SciForschen
Open HUB for Scientific Research

ISSN 2379-7150

Journal of Neurology and Neurobiology

Short communication Volume: 2.3 Open Access

Self-Regulation and Biofeedback Applications for Sleep Disorders

Harry L Campbell*

President of Biofeedback Resources International, New York, USA

***Corresponding author:** Harry L Campbell, Biofeedback Resources International, 109 Croton Ave, Suite 240 Ossining, NY 10562, USA, Tel: 914-762-4646; **E-mail:** Harry@biofeedbackinternational.com

Received date: 11 Mar 2016; **Accepted date:** 11 Apr 2016; **Published date:** 15 Apr 2016.

Citation: Campbell HL (2016) Self-Regulation and Biofeedback Applications for Sleep Disorders. J Neurol Neurobiol 2(3): doi http://dx.doi.org/10.16966/2379-7150.126

Inadequate sleep is at the root of many other health and quality of life problems including hypertension, fatigue, attention problems, irritability, obesity, and stress and stress related disorders. Medications can be effective and helpful. They can also be undesirable due to side-effects, potential for dependence, and a growing desire of people to be more natural in many aspects of their lives.

Long ago it used to be much simpler to get enough sleep. Before the invention and widespread availability of electric lighting in the evening when it got dark outside people got ready to go to sleep and they went to sleep. There wasn't much else to do. If you thought of something there wasn't much light to do it in. With electric light came many more choices as to what to do at night. People began to work and play through the night. Night life and shift work have a big effect on amount and quality of sleep. Even when people decide to go to bed there are many forces working against them. Televisions, stereos, laptops, tablets, smart phones are often used up to bedtime and then even in bed. All of these things keep the brain activated. The extra light works against the natural wake/sleep rhythms of the brain and body. This affects even people who don't appear to have sleep disorders. Symptoms are often sub-clinical.

The brain and body need sleep to maintain optimal health. Much of the restoration and maintenance that we need occurs during sleep. Without quality sleep some of that work does not get done. This can lead to many health problems including the ones listed earlier. Most people are not getting an ideal amount of sleep to maintain optimal health. It's usually not just once in a while that a person loses one or two hours of sleep. Most likely it is happening at least weekly. Dr. William Dement, a pioneer in sleep medicine, in his book, *The Promise of Sleep* [1] discusses a concept termed sleep debt. The idea is that when you miss out on getting the number of hours of sleep that your body needs, you would need to sleep an additional amount of time equal to the hours that you had missed in order for your body not to suffer from missing that sleep. If this is the case then I think that most people are in more than financial debt, they are also in sleep debt. This lack of sleep may not always be discovered as potentially being at the root of other health problems when a patient does seek medical care for other symptoms.

I suggest that before medication is used as the first line solution that other interventions be explored. Number one should be sleep hygiene. Patients should be instructed to develop a routine that is conducive to good sleep. Set a regular time as much as possible to go to bed. Reduce screen time including TV, smart phone, and tablet near bed time. Reduce light in the bedroom including from outside, night lights, bright LEDs on clocks, chargers, etc. Ask for cooperation from your partner if you share the bedroom. I am amazed at the stories that people tell me about what they do knowing that they have a sleep problem.

They watch TV until they fall asleep or leave the TV on all night. They leave their phone on by their bed or in their bed and respond to text messages and Facebook posts through the night. They watch TV, read, eat, do all of their social media activity, etc. in bed. As many sleep experts have said, the bed should be reserved for sleeping and sex only. If you use it for everything else your body is not signaled to go to sleep when you are in bed.

The American Academy of Sleep Medicine has recommended biofeedback along with progressive muscle relaxation for insomnia [2]. The American Sleep Disorders Association task force also recommended psychological and behavioral interventions for both chronic primary insomnia and secondary insomnia. Biofeedback was also included in these recommendations [3]. Relaxation therapy, biofeedback, and cognitive behavioral therapy were also recommended in a review by Morin, Jarvis, and Lynch in 2007 [4] for non-pharmalogic options for treatment of sleep maintenance and sleep onset insomnia.

Biofeedback is used to help a person learn conscious control over their physiology. Biofeedback modalities that may be used to help with sleep include surface EMG (Electromyograph), HRV (Heart Rate Variability) Respiration, and EEG (Electroencephalography-Brainwave). The rationale is that the patient may have difficulty falling asleep or maintaining sleep because their nervous system is still in an alert or excited state which does not help with sleep. The nervous system needs to move to a more relaxed state in order to facilitate sleep. Biofeedback technology measures very small changes in the levels of muscle activity, heart rate, breathing, and brainwaves to help a person calm and relax their nervous system so that they are in a state that naturally leads towards sleep. Once they practice this enough with the technology, they can relax their nervous system on command without even having the biofeedback equipment available to them. With neurofeedback specifically, which is brainwave biofeedback, the training can help with both sleep onset and maintaining sleep without waking up during the night. It also helps with the quality of sleep. Sometimes a person falls asleep without a problem but either they are waking up and having trouble falling asleep again or they are not going through all of the normal and necessary stages of sleep to reap the full benefit of sleep. Neurofeedback can help to retrain and regulate the brain so that sleep is improved. Sensors record the electrical activity produced by the brain at selected sites. Visual and or auditory feedback from a computer, signal the brain that the patterns being produced are meeting the goals that are set by the trainer. The brain learns to produce the desired patterns more often. Heart Rate Variability is another modality of biofeedback that measures heart rate activity and, depending on the equipment used, also breathing activity. This is a very clear way to show how the heart rate activity is almost immediately affected by changes in

breathing. The subject is usually instructed to breathe deeper and slower at about six breaths per minute. The change that occurs in the heart rate activity is very impressive to most people who experience or view it. This evidence is usually enough to encourage a person to practice diaphragmatic breathing to help calm their nervous system down. When this is combined with positive imagery it is even more powerful. This is another way to promote improved sleep [5,6].

References

1. Dement WC (2000) The Promise of Sleep.
2. Chesson AL, Anderson WMD, Littner M, Davila D, Hartse K, et al. (1999) Practice Parameters for the Nonpharmacologic Treatment of Chronic Insomnia. SLEEP 22: 8.
3. Morgenthaler T, Kramer M, Alessi C, Friedman L, Boehlecke B, et al. (2006) Practice Parameters for the Psychological and Behavioral Treatment of Insomnia: An Update. An American Academy of Sleep Medicine Report. SLEEP 29: 11.
4. Morin AK, Jarvis CI, Lynch AM (2007) Therapeutic options for sleep-maintenance and sleep-onset insomnia. Pharmacotherapy 27: 89-110.
5. Hammond CD (2009) Comprehensive Neurofeedback Bibliography. The Center for Advanced NeuroTherapy, California, USA.
6. Yucha C, Montgomery D (2008) Evidence-Based Practice in Biofeedback and Neurofeedback. Association for Applied Psychophysiology and Biofeedback (AAPB), Wheat Ridge, Colorado.