, and can go on for months and years (Mayo Clinic, 2014; Reed et al., 2008). The lifetime prevalence of vulvodynia in the United States among women ranges between 8.3% and 9.9% (Arnold, Bachmann, Rosen, & Rhoads, 2007; Reed et al., 2012). The discomfort can be so severe that sitting is uncomfortable and intercourse is impossible because of the extreme pain. Just touching the area diagnostically with a Q-tip can be excruciatingly painful. Women often report that the symptoms were caused or aggravated by stress and yeast infections (Arnold et al., 2007).

Pelvic floor pain is often hidden and shameful, and many women suffer as successful treatment is elusive. There may be hope! Glazer et al. (1995) and Glazer, Jantos, Hartmann, and Swencionis (1998) showed that after pelvic floor electromyographic (EMG) biofeedback training, women in their study with vulvodynia reported an 83% reduction in pain and 78% resumed sexual activity. With an integrated program of relaxation, stress management, lifestyle changes, and EMG feedback, it is possible that vestibulectomy may be avoided (Bergeron, Khalifé, Glazer, & Binik et al., 2008; Mariani, 2002; Glazer & Rodke, 2002).

This case report describes the process of a holistic biofeedback intervention through which a 23-year-old student suffering from severe vulvodynia healed herself through a combination of biofeedback, respiratory retraining, self-awareness, and stress management (Peper et al., 2014; Peper, Gibney, & Holt, 2002). Additional details of the participant's narrative and her description of how she experienced the training can be downloaded from https://biofeedbackhealth.files.wordpress.com/2011/01/a-healing-of-vulvodynia-from-the-client-perspective-2015-06-15.pdf.

Background

The participant was a 23-year-old female student who experienced severe vulvar pain for the previous 6 months. The first symptoms began after she had a severe yeast infection at the end of 2013, which was treated with multiple oral and intravaginal medications as well as hydrocortisone creams. The university health service referred her to a vulvodynia consultant who diagnosed her condition and recommended surgery (vestibulectomy) to remove the sensitive areas. This recommendation totally shocked her.

I cried immediately upon leaving the physician's office. Even though he is an expert on the subject, I felt like I had no psychological support. I was on gabapentin to reduce pain, and it made me very depressed. I thought to myself: Is my life, as I know it, over?

The diagnosis affected virtually every area of my life. Physically, I was in pain every single day. Sometimes it was a raging burning sensation, while at other times it was more of an uncomfortable sensation. I could not wear my skinny jeans anymore or ride a bike. I became very depressed. I cried most days because I felt old and hopeless instead of feeling like a vibrant 23-year-old woman. The physical pain, combined with my negative feelings, affected my relationship with my boyfriend. We were unable to have sex at all, and because of my depressed status, we could not engage in any kind of fun. Academically, it was very difficult to concentrate in my classes because I was always in pain. These were the toughest months of my life.

The First Session

The first session focused on exploring how self-regulation strategies could be useful to reduce discomfort and assist the participant to feel understood and safe—providing hope that there may be other options besides surgery.

She described her history as follows:

Last year was a very stressful one due to various circumstances, including moving into a new and unsanitary house, a long commute to school, and some personal, relationship, and familial problems. Because I was under a lot of stress, I did not get my period for almost 4 months. I took several pregnancy tests because sometimes I would feel nauseous and bloated, but every result came back negative.

As she talked, the therapist responded by saying:

It must feel very embarrassing and shameful to talk about this. You can't really talk to your friends about this. Each time you go to a physician, he/she inspects and often touches these private areas. You must feel totally invaded. And to think that surgery would remove part of your vestibule is horrendous.

She responded with a soft verbal "yes" and a whole-body letting-go response. The therapist explained that most likely as a very little child she was very sensitive and reacted strongly, especially to negative emotions around her. Again, she responded with "yes," implying that "here is someone who finally understands me."

The therapist described how she felt before the patient had described the feelings to the therapist. This enabled her to experience the first step in the healing process: feeling understood and safe.

This teaching/therapeutic strategy was based on normalizing behaviors that seemed abnormal to the participant. The discussion included laughter and humor. For example, she was asked to loosen her waistband so that she could allow her abdomen to expand—a precondition to learn diaphragmatic breathing. The therapist reminded her how difficult this was to do, since it goes against our social and cultural upbringing. "Let's be honest, who would ever want to date a person with a protruding stomach?" This was followed by mutual laughter, which promoted diaphragmatic breathing and relaxation. The therapist also explained that many of her body's responses were the result of chronically activating physiological defense patterns, which tended to tighten the pelvic floor.

Creating a Psychophysiological Model for the Disorder.

The assessment phase included building a psychophysiological model of the mechanisms producing the pain and communicating this model to the patient as a rationale for a self-regulation–based intervention plan. Patients who perceive a clear linkage between interventions and their own complaints will show more "buy-in" for engaging in behavioral change.

The psychophysiological model was derived from work by Howard Glazer, who had used EMG feedback as a treatment for vulvodynia, and David Wise and Rodney Anderson, who taught relaxation and trigger point massage for the successful treatment of severe pelvic floor pain (Anderson, Wise, Sawyer, & Chan, 2005; Glazer et al., 1998; Wise & Anderson, 2006). The model assumed that

she had developed an irritation of the vestibular area, which caused her to tighten her lower abdomen and pelvic floor muscles reflexively in a covert defense reaction. This was augmented by her ongoing worry and catastrophic thinking ("I must have surgery, it will never go away, I can never have sex again, my boyfriend may leave me").

She was caught in an escalating cycle of triggering the defense reaction—tightening her lower abdomen and pelvic area, shallow breathing, and concurrent increases in sympathetic nervous activation—which together increased discomfort and possibly activated trigger points, which could cause referred pain (Banks, Jacobs, Gevirtz, & Hubbard, 1998).

When the participant experienced a sensation or thought about the pain, her body responded in a defense reaction by breathing more thoracically and tightening the pelvic and lower abdominal area. This pattern became a conditioned response—anticipating being touched or initiating intercourse also caused her to tense and freeze up.

Her behavioral responses of tightening up were not abnormal. Most mammals tend to react the same way. This concept was illustrated by the therapist telling a story of how his dog would automatically avoid a specific location on the trail. The dog would always try to avoid that area even when on a leash. It was not because of a unique smell; it was because as a young puppy, she was attacked at that location by a much bigger dog. The location was the trigger that reactivated the fear even though the other dog was no longer there. These discussions were aimed to normalize her interpretation of her behavioral responses, which she had previously interpreted as shameful and guilt ridden.

To reverse and interrupt the habitual defense reaction, the therapist began teaching her effortless diaphragmatic breathing in a sitting position. The therapist modeled diaphragmatic breathing and then encouraged her to constrict/flatten her abdomen during exhalation and expand during inhalation. As she exhaled, she whispered "haaa" and imagined the exhaled air flowing through her pelvic and vulvar area and down and out through her legs. The therapist exhaled as she exhaled. The initial focus was to exhale by slightly tightening the lower abdominal muscles, thereby decreasing the abdominal diameter. Then, during inhalation, she was taught to allow the transverse abdominis muscle and the pelvic floor to relax so that the abdomen could expand. Subjectively, she could feel her pelvic floor going down and relaxing and her lower back expanding.

The training objective was to breathe effortlessly at about six breaths per minute, thereby supporting sympathetic-parasympathetic balance through increased heart rate variability. Each time she exhaled slowly, she imagined a flow of soothing liquid flowing down through the area of discomfort and cleansing it. As she practiced, her pain significantly decreased from 8 to 1 on a 0 (*no pain*) to 10 (*severe pain*) scale. She experienced hope that health could be restored.

Psychophysiological Homework

She was prescribed homework with the understanding that it needed to be practiced many times during the day. The analogy used to explain this concept was that of healing a wound on the skin. If a scab occurs and you rip the scab off, it will not heal. Similarly, each time she would trigger a defense reaction in response to negative thoughts or sensations of discomfort, it would irritate the vulvar area. Thus, each time when she caught herself going into a defense reaction, she was asked to breathe diaphragmatically, relax, and imagine a healing energy flowing down the pelvic area and legs.

Finally, she was asked to implement a holistic health lifestyle: eating a healthy diet using the guidelines described by Michael Pollan (2008) in his book *In Defense of Food: An Eater's Manifesto,* healthy sleep patterns by going to bed on time and sleeping 7 to 8 hours a night, and regular exercise and relaxation (Gorter and Peper, 2011; Peper, 2014b). She was asked to log her healthy lifestyle changes, breathing practices, and discomfort levels. It was understood that even if this approach did not change the long-term outcome of vulvodynia, at least it would do no harm and would support her health and immune system.

The Second Session with Biofeedback Recording

The second session occurred that same day when she volunteered as a subject in a biofeedback class. She shared that she had vulvodynia, which helped her let go of a hidden secret (vulvodynia) and reduced the shame (Pennebaker, 2012; Pennebaker, Kiecolt-Glaser, & Glaser, 1988).

The biofeedback session, in front of the 15 students, included monitoring her abdominal and thoracic respiration and monitoring the surface electromyography (SEMG) muscle tension recorded from the left scalene/right trapezius and right lower abdomen (transverse abdominis muscle). The SEMG was used as surrogate marker for the lower abdominal pelvic tension, as shown in Figures 1 and 2.

Although she breathed thoracically in this session, she demonstrated to herself and the class that she could shift her breathing from thoracic breathing to abdominal breathing (diaphragmatic breathing). As she reported,

It was amazing to see on the computer screen the difference between my regular breathing pattern and my diaphragmatic breathing pattern. I could not believe I had been breathing that horribly my whole life, or at least, for who knows how long. My first instinct was to feel sorry for myself. Then, rather than practicing negative patterns and thoughts, I felt happy because I was learning how to breathe properly. My pain decreased from an 8 to alternating between a 0 and 3.

During the following two sessions, whenever she became aware of vulvar sensations, she was directed to practice diaphragmatic breathing and interrupt and transform negative thoughts into positive healing images.

She reported that stress continued to be a major factor that increased her discomfort. When stressed or feeling discomfort, she unknowingly would slouch and collapse into a powerless position, which would trigger catastrophic thinking. "I will not get better, I can never have sex, I will be disfigured by surgery, my boyfriend will leave me, etc." She was guided through effortless diaphragmatic breathing and cognitive reframing language, which resulted in a significant decrease in discomfort and pain.

This training/teaching included discussions about underlying biological survival processes. Namely, what would you expect to happen to your body when you think hopeless thoughts? The body triggers a defense reaction just as it did 50,000 years ago when it was prey and being attacked. As Stanford Professor Robert Sapolsky, the author of *Why Zebras Don't Get Ulcers*, stated, "Why heal your body, why digest your food, when you could become someone else's lunch?" (Sapolsky, 2004).

The concepts of mind-body interconnectedness were taught through discussions, biofeedback training, an experiential exercise with lemon imagery, and an exercise showing a link between postural changes and corresponding in changes in arm strength.

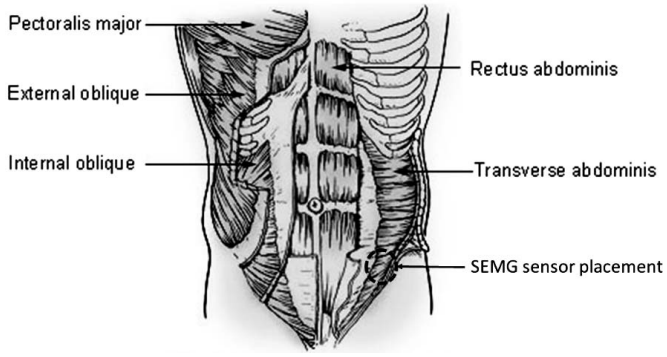

Figure 1. Muscle anatomy of the abdomen with the surface electromyography sensor placement location for monitoring the transverse abdominis muscle.

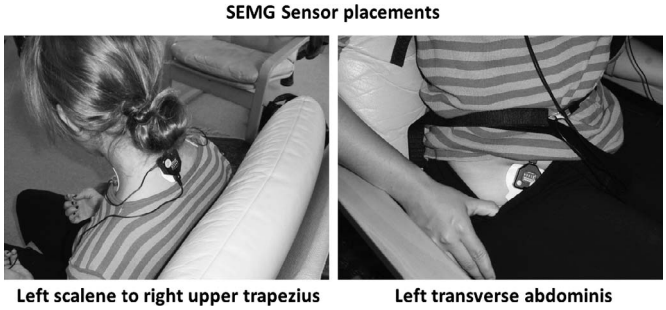

Figure 2. Surface electromyography sensor placements for wide electrode placement to record left scale to right upper trapezius and narrow electrode placement to record left transverse abdominis.

- Lemon imagery: Using guided imagery, she was asked to imagine cutting a lemon, then squeezing it and finally drinking the lemon juice. She reported that her salivation significantly increased when drinking the lemon juice, just as is the case with 98% of the students who are guided through this exercise (Gorter & Peper, 2011). This practice illustrated that her autonomic system reacts to an image/thoughts just as it would react to an actual stimuli. Thus, be careful what you imagine or think.
- Posture changes arm strength: While standing, she was asked to resist the downward pressure applied on her forearm near the wrist, first in a slouched posture and then in an erect expanded position. Like most subjects, she felt much stronger in her ability to resist the downward pressure when in the more erect upright position (Peper, 2014a; Peper, Booiman, Lin, & Harvey, in press). This somatic postural change effect was discussed within an evolutionary perspective. When mammals are powerful, they expand in space and their testosterone level goes up and cortisol level goes down; when they are powerless, they constrict, and their testosterone goes down and cortisol goes up (Carney, Cuddy, & Yap, 2010). The experience of this exercise was used as a metaphor for how her immune system is functioning.

These practices emphasized the relationship between thoughts and posture. She was asked from this point onward to observe her posture and thoughts. Whenever she began to detect slouching, such as sitting with her legs crossed and arms wrapping herself, she deliberately shifted to a more powerful expanded position. At the moment of this awareness, she was to breathe diaphragmatically, expand the body by uncrossing her legs, elongating her

spine, and thinking of empowering and optimistic thoughts and images.

After 3 weeks, she reported significant improvement and was pain free much of the time. For the first time in 6 months, she was able to engage in full intercourse with her boyfriend. As she reported,

> We both could not believe it, and I was so happy that I was finally able to do it. I made sure I was relaxed and breathed throughout. This was the best night since December, given that I was able to fully have intercourse after 6 months of waiting.

Fourth Session

The next session occurred when she called to report that her pain had reappeared after she drove all night from Las Vegas back to San Francisco. While driving, she was terrified of the trucks and fearful of getting into an accident. Although the pain was significantly less, she felt defeated.

The biofeedback session focused on exploring her body's responses to stress and emphasized her stress reduction skills. While she sat comfortably, SEMG was recorded (a) with a wide electrode placement from her left scalene to right upper trapezius muscles and (b) with a narrow electrode placement on the right transverse abdominis muscle. Respiration was recorded with strain gauges on the upper chest and abdomen, and blood volume pulse and the derived heart rate were recorded from the left index finger.

She was instructed to relax, then to recall the memory of driving from Las Vegas late at night, and then to relax and breathe effortlessly.

The results showed that the anticipation and discussion of the stressful event increased and maintained her shoulder tension, even when she thought she was relaxed. The memory recall transformed her breathing to very shallow and rapid breathing and increased her transverse abdominis SEMG activity. During the relaxation, her transverse abdominis SEMG decreased when she inhaled, but her scalene to trapezius SEMG remained elevated, of which she was totally unaware, until the therapist reminded her to drop and relax her shoulders, as shown in Figure 3.

The physiological recording was shown to the participant and discussed within an evolutionary response pattern. When fearful, the abdomen and pelvic floor tightened, the shoulders raised to protect against injury, and breathing became shallow so that the body froze in place and became less visible to a predator. The predator was her fearful thoughts of driving.

The focus of the biofeedback training consisted of learning to relax the shoulders, to move into an expanded power

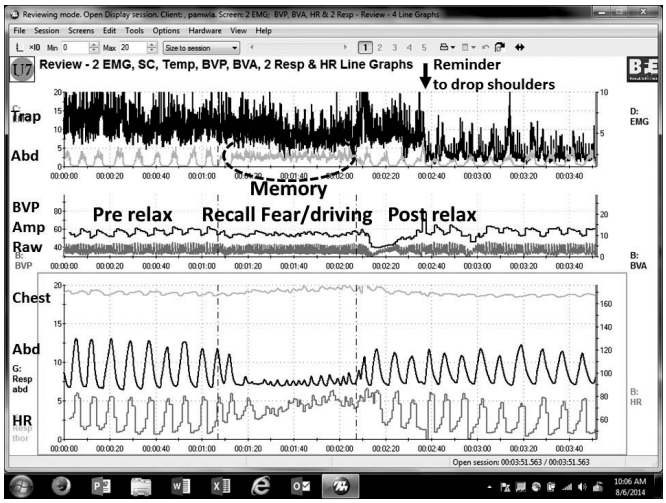

Figure 3. Physiological recording of prestressor relaxation, the recall of a fearful driving experience, and a poststressor relaxation. The scalene to trapezius surface electromyography increased while she recalled the experience and then initially did not relax.

position with the shoulder relaxed while breathing diaphragmatically, and to practice "symptom prescription." Symptom prescription consisted of asking the participant to simulate the body pattern that was associated with the symptoms, which in her case was shallow breathing, and a slight increase in abdominal and pelvic floor constriction. Then the moment she become aware of the tension, she was to let it go and relax, as shown in Figure 4.

At the end of this session, her symptoms had disappeared, and she was reminded to practice continuously during the day. She had to learn to deal with stress in a new and different way from the way that she had learned as a small child.

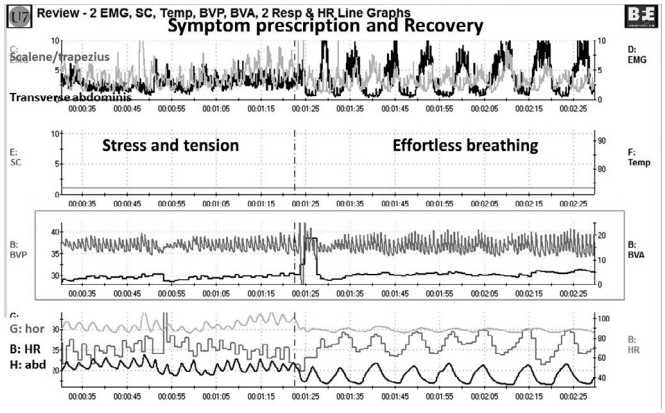

Figure 4. Physiological recording during symptoms prescription and recovery. Note the slight increase in transverse abdominis surface electromyography (SEMG) during symptom prescription and the rhythmic increase and decrease of lower abdominal SEMG during exhalation and inhalation, which is 180° out of phase with the scalene-to-trapezius SEMG activity.

Results at Follow-up

At the 8-month follow-up, she reported that she was symptom free and once again was enjoying intercourse with her boyfriend about twice a week. The only time that she experienced slight discomfort was during times of stress at work, during times of frustration with her boyfriend, and especially at the time of menstruation. The pelvic floor sensations were for her like the "canary in the coal mine." As she said,

> When I am aware of the stress, I sit in a power position and breathe for minutes while I envision myself as a powerful and independent young woman. This exercise boosts my confidence immediately and elicits positive thoughts. It's good to do this exercise to calm myself down if I am nervous.

Discussion

This case report described the successful resolution of a case of vulvodynia. It illustrated the dynamic interaction of mind and body. From the therapist's perspective, the major factors that promoted healing included allowing the patient to feel safe, creating hope by enabling her to experience a decrease in discomfort while doing a specific practice, and assisting her to master skills to promote self-healing.

The practices focused on reversing the ongoing covert defense/stress reactions that activated her pelvic floor and lower abdomen. By describing the process as a normal but exaggerated biological response, guilt and fear could be released. Instead of feeling powerless that there was nothing she could do except surgery (vestibulectomy), the integrated biofeedback protocol offered skill mastery training to promote self-healing through diaphragmatic breathing, somatic postural changes, reframing internal language, and healing imagery embedded within a common sense holistic health approach.

The article was a collaborative effort with the participant. Her personal experiences shed light on the internal process that are so often skipped over in clinical reports. The participant also described her own experience and articulated her own understanding of the success of this healing process. This can be downloaded from https://biofeedbackhealth.files.wordpress.com/2011/01/a-healing-of-vulvodynia-from-the-client-perspective-2015-06-15.pdf.

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