Neurofeedback Treatment of Severe and Suicidal Depression

BCIA Webinar 15-8:
November 6, 2015
Presented by
Dennis A. Romig, PhD, BCN
Director, Brain Improvement Center
Austin, Texas
Special Acknowledgement to Dr. Angelo Bolea

Victims of Untreatable Depression

Dennis A. Romig, PhD, BCN
Brain Improvement Center
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Austin, Texas

- Psychologist and Director of the Brain Improvement Center, Group private practice treating clients using Neurofeedback, other Biofeedback, and cognitive behavioral treatment (CBT):
  - Traumatic Brain Injury (TBI) and Post-Concussion Syndrome (PCS)
  - Depression
  - Anxiety
  - Attention Deficit Disorder (ADD) and other psychological problems

- Current President of the Biofeedback Society of Texas
- Co-Program Chairman of the Association of Applied Psychophysiology and Biofeedback (AAPB) 46th Annual Scientific Meeting in Austin, Texas in March, 2015
- How Texas Veterans Benefit from Neurofeedback. Invited to give a presentation and demonstration at the Texas Capitol to the Texas Governor’s Staff, Texas House Staff, Texas Senate Staff, Austin, TX. 2012 (Resulted in additional state appropriations for neurofeedback treatment of military veterans)
Webinar Objectives

1. Suicidal depression can be successfully treated with neurofeedback
2. How to assess the brain waves for the best starting methods
3. The three parts of depression that the Quadrant Brain Model treats
4. Prototype methods for each part of depression
5. Recommended Adjunctive Methods to treat Depression

BCIA Webinar Outline

- Suicidal and Severe Depression Treatment Results using Dr. Angelo Bolea's Quadrant Brain Approach
- Overview of Research on 20 Successful Clients with Suicidal or Severe Depression
- First Depression Case Presentation- “A”: Postpartum Depression
- Second Depression Case Presentation- “J”: Post-Concussion Syndrome Depression
- Improvement in Sleep as a path to decreasing “D”
- Adjunctive Methods to Support Neurofeedback
- Your Questions and Ideas

Research Basis for Bolea Quadrant Model for Successful Neurofeedback

1. Hospitalized Long Term Schizophrenic Patients
   - Treatment success with 70 chronic inpatient schizophrenic patients, most with head injuries and depression symptoms, were successfully discharged.
   - Two year follow-up showed improvements were sustained.

Successful Treatment of 25 Consecutive Clients with Post Concussion Syndrome using Neurofeedback

- The results of a study of 25 consecutive clients with Post-Concussion Syndrome brain injuries were presented. The diagnostic characteristics of the clients were described including the number of head injuries, the presence of psychological trauma, the variety of symptoms at intake, and the length of time between head injuries and onset of symptoms.

- Of the 25 clients, 21 were completely rehabilitated, while the other 4 clients went from total disability to only partial disability. The neurofeedback protocols and the adjunctive treatments that were found most useful were presented. The principles for which adjunctive modalities to use based upon the severity and co-morbidity of symptoms were outlined.

Neurotherapy Treatment Results for Suicidal and Severe Depression
20 Consecutive, Sequential Clients

Average Number of Sessions to Immediate Positive Results: 3.4
Primary Physician Referrals.

Example Documented Immediate Positive Results:
- Slept better, calmer, did not binge eat, mood is better, cleaned house, thinking better.
- Felt much better. Was able to accomplish much at home.
- Went off all 3 different medications. Feels positive. Nice to family.
- Felt better every day after 1st session up to Monday. Happier, less. Able to calm husband down in argument.
- "Owner at work said it was good to have me back." Thinking and memory are better. Better mindfulness.

Average Number of Total Treatment Sessions for Depression: 12.6

Example Documented Positive Results in Client's Life:
- Able to return to job after 7 sessions. Physician remarked client looked better than in five years.
- Fewer headaches. I'm a lot happier human being. Decreased sleep meds. "I am doing better than I ever have in my life." Able to see own responsibility in problem.
- Felt better than she had in years. Not in the fog she had been in for a long time. Discontinued anti-depressants.
- Slept much better; good focus, calmer, felt optimistic, and held a job.
- More optimistic than in whole life.
- "Almost afraid to admit it, but I feel great. Seems like a miracle. I am experiencing happiness I have not felt since I was a child."
3. Neurotherapy Treatment Results for Suicidal and Severe Depression
20 Consecutive, Sequential Clients

Average Number of Total Treatment Sessions for Depression: 12.6

- All Clients able to return to work, education, and/or family responsibilities
- 19/20 Depression symptoms gone at conclusion of treatment. Off of all psychotropic medicine 95% Success

Angelo Bolea and Dennis Romig. Immediate and Follow-up Success of Neurofeedback Treatment for 20 Severely Depressed Clients: Quadrant Brain Theory and Application. International Society of Neurofeedback Research Annual Conference, Carrolton, Texas 2013 (Video available from ISNR)

Comparative Relapse Rates for Different Treatments of Depression

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1 Year Relapse Rate</th>
</tr>
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<tbody>
<tr>
<td>Prescription Drugs</td>
<td>50%</td>
</tr>
<tr>
<td>Cognitive Behavior Therapy and Other Counseling Therapy</td>
<td>29-30%</td>
</tr>
<tr>
<td>Expected Relapse Rate</td>
<td>30-50%</td>
</tr>
<tr>
<td>Bolea-Romig Quadrant Brain Based Neurofeedback (n= 20)</td>
<td>5%</td>
</tr>
</tbody>
</table>

Dennis Romig, PhD and Angelo Bolea, PhD

Neurofeedback increases white brain matter pathways and volume of Grey Matter. Dr. Mario Beauregard, ISNR 2011
Two Major Principles of Biofeedback Success

1. The client understands how biofeedback works
2. The client is motivated to do the biofeedback training

First Depression Case Presentation Outline of “A”: Post-Partum Depression

• Presenting Depression Symptoms and Situation
• Interview Assessment Summary
• Quadrant Brain Spectral Assessment Summary
• What I did and Why I did it
• A’s Treatment Results

“A”s Presenting Depression Symptoms and Situation

1. “A”, mother of 3 children, who was not feeling well went to a physician in a rural community
2. Physician prescribed anti-depressant medication
3. Few weeks later it was discovered that “A” was actually pregnant.
4. Had rough pregnancy and child was born three months premature. “A” visited hospital frequently to see infant
5. The day the infant was brought home, “A” was suicidal and refused to pick the infant up.
Head Injury and Other Health History: A

- Age: 29
- Education and Training: High School
- Occupation: Mom
- Head Injuries:
  - "One head injury as 4 year old, left eye with golf club"
  - "Three car accidents as a child"
- Serious Illnesses like Strep Throat, Mono, Epstein-Barr’s, Serious Sinus
  - "Staph infection of pelvic inflammation 2003"
- Interests and Hobbies:
  - "Reading, Cooking (Past), and Singing in Church"

Client Education and Assessment
1st Meeting Agenda (2 Hours)

My Interaction Style – Teaching, Respectful, and Side by Side

1. Stories of Successful Clients
2. Parts of the Brain have different functions
3. Client Frequencies and Desired Levels of Energy (microvolts)
4. "How do you think Brain Wave Biofeedback can help you?" - Client Goals
5. History: Mono/Childhood Strep; head injuries; sleep; traumatic experiences; psychotropic medications

Client Education and Assessment
1st Meeting Agenda (2 Hours) Continued

6. Any questions?
7. Assessment at 10-12 brain Sites. Print out assessment at each site and go over average scores. Client sees brain wave imbalances that correspond to Client Goals
8. Do abbreviated Neurofeedback Protocol on right side, left side, and right side
9. Write down results and show client results
10. Schedule Next Session
Critical Clinical Conditions Successfully Treated with Select Biofeedback Modalities

Skill Stream

Emotional Ridge

Associations – must be some connection

Associations – what is it connected to

Remembering how it feels to do it

Supplementary motor: get ready for movement

Motor: movement

SENSORY

Leg & Foot

Shoulder

Hand

Face

Jaw

Abdomen

Neck

Brain Training Assessment Summary

1. What would you like to have improved?
   “Depression, focused on death. Anxiety and Panic. No food for two days. Waking up hourly and rocking self to sleep”

2. What challenging life events or psychological difficulties have you had? “Newborn came home after 3 months in NICU and I started having anxiety.”

3. Any substance abuse? Tobacco

4. Who are some of your relatives or friends who have had a positive impact on you?
   Mom, husband, mother and father-in-laws, people at church

5. What would you like to do when your brain is trained the way you want?
   “I just want to be involved in life. Take care of family and home.”

The Three Parts of Depression that the Quadrant Brain Model Treats

1. Lack of positivity

2. Lack of “Get up and Go”, Weighed down with Foggy thinking

3. Continuous worry and anxious thoughts
### Brain Wave Training Frequencies for Assessment

<table>
<thead>
<tr>
<th>Name of Frequency</th>
<th>Frequency Settings (Hz)</th>
<th>Typical Training Goals with one sensor (in microvolts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta/Theta</td>
<td>2 – 5</td>
<td>Less than 6 - 8, Less 3:1 theta/beta/smr ratio</td>
</tr>
<tr>
<td>Alpha</td>
<td>8 – 12</td>
<td>More than 4</td>
</tr>
<tr>
<td>Beta</td>
<td>16 – 22</td>
<td>More than 3</td>
</tr>
<tr>
<td>Fast Beta</td>
<td>26 – 35</td>
<td>4 - 5 or less</td>
</tr>
<tr>
<td>SMR</td>
<td>13 – 15</td>
<td>More than 3</td>
</tr>
</tbody>
</table>

**The Three Parts of Depression that the Quadrant Brain Model Treats**

1. **Lack of positivity**: At Cp4 and/or P4 the Bf (25-35 Hz) is higher than Alpha (8-12 Hz). Alpha > Bf at least 2 microvolts

2. **Lack of “Get up and Go”**, Weighed down with Foggy thinking: At Cp4 and/or P4 and/or Fc3 and/or F3 and/or Fp1 the DT is over the 3:1 ratio with SMR (13-15). "get up and go" is too low especially relative to the DT (2-5Hz) brain waves

3. **Continuous worry and anxious thoughts**: Left frontal alpha is higher than left frontal Beta (16-22Hz)
**EEG Brain Wave Assessment Summary**

<table>
<thead>
<tr>
<th>Site</th>
<th>Inhibit/Upper</th>
<th>Ave. Microvolts</th>
<th>Reward/Lower</th>
<th>Ave. Microvolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cp4</td>
<td>BF</td>
<td>6.1 (12.2)</td>
<td>A</td>
<td>8.1 (11.8)</td>
</tr>
<tr>
<td>F3</td>
<td>DT</td>
<td>8.1 (11.2)</td>
<td>SMR</td>
<td>2.7 (3.5)</td>
</tr>
<tr>
<td>F5</td>
<td>BF</td>
<td>4.4 (6.2)</td>
<td>SMR</td>
<td>3.2 (3.8)</td>
</tr>
<tr>
<td>Cp4</td>
<td>DT</td>
<td>10.7 (11.1)</td>
<td>SMR</td>
<td>3.1 (3.8)</td>
</tr>
<tr>
<td>F3</td>
<td>BF</td>
<td>6.1 (12.2)</td>
<td>A</td>
<td>7.8 (11.8)</td>
</tr>
</tbody>
</table>

**Initial Therapy Training Session**

<table>
<thead>
<tr>
<th>Date</th>
<th>Brain Sites</th>
<th>Inhibit/Upper</th>
<th>Ave. Microvolts</th>
<th>Reward/Lower</th>
<th>Ave. Microvolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/17</td>
<td>Cp4</td>
<td>BF</td>
<td>6.1 (12.2)</td>
<td>A</td>
<td>8.1 (11.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DT</td>
<td>8.1 (11.2)</td>
<td>SMR</td>
<td>2.7 (3.5)</td>
</tr>
<tr>
<td>8/3</td>
<td>F3</td>
<td>BF</td>
<td>4.4 (6.2)</td>
<td>SMR</td>
<td>3.2 (3.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DT</td>
<td>10.7 (11.1)</td>
<td>SMR</td>
<td>3.1 (3.8)</td>
</tr>
<tr>
<td>7/17</td>
<td>Cp4</td>
<td>BF</td>
<td>6.1 (12.2)</td>
<td>A</td>
<td>7.8 (11.8)</td>
</tr>
</tbody>
</table>
“A”’s Neurotherapy Results

- After 2 hour Assessment and Neurotherapy she jumped up, grabbed her husband, rushed home, and picked up her infant.
- At the beginning of second Neurotherapy session two days later, I asked, “How is your brain doing?” A replied, “Doing better overall” with a smile on her face.
- Husband called a few weeks after A started Neurotherapy and said, “I have seen so many positive improvements in A. Can I come in for some of this for myself?”
- No relapse after 2 years.

How did A get such good improvement so rapidly?

Psychological and Behavioral Functions of Each Quadrant
Neurotherapy Protocol to Improve Optimism and Get-Up-and-Go

Phase 1. One Sensor

<table>
<thead>
<tr>
<th>Site</th>
<th>Inhibit</th>
<th>Reward</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP4</td>
<td>BF: 25-35 hz</td>
<td>Alpha: 8-12 hz</td>
<td>4-5 minutes</td>
</tr>
<tr>
<td>DT</td>
<td>2-5 hz</td>
<td>SMR: 13-15 hz</td>
<td>4-5 minutes</td>
</tr>
<tr>
<td>FC6</td>
<td>A. BF: 25-35 hz</td>
<td>SMR: 13-15 hz</td>
<td>4-5 minutes</td>
</tr>
<tr>
<td>B. DT: 2-5 hz</td>
<td>SMR: 13-15 hz</td>
<td>4-5 minutes</td>
<td></td>
</tr>
<tr>
<td>C. Alpha: 8-12 hz</td>
<td>Beta: 16-22 hz</td>
<td>4-5 minutes</td>
<td></td>
</tr>
<tr>
<td>CP4</td>
<td>BF: 25-35 hz</td>
<td>Alpha: 8-12 hz</td>
<td>3-5 minutes</td>
</tr>
</tbody>
</table>

Phase 2. Shift to Fp1 after FC4/FC6 balance improves. Do Fp1 DT/SMR for 1-2 minutes the first two times. Then increase to 3-4 minutes. Use one sensor first then shift to two sensors using protocol on next page when there has been 80% or more improvement in balance at any site.

“EEG is the Missing Link in the assessment and treatment of concussions and other head injuries.”

Andrew Lozen, M.D. Neurosurgeon
Medical College of Wisconsin
Diagnostic Neuroimaging Course
July, 2015
Concussions and other head injuries set off a cascade of brain changes that over time increase post concussion syndrome (PCS) symptoms, including sleep disorders and depression.

The PCS symptoms can emerge from 1 week to as long as 30 years after the injury.

Second head injury and/or illness and/or psychological trauma increase symptoms and their intensity.

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Second Depression Case Presentation Outline of "J":
Post Concussion Syndrome

- Quadrant Brain Spectral Assessment Summary
- Presenting Depression Symptoms and Situation
- What I did and Why I did it
- J's Treatment Results

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Brain Training Assessment Summary J

1. What would you like to have improved? Motivation, depression, not optimistic; waiting for other shoe to drop
2. What challenging life events or psychological difficulties have you had? First husband verbally and emotionally abusive. Mom died in 2010. Had mono in 2010.
3. Any substance abuse? No
4. Who are some of your relatives or friends who have had a positive impact on you? Friends, daughter-in-law, and people at church
5. What would you like to do when your brain is trained the way you want? "Find joy again."
### Interview Assessment Summary “J”

- **June 8:** J reported that she struggles with depression and fear. Sleeps a lot. No motivation. Sick a lot. Feels depleted of energy. Has been on anti-depressant medications. Stated that she has had mild depression for some time, but the depression has become severe the last three months.
- **June 13:** Told her husband I questioning her about having a head injury. He replied, “Yes, you were in the automobile accident with your sisters in February, 2011.” – A whiplash from a rear end collision. Counter-coup Fp1
Initial Three Therapy Training Sessions

<table>
<thead>
<tr>
<th>Date</th>
<th>Brain Sites</th>
<th>Inhibit/Lower</th>
<th>Ave. Microvolts</th>
<th>Reward/Raise</th>
<th>Ave. Microvolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/8</td>
<td>No difference from assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/10</td>
<td>No difference from assessment</td>
<td>Report from Husband</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/13</td>
<td>CP4</td>
<td>BF</td>
<td>7.5 (6.8)</td>
<td>A</td>
<td>8.5 (14.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DK</td>
<td>11.4 (10.1)</td>
<td>SMR</td>
<td>6.4 (8.7)</td>
</tr>
<tr>
<td></td>
<td>F3</td>
<td>BF</td>
<td>7.2 (9.6)</td>
<td>SMR</td>
<td>6.6 (6.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>* 9 (13.2)</td>
<td>SMR</td>
<td>7 (8.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DT</td>
<td>14.9 (9.1)</td>
<td>SMR</td>
<td>9.1 (9.6)</td>
</tr>
<tr>
<td>6/13</td>
<td>FC3</td>
<td>DT</td>
<td>* 7.8 (6.3)</td>
<td>SMR</td>
<td>7 (8.0)</td>
</tr>
<tr>
<td></td>
<td>C4h</td>
<td>BF</td>
<td>7.7 (6.9)</td>
<td>A</td>
<td>8.8 (14.4)</td>
</tr>
<tr>
<td>7/4</td>
<td>Fp1, F3</td>
<td>DT</td>
<td>* 11.5 (90 one sensor)</td>
<td>SMR</td>
<td>3.7 (6.2)</td>
</tr>
</tbody>
</table>

Dennis Romig, PhD and Angelo Bolea, PhD

“J”s Neurotherapy Results

June 16, 2011
"Amazing how much better I feel. Got more done in the last 2 days than you can believe."

July 18, 2011
Reports she is more alert and has more focus.

July 27, 2011
Reports she is less anxious and stressed.

August 1, 2011
"Big difference in being optimistic. Immediate memory is better."

August 22, 2011
Discontinued anti-depressant last week. "When I woke up the lights were brighter, sounds were clearer. More aware."

August 29, 2011
Reports having less joy without anti-depressant.

September 5, 2011
Weepy. No anti-depressants for three weeks. Reports that when she reads, she can comprehend better. J has improved so much that she can reduce from once a week treatment to once every two weeks.

Dennis Romig, PhD and Angelo Bolea, PhD

“J”s Neurotherapy Results continued

October 11, 2011
Great Sleep. Warm bath with Epsom salt

October 31, 2011
Sleep is better. Energy level is higher. Able to complete housework tasks and other projects.

December 12, 2011
"Energy has improved. Sleep is so much better. This is the best Christmas present ever."

March 20, 2012
"Feel better than in years. Not in the fog I have lived in for so long. Improved reading comprehension."

Discontinued Treatment. J referred her husband, her son, her daughter-in-law and a friend

January 28, 2013
Tune up session "I have never felt better in my whole life. It is wonderful."

Total number of sessions: 25

No relapse after 3 years

Dennis Romig, PhD and Angelo Bolea, PhD
Symptoms Caused by Poor Sleep

Depression

 Irritability

Anxiety

Fatigue

Lack of Concentration and Focus

Headache

Symptoms Caused by Depression

Poor Sleep

Lack of Motivation

Anxiety

Poor Memory

Neurotherapy Protocol to Improve Sleep

Slow Down Breathing Rate to 9 Breaths per minute or less before start.

<table>
<thead>
<tr>
<th>Site</th>
<th>Inhibit</th>
<th>Reward</th>
<th>Eyes Open</th>
<th>Eyes Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP4</td>
<td>BF 25-35 Hz</td>
<td>Alpha 8-12 Hz</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>DT 1-5</td>
<td>BF 25-35 Hz</td>
<td>Alpha 8-12 Hz</td>
<td>2 minutes</td>
<td>4 minutes</td>
</tr>
<tr>
<td>P4</td>
<td>BF 25-35 Hz</td>
<td>Alpha 8-12 Hz</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>PO4</td>
<td>BF 25-35 Hz</td>
<td>Alpha 8-12 Hz</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>O2</td>
<td>BF 25-35 Hz</td>
<td>Alpha 8-12 Hz</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>FC3</td>
<td>Alpha 8-12 Hz</td>
<td>Beta 16-22</td>
<td>4 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>P4</td>
<td>BF 25-35 Hz</td>
<td>Alpha 8-12 Hz</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
</tbody>
</table>
Improve Positivity and Energy (Depression)

- Think 5 positive thoughts after 1 negative thought
- Do activities that are fun
- Be around positive people
- Exercise 30 minutes
- Get a good night’s sleep

Cognitive Behaviors

Biofeedback

- Paced Breathing
- Heart rate variability feedback

Neurofeedback (EEG)

- Increase optimistic brain waves (4-8 Hz at CP4, P4, P6)
- Reduce anxious brain waves (8-13 Hz)
- Increase get-up-and-go brain waves (SMR 13-15 Hz)
- Reduce sleep brain waves (DT 2-5 Hz at CP4, FC3, and FP1)

Improve Sleep (Sleep Disorders)

- Rest 2 hours before bed
- No screen time 2 hours before bed
- Warm bath or shower 30 minutes before bed
- No conflicts when tired, hungry, or sick

Cognitive Behaviors

Biofeedback

- Paced Breathing, 5-6 breaths per minute, eyes closed

Neurofeedback (EEG)

- Interrupted sleep: Reduce anxious brain waves, increase optimistic brain waves, eyes open and eyes closed CP6, P4, POZ, O2
- Sleep onset problem: Reduce sleep brainwaves (DT 2-5 Hz), Increase get-up-and-go brain waves (SMR 13-15 Hz)