

## **Biofeedback: Harnessing the Power Within to Improve Chronic Pain**

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Welcome to *Emerging Solutions in Pain*. My name is Anthony Whitney. I am a behavioral therapist, licensed mental health counselor, and biofeedback specialist. I work at St. Luke's Rehab in Spokane, Washington. I recently had the pleasure of presenting at pain week 2014 with the topic of *Biofeedback: Harnessing the Power Within to Improve Chronic Pain*. I would like to take a few minutes to highlight some of the main goals and information in the presentation and summarize the objectives.

Biofeedback is an area of medicine or health care that is often not known, even individuals who I work with ongoing, it is just a term that is difficult to define. Even though it has been around actively clinically since the 1970s, it is not something we think of a lot of the time, and over 95% of the patients that I see, the first time I see them, they have no idea what they are really there for or what this biofeedback thing is. In the presentation, some of my objectives are to increase the understanding knowledge of what is biofeedback and how can it be incorporated in the treatment of chronic pain. I also want to identify and go over some of the primary types of biofeedback or areas that we measure and use in the treatment of chronic pain, explain or try to increase an understanding of when is it appropriate or when should I be considering to refer to biofeedback, and then, also ways of minimizing resistance and enhancing the awareness of referring early and considering alternative treatment such as biofeedback or psychological pain management as part of a treatment team in a multidisciplinary approach for pain management. In the area of biofeedback, I would like to use a lot of analogies to describe because I find it difficult. I have been working with biofeedback for over 12 years, and I still have a hard time doing a decent job of trying to explain it to somebody. Most of the patients when I first see them, I warn them that it will usually take anywhere between two to four appointments before they start to really feel more confident and kind of get a better idea of, okay now, now this makes sense, now, I understand how this biofeedback stuff is going to be useful. And part of that is just because of how much can be involved and the fact that we are working with unique individuals. I have standard protocols and techniques that we use, but they have to adapt, they have to be tweaked to fit the unique person or as the situation progresses. So, a lot of the time, when I am working with an individual, I start to have a better understanding of exactly what type of biofeedback or how it is going to be used as we get a better understanding of the individual, and also of how the body is reacting to the stress and symptoms of chronic pain. I describe biofeedback, where most people are familiar with that, if you have ever stepped on a scale to see how much you weigh, that that is a rudimentary or simple version of biofeedback. The scale gives us a number, depending on where we are at in our lifestyle, if we are focusing on losing weight and maybe making some dietary changes that number can be informative. It can help encourage us or reinforce the changes that we are making if that number is getting smaller. If it is not changing or getting higher, we need to question what am I doing, is it

helping? So that information can really help drive progress or help us understand if what we are doing is actually creating the results or the benefit that we are looking for.

Another example would be taking your temperature. We take the temperature. We have an idea immediately does the person have a fever or not; if the fever is very high, 104, or something like that, we need to seek medical treatment; if it is low, maybe we need to do some Tylenol. If they do not have a fever then what else is possibly causing the symptoms that we are seeing? It is the same idea except for looking at more complicated areas of feedback and using those to drive change, to help the person better understand what is going on, increase accurate body awareness with chronic pain. Body awareness is a big problem. It hurts and when it hurts we want to try to avoid the pain, but unfortunately, as we pull ourselves to try to distract ourselves from the pain, we also distract ourselves or become unaware of what is going on in the body, and because the body is not designed to deal with chronic pain, it often adapts in ways that are maladaptive. So, things that would be a positive adjustment if we are working with an acute survival situation can become more problematic and create symptoms that are beyond even the original injury or source of pain. So being able to increase a person's awareness of this and better help them understand the body and the fact that the mind and body are indeed connected is an excellent tool to have in your toolbox or to be able to put in a toolbox of one our patients struggling with pain. When should you refer to biofeedback? What you want to be thinking as early referrals are by far probably the most critical thing you can do to increase the likelihood that they would benefit from treatment. By definition, we do not consider chronic pain to start until we are about three months without it improving. Usually at that point, we are still trying to identify what we are working with, ideally around that six month to twelve month window, by then, we should have a clear indication that this is indeed a chronic pain situation. At that point, we should have a pretty good understanding of whether or not there is a surgery that is going to fix it versus a surgery, such as a fusion, that is going to do the best it can to stabilize but likely still have chronic pain. There is a big difference between those, and so once you start looking and seeing patterns, the patient is not improving, particularly, have a really common area just to keep an eye on is if the person is doing physical therapy and is discharged or discharges themselves because the pain is just getting too much and they cannot make it work. That is where we want to start looking at, 'I need to get some more people helping me,' and we want to start building a multidisciplinary team. On average, my patient population is 3 to 4 years post injury, usually this is when I get people for the first time, and at that point we are spending the vast majority of our energy in treatment just focusing on undoing or minimizing a lot of the maladaptive behavioral changes that have occurred, and the negative ways that the body has changed over time due to chronic pain, so we really even get to actually treating the pain as much as we are treating all of the stuff that has happened because of it. It is still definitely valuable and is a good tool, but it is much more efficient and can help prevent the development of an actual pain disorder the earlier we are able to work with the individual. Once I see a person for the first time and go through the introduction, as I have already mentioned, I let them know that again their goal is to become independent with this, to empower them. I usually explain the health care approach as a three-legged stool. We have two legs that we are very familiar with, which are pharmaceuticals and then interventions, interventions can be anything from a surgery to an injection to

manual physical therapy, massage where it is all based on it being done to you, Botox, all those kind of things are interventions. For the most part, a lot of the time, we are able to do really well with the two-legged health care stool. Using the analogy, if we are sitting on a two-legged stool, as long as you distribute your weight properly and you can stay focused, it will work fairly well, but something bumps into you or you get distracted very easily, you are going to fall over or the stool will collapse. And that is what chronic pain does. It takes a system that can work okay and then it just makes it usually a mess. So, we want to bring in that third leg. The third leg is health and well-being. It is dietary, biofeedback, psychology. It is much more of a shift towards what the person can do versus the other two legs, it is what is being done. They take the medication. The medication does the changes. The intervention, the surgeon, the doctor, the therapist, they create the change. In the third leg, the patient is the one that is making the change. They are the one who chooses to eat healthy or to do the breathing techniques or other biofeedback tools or focus just simply on balancing their daily life stress versus time to heal and recover. In the early aspect of treatment, trying to introduce the third leg, we often get a lot of resistance at that point because we are working with usually a population where they did not choose to have chronic pain. There is a lot of anger and frustration about it being there. It is not supposed to be part of our lives, and so, then all of a sudden being treated in a way that says now you are responsible for this, you are responsible for the change, this is what you can do. It tends to feel like more basically saying, 'It is all your fault and you have to deal with it.' So, there is resistance. It definitely is overwhelming, but those same things that create that reaction are the things that are going to lead to it becoming empowering and motivating and to actually put them in a state where they are having increased internal locus of control, they are driving their lives, they are back in control, pain is not driving their existence anymore. And that transition is again giving them and empowering them and helping them understand how the things that they can do, do have an impact and better their quality of life. This is a long process. That is a big part of the treatment modality, particularly with the psychology and the biofeedback. With our biofeedback patients the first tool that we use is what is called, heart rate variability, and we use a sensor that is a respiratory belt. That is our foundation piece. Breathing is a critical tool that most of us have no idea on how to really use in a way that is going to put the body in a state of relaxation. The relaxation and stress are two words that we redefine in biofeedback treatment. They have very different meaning in a treatment setting than we use them in everyday life. Relaxation in the biofeedback world is a measurable state. We actually use the phrase 'the relaxation response.' This is where the heart beats in a particular pattern, circulatory patterns change, the person is going from a strain and stress response or sympathetic arousal and is calming and moving into a parasympathetic recovery relaxation state. Breathing pattern significantly change, hormonal levels vary, so this is an actual state of being that the body and the mind can go into and that biofeedback can be used to help the person first understand that and then teach not just the person but the mind, the subconscious, how to make changes that are going to increase homeostasis versus the chaos and stress of chronic pain. I would like to describe it to the individuals I work with that it is a similar process we all went through when we started to learn how to drive a car. We can understand the basics, we know there is the gas pedal, there is the brake, we turn the wheel thing to move the car around, but it takes repetition and exposure, and over and over and over again for us to slowly start to really be able to drive. In the

beginning when we start to drive you can rarely stay in your lane and look down to check your speed without driving off the road, but as we drive more and more, now we can be driving, talking on the phone, eating fixing our hair, and all at the same time not even thinking twice about it, which is not always good, but that transition of how we got there is the repetition in our subconscious basically developing software and running programs to help us. Our brain will cue us to look at the mirror, we do not have to remind ourselves to look at the rearview mirror anymore. It is the same idea within the chronic pain. We want to first increase the awareness of the body what is going on, and breathing being an area that we have instant control any moment. Another big challenge that we have in treating chronic pain is the state of where energy is being focused, and this is true beyond chronic pain, this is true with just in America as a whole, rarely are we ever actually present. We are either always in the past or in the future, and I teach this and I do this for living, and I can tell you most times when I am driving to work or driving home, I am rarely ever in my car. I am already in my office trying to figure out what I need to do today or I am already at home trying to think what I got to get done before I go back to the office. So, being present is critical and, more so with chronic pain. We want to avoid that. I want to be who I used to be. I want to get my life back which is it possible, and I want to stay away from the fear and the anxiety of the unknown of the future. So, a single breath, at any point, we can take a breath, and we are instantly present, at least for that second, we can go right out of it very quickly too. So, the breath connects the brain and then we connect it with the body, and we want to work on helping the person understand and actually introduce them to their diaphragm, which is one of the primary muscles we use for breathing, except for again most Americans and modernized culture stop using the diaphragm to breathe around the age of five or six, and we are seeing trend become even younger because of the level of stress we are constantly doing. When I have a patient who is halfway through the treatment process, and I am monitoring breathing and heart rate and other modalities, I am really good at putting people to sleep when I have them relax. We have a dimmed room and so far so, it is pretty easy usually for me to get a patient to fall asleep, which is actually a great opportunity because they can be having all these positive results on the feedback that they are getting from the visuals and then as they drift into sleep, as we are recording that we will see, depending on what we are measuring, see the different measurements revert back into a stress-strain state because that has become the majority of autopilots, even those without chronic pain. And it takes about six months of repetitive engagement in the different relaxation tools or breathing techniques before we start to really change or rewire our autopilot. I like to point that out in caution to the patients because I do not want them to be discouraged that it is going to take six months before they start seeing change, but more that it is six months before we really start getting even below the surface of the iceberg of change that can come from increasing understanding of the body and actually working with it. So, getting back to the breathing, we use the different belts, we can put one belt across the chest, one across the belly or diaphragm, and then they get a visual, we can have it be a flower that blooms or closes, or it can be a graph line and give them the visual feedback and auditory, we can have the sounds adjusted as well that helps them know how much are they using their chest versus how much are we using the diaphragm. This is important for the understanding piece, but I would like to say to the patients that only about 25% of the treatment process in biofeedback is using the conscious part of the brain that we are using right now to communicate and do this

continuing education course, it is the other 75% that is devoted to helping the subconscious better understand what is going on, identify what to focus on when we have certain sensation symptoms, pain, that will help enhance function or improve that homeostasis or internal balance rather than maintaining chaos or stress in the survival mode. Biofeedback can really help these individuals with chronic pain go from a life where they are surviving with pain to living with pain. So, the breathing technique is used. That is our foundational piece. Everybody should know how to truly breathe in a way that changes the body, and this is not an easy selling point in the beginning. It is kind of hard to get someone to take that seriously. They have had five lumbar surgeries and they are fused, and they have been doing all this therapy for 5+ years or something like that, and I try to sell them in the beginning that I am going to help you learn how to breathe. So that is not really an encouraging statement in the beginning, but it is very different than obviously our regular breathing. Everyone knows how to breathe well or I am not seeing them, and we breathe anywhere between 16 to 27 thousand times a day, so that is not a concern or question. It is realizing how much our breathing can change the way that we function and feel, and just real quickly if you stick your tongue on the roof of your mouth and breathe in a panting like manner, very quickly you will start to feel even a little lightheaded, but you will get a, kind of a, boost of energy and a tingly type sensation. It stimulates the sympathetic response, and it is actually a breathing that is used in a lot of yoga for that purpose of boosting energy, and then if you close your eyes and take a breath slowly in your nose, pause just for a moment and then let it out, and do that once or twice or three to four times, usually instantly there is just kind of a calming effect, and the pause is critical too. That is just enough to cue the nervous system to react, and now what we are doing is going the other direction. We are stimulating the parasympathetic and encouraging a calming of the body, so breathing can be an extremely powerful tool. Biofeedback helps the patient realize that. You can teach breathing techniques to anyone. It is just a really hard sell, it does not make sense. We are not going to feel the change immediately. So, being able to use the biofeedback combined with the behavioral therapy and for them to see the change, and particularly the breathing has a significant and direct impact on our heart pattern our heart behavior which is where we do the heart rate variability training with them, and this is an excellent tool to engage in for stabilizing and increasing flexibility within the autonomic nervous system. So, the person learns the breathing techniques, they learn the connection that it has with the heart. As I already said, I like analogies. The analogy I use is I have a set of keys that are literally my office keys, and all the office keys are exactly the same, they are the same type of door key. And so the key represents breathing. We all know how to use it, whether it be a door key, a car key, or a lock key. We stick it in, we turn it, it opens or it does not, or it starts or it does not. Very simple, just like breathing, but if I take the keys and set them on top of each other, you can see that they all have the exact same pattern until the very end and on one key there is a tiny little bump and on the other that bump is not there, and that tiny little bump, that tiny difference, will be what determines whether or not I get in my office door in the morning or not, which is a big deal than sometimes hitting my head thinking it is going to open, and it is kind of the same idea with the breathing. I can take a breath all kinds of ways but is it going to open or give me access to the system? That is the fine thing. We are helping the person develop just the right key to gain access in this case to the heart, to calm the system down, to actually increase circulation by facilitating dilation of the

arteries and blood vessels, which is the opposite of what the body wants to do when it is in that stressed state. The pauses I highlighted earlier, that is just alone is something that is major part of the treatment process because the body when it is in pain wants to breathe in and out as quickly as possible because it feels like it is surviving, and if we get hit or attacked with air in our lungs, we get the wind knocked out of us and it is going to comprise us. So the body is trying to protect, but it is not a state that we can live in. It is a survival state. So helping them learn how to just simply add the pause without causing it to be more stressful can be an unbelievably powerful tool and something that again empowers them, creates a real physical change which they can see and we can measure. The biofeedback equipment does not measure pain and that is another big challenge working with chronic pain as we cannot even measure the thing we are trying to treat. So finding alternative ways to add more of a measurable or objective tool is an excellent thing to have when treating someone with chronic pain, and definitely have started off doing counseling and psychological therapy discovered biofeedback, and I have not stopped going down that road since just because it is such an effective tool and can really empower the person. Even when we are not fixing the disc, we are not repairing the injury. We are helping the body better live with that injury or problem being there.

The other techniques that we use are surface electromyography which measures muscle tension. The sensors we use are like electrodes that you would use for cardio assessment. They are sticky like a Band-Aid. Nothing in the biofeedback that we do makes change happen. It does not do anything to the system. It is getting information and then we help the person learn how to understand that information and then they are the ones that make the changes. We also use EEG readings, which is a neurofeedback, which is right now one of the hottest areas in biofeedback. It is a great treatment tool. We are seeing lots of really positive changes, but it is something I do not really recommend often with a chronic pain treatment plan because it requires a lot of sessions which often we cannot manage in the insurance world that we are in now, and that it is much more dependent on the equipment and the repetition. I like the other tools because they are the tools that empower the person, they can do the breathing techniques, they learn how to relax the shoulders and know the difference of a tense muscle and relaxed muscle. Neurofeedback definitely is an excellent tool but one that, again, I do not recommend highly in the treatment of chronic pain, definitely other areas it has fabulous work. We measure sweat response that can be reactive to stress and relaxation. We use techniques that measure temperature, and this is very helpful, especially for individuals who have a very strong vasoreactive response to chronic pain or their pain is associated with some type of circulatory problem as this can help us teach the body to maintain good circulation versus that survival sympathetic response that wants to draw all the blood towards the core which really slows down healing in the extremities, and just the daily recovery process needed throughout the person's day. There are other various techniques as well, but those are some of the primary tools that we like to use in biofeedback. If you want to find more information on it, there is an excellent website [bcia.org](http://bcia.org) and that is the biofeedback certification institute. It is an international website and it has a find a practitioner and you can do that within a ten-mile radius anywhere in the United States and other countries as well.

The main takeaway point is again to consider having a treatment team, especially once we start getting beyond the three or six month window, we really want to look at how are we going to come across from a multidisciplinary approach to help this individual, also to just reduce the strain and stress on the provider as well. Biofeedback is something you should, I recommend, considering and looking for as an excellent tool to empower. It is much more effective to prevent the development of a pain disorder than it is to treat, but still, a good tool for treating, and then that also that early intervention or early referral is key.

Thank you for participating in this activity. I hope that the information was useful and helpful for you and will enhance your ability to provide services to those struggling with chronic pain.

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