Biofeedback Resources International

Biofeedback Matters©

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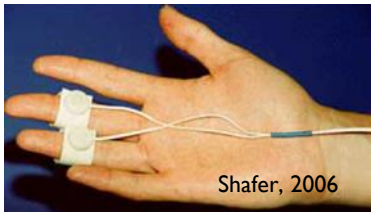
Skin Conductance Biofeedback

Inside this issue:

Skin Conductance can be both one of the simplest yet one of the most complex modalities of biofeedback at the same time. More stress, the reading goes up. More relaxed, the reading goes down. Simple, right? Not so fast. Make sure we are not actually talking about resistance measures which are exactly opposite from conductance. Besides two opposite measures of conductance and resistance, we should also add skin potential. When I was introduced to biofeedback way back in 1984, GSR or Galvanic Skin Response was the common feedback modality for monitoring changes based on sweat activity. The readings in Ohms would go down when there was more sweat on the skin because resistance was decreasing and it would go up if the amount of sweat decreased because resistance was increasing. The audio tone was reversed so that it went up when the subject was responding to something and got lower when they recovered or calmed down.



Besides the devices like the GSR-2, made by Thought Technology (still available), there was a GSR device that you could buy at that time from Radio Shack (no longer available). This was more of a toy than a serious biofeedback instrument. Most of the more modern instruments use skin conductance measures instead of resistance. They measure in units of mhos (ohms spelled backwards because conductance is the opposite of resistance - kind of silly to me). This has sort of been replaced by a newer term, micro Siemens. I know that this term honors Ernst Werner von Siemens, 20th-century electrical engineer and electrical researcher but it does make it more difficult to teach about skin conductance even to a group of adults much less a group of teenagers. I always get some laughs when I say siemens. I'll just leave it at that. You figure it out.

Now I will talk about using skin conductance biofeedback therapeutically.

Skin conductance can be a very powerful indicator of stress reactions. For

Stress And Sleep

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Sleep problems including insomnia are an excellent application of Peripheral Biofeedback and EEG Biofeedback (Neurofeedback). They are also among the major symptoms caused by stress. It is difficult to fall asleep while the body is tense or your brain and nervous system is in fight-fight-freeze (emergency) mode. It is difficult to fall asleep if you close your eyes and your brain is still too busy.

Not getting enough sleep is a problem for between 28.5% - 41.1% of adults in the USA according to CDC 2014 statistics. The term they use is "short sleep duration", defined as less than 7 hours of sleep per night for adults (see CDC - Data and Statistics - Sleep and Sleep Disorders). People who have short sleep duration also have other health risks at a higher rate than others. Some of these shared risks include obesity, physical inactivity, alcohol use, and smoking. Short sleepers also reported these ten chronic disorders at a higher rate than those who get enough sleep:

Heart Attack

Coronary heart disease

Stroke

Asthma

COPD (Chronic obstructive pulmonary disease)

Cancer

Arthritis

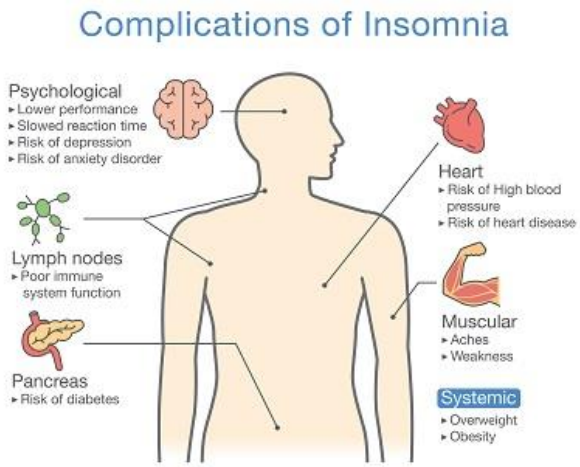
Depression

Chronic kidney disease

Diabetes

Teenagers need even more sleep, 8-10 hours per night. A stunning two thirds of adolescents reported getting less than 8 hours. This can easily be related to the high incidence of anxiety and attention issues in student populations.

"Not getting enough sleep can lead to motor vehicle crashes and mistakes at work, which cause a lot of injury and disability each year. Getting enough sleep is not a luxury—it is something people need for good health." CDC - Sleep Home Page - Sleep and Sleep Disorders .



Enough with statistics and quotes let's just talk common sense. If the body, including the brain, needs sleep to restore energy, rest, and repair, doesn't it make sense that if it isn't getting it that there would be consequences? When this happens on a regular basis then it becomes chronic and compounds the problem.

EMG biofeedback can be used to help a person relax the muscles to get the body into a more physically relaxed state to promote sleep. Heart Rate Variability biofeedback can help to calm and balance the autonomic nervous system which is more ideal for sleep. I often notice, during biofeedback sessions, that clients begin to yawn and become drowsy while doing the slow, paced breathing that goes along with HRV biofeedback. I tell them to take note of that effect and suggest that they practice this kind of breathing before bedtime. Most report that it helps them fall asleep. EEG biofeedback (neurofeedback) can be used to decrease fast wave activity – beta and high beta and increase mid-range SMR (Sensory Motor Rhythm) and slower waves Alpha and Theta to promote sleep.

Improving sleep can be an important part of decreasing many physical and mental health symptoms and simply improving overall health and wellness as well as performance.

Skin Conductance continued

most people when they become stressed, the skin conductance level increases. When they calm down the skin conductance level decreases. It sounds simple; however it is more complicated than that. If you tell your clients that when skin conductance level increases that means that you are stressed, you are not being fully accurate.

Many things can cause skin conductance to increase that would not be considered a response to stress. Here are a few. The startle response, make a loud noise and skin conductance will rise as the nervous system responds to help you figure out what the source of the noise was and if it was dangerous. Some people who are anxious or suffer from PTSD may have an exaggerated startle response but it is normal for skin conductance to increase after a loud noise. How much it increases and how quickly it returns to baseline is more important than the fact that it increased.

Skin conductance responds to touch. If you or someone else touches the person who is connected to skin conductance biofeedback the level will usually increase. Although this can be a negative stress response because the person does not want to be touched it doesn't have to be. Similar to the startle response, the nervous system is alerted by the touch and signals the person to assess if the touch was dangerous or not. If it is not then the skin conductance should return to baseline. If the person interprets the touch as pleasant that can be another reason for a response. The level tends to increase even if the subject touches their own skin.

If the subject laughs there will be a skin conductance response. There may also be a skin conductance response if the person thinks of something interesting or exciting. As you can see, there are many things that can cause a response for skin conductance biofeedback. Not all of them are negative so it is not always a bad thing for skin conductance to increase. There are even a couple of clinical reasons that you might want skin conductance to increase. A depressed person may have unusually low SC. Increasing the level may help the person become more engaged and emotionally active or excited. The other one is ADD. When a person is not focused and engaged their SC level may be unusually low. If they increase their SC level their engagement and focus level may also increase.

There are certain relaxation techniques that seem to help with specific biofeedback modalities. Progressive muscle relaxation for surface EMG, diaphragmatic breathing or autogenic relaxation for skin temperature, and paced breathing for Heart Rate Variability.

It can be a little tricker to find something that will work reliably for SC. Some say diaphragmatic breathing but skin conductance may increase with each inhale if the breathing is too aggressive or exaggerated. It tends to work better if the breathing is not quite as deep and more relaxed and natural. In her book, The Clinical Handbook of Biofeedback A Step-by-Step Guide for Training and Practice with Mindfulness, Inna Khazan, Ph.D. recommends low and slow breathing, images associated with quieting and calming, autogenic-like phrases, such as I am calm and comfortable, and passive waves of relaxation from the head to the toes imagery. Try some of these if you haven't yet.

Biofeedback/ Neurofeedback

Seminar Schedule

BCIA Certification

Biofeedback

April 9-11, 2021
July 9-11, 2021
October 8-10, 2021 all dates
Hawthorne, NY
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Neurofeedback

April 23-25 2021

August 13-15, 2021

November 5-7, 2021

All dates Hawthorne, NY

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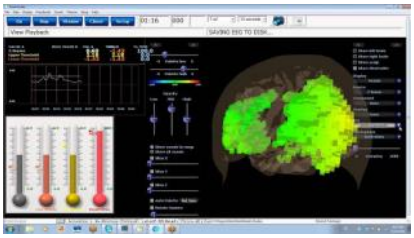

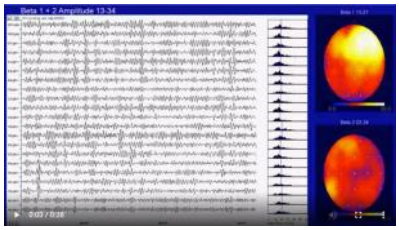

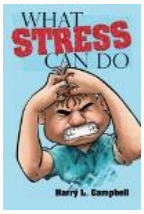

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Harry L. Campbell