

# **An Individual Case Study Using Neurofeedback to Treat Neuropathy, Balance, Motor Coordination and Health Difficulties related to Chemotherapy**

**Southeast Biofeedback and Clinical Neuroscience Association**

**Biofeedback and Neurofeedback:**

**Principles and Practices of Training Self-Regulation for Optimal Health**

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# APA Statement

*"Materials that are included in this course may include interventions and modalities that are beyond the authorized practice of mental health professionals. As a licensed professional, you are responsible for reviewing the scope of practice, including activities that are defined in law as beyond the boundaries of practice in accordance with and in compliance with your professions standards."*

# Case Overview

Patient is a 62 year old divorced white female diagnosed with breast cancer on July 8, 2011.

Patient was treated with 30 sessions of neurofeedback for health related problems including:

- Neuropathy
- Poor Balance
- Motor Deficits
- Chemo Brain
- Poor Sleep

# Learning Objectives

- 1) Participants will understand the possible side effects of chemotherapy on the brain and body.
- 2) Participants will learn how chemotherapy can impact changes in the brain.
- 3) Participants will learn how neurofeedback can effect changes in the brain through pre/post treatment measures using QEEG brain mapping.
- 4) Participants will learn neurofeedback treatment protocols to address various side –effects of chemotherapy.
- 5) Participants will become familiar with some literature that address how neurofeedback can effect changes in white and grey matter in cancer patients.

# Health History

Patient is diabetic and diabetes is controlled this through Metformin 500 mg daily.

Patient participated in weight loss program and her A1C has dropped to below the diabetic number and diabetes is now controlled through diet. However, recent studies have shown that Metformin is helpful in reducing the return of cancer so patient continues to take one tablet daily.

Patient has normal blood pressure, however, went on blood pressure medication as a result of her parental heart history. Blood pressure is stable and has remained stable. Patient takes Crestor to control cholesterol. Patient was active until age 60, and has never smoked. Patient drinks a glass of wine or two daily.

# Health History

In June of 2012, patient fell and broke both elbows. Right elbow is a replacement and medical treatment managed to clean up the left. Patient was expected to gain 65 % of function of right elbow and now has 95-97% use of the right arm and elbow.

Prior history includes two breast reductions, the first in 2004 and the second in 2007 due to breasts being fibrous and cystic. Patient had routine mammograms.

# Breast Cancer History

Patient was initially diagnosed with breast cancer on July 8, 2011.

Patient underwent a lumpectomy in July 2011. Post-surgical report indicated no lymph nodes or surrounding tissue were cancerous. After surgery patient underwent four treatments of post-surgical chemotherapy (4 treatments of “red Devil”), as a precaution and chemotherapy was followed by 26 sessions of radiation, and tolerated it well, with a little numbing in her toes.

# Breast Cancer History

Patient was diagnosed with recurrence of breast cancer, in the same spot of the incision for the lumpectomy in March 2013. Patient elected to go forward with a double mastectomy. Patient underwent a right mastectomy March 13, 2013. A different chemotherapy was used post-surgery. Patient immediately noticed numbness and pain in her fingertips, toes, feet and lower leg and reported this right away. Patient reported very different, worsening and severe side effects including feeling tired, dehydration; and she had a low red blood count and finally stopped the chemotherapy after 4 sessions. On October 18, 2013 patient had the left mastectomy and reconstructive surgery, approximately 7 hours under anesthesia. Unfortunately, in March of 2013 she was diagnosed with recurring breast cancer (site of the lumpectomy scar). She elected to have a double mastectomy and did the right breast in July. This time after the first dose of chemo she had severe reactions (different chemo combination to maxifin and ACT Chemotherapy {"ACT" stands for A-Adriamycin, C-Cytoxan, T-Taxol}), including numbing and pain in her hands toes, feet and lower leg. They tried a few different things and variations with the chemo but she continued to have worsening and severe side effects so after 4 treatments they stopped the chemo altogether.



# QEEG History

Initial Map: March 15, 2008 – As a friend, patient was curious about QEEG.

Map #2: June 30, 2009 – Patient wanted to be mapped again and to have her boyfriend mapped.

Map #3: September 7, 2013 – Post cancer treatment.

Map #4: November, 2013 – Post treatment, remap.

Comparison Q

# Treatment History

Patient arrived on Wednesday evening September 4, 2013 from Michigan. Her sister drove her down to NC. She had to return within 2 weeks due to doctor's appointment.

Upon presentation, for neurofeedback patient had poor sleep, numbing in hands and arms and her balance was so bad she had to walk with a cane; and when she stood up she had to hold onto a solid object to keep her balance; and when she stands still has to hold onto an object to keep balance. Patient was unable to drive a car and unable to perform routine work requirements and was eventually terminated from her employment.

Patient was asked to give periodic progress reports when she noticed any significant changes or improvements.

# Treatment Day 1, September 5, 2013

Session one was a squash.

Protocol 1) Cz 2-10d, 13-15u, 16-30d

Protocol 2) C3 2-10d, 13-15u, 21-30d

/ C4 2-7d, 13-15u, 21-30d

Progress: After the session she had better balance and was able to walk without her cane.

# Treatment Day 2; September 6, 2013

Protocol 1) Cz 2-10d, 13-15u, 16-30d

Protocol 2) C3 2-10d, 13-15u, 21-30d

/ C4 2-7d, 13-15u, 21-30d

Progress: Her balance further improved, she felt more energy and walked without cane and with a more steady gait. Patient reported improved sleep, and improved balance after first session

# Treatment Day 3; September 7, 2013

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

Post session: Could move feet up and down and also bend feet tippy toe which couldn't do before.

Patient reported Improved sleep, improved balance More Energy, more feeling in finger tips after second session.

# Treatment Day 4; September 8, 2013

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

Progress Report: Patient reported feeling a sensation (not painful) from mid body down to her feet during Protocol #3

# Treatment Day 5; September 9, 2013

Protocol 1) Cz 2-10d, 13-15u, 16-30d

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

Progress Report: Patient reported better balance and walking a little better, better range of motion in feet.

# Treatment Day 6; September 10, 2013

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

Progress Report: Patient reported better balance and walking a little better, better range of motion in feet, and ability to stand on her toes.

“After Monday's session I could walk heel toe and bend both feet at the ankle. Also balance was maintained. More physical stamina than before.”



# Treatment Day 7; September 11, 2013

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Progress Report: Patient reported better balance and walking a little better, better range of motion in feet, ability to stand on toes, and she was able to drive her car.

# Treatment Day 8; September 12, 2013

- Protocol 1) Cz 2-10d, 13-15u, 16-30d
- Protocol 2) C3 2-10d, 13-15u, 21-30d / C4 2-7d, 13-15u, 21-30d

# Treatment Day 9; September 13, 2013

Protocol 2) C3 2-10d, 13-15u, 21-30d

/ C4 2-7d, 13-15u, 21-30d

Protocol 3) T3 2-12d, 15-20u

/ T4 13-15u, 16-30d

# Treatment Day 10; September 14, 2013

Protocol 1) Cz 2-10d, 13-15u, 16-30d

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

“Starting to feel my heels slightly and focusing on balance.”

# Treatment Day 11; September 15, 2013

Protocol 1) Cz 2-10d, 13-15u, 16-30d

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

# Treatment Day 12; September 16, 2013

Protocol 1) Cz 2-10d, 13-15u, 16-30d

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

# Treatment Day 13; September 17, 2013

Protocol 1) Cz 2-10d, 13-15u, 16-30d

Protocol 2) C3 2-10d, 13-15u, 21-30d  
/ C4 2-7d, 13-15u, 21-30d

Protocol 3) T3 2-12d, 15-20u  
/ T4 13-15u, 16-30d

Sessions TOTAL = 30

“I am having more sensations in my feet. Starting to have brief moments of walking at a normal pace.”

# Treatment Notes

Patient was encouraged to use mental imagery regarding walking balance increased feeling in hands and feet, etc.

Patient encouraged to practice diaphragmatic breathing multiple times per day.



# Post Treatment Note; September 22, 2013

“Walking better. Started to walk the treadmill daily focusing on doing a little more each day.”

# References

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