Dementia and Neurofeedback
Featuring the use of
Play Attention
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Play Attention Potential Clients

* Dr. Crum’s Presentation
* You may also see a success story on www.playattention.com. Click on Success Stories and read George’s story.
What is Dementia?

When someone after the age of 65 loses his or her cognitive abilities, at a rate greater than the ‘normal’ stages of aging and without previous problems, he or she might be suffering Dementia. When this unusual loss of abilities occurs before the age of 65, it is called ‘early onset dementia’. A well-known and common form of dementia is Alzheimer’s disease. In general two classification of dementia are used – reversible or irreversible – depending on the cause of the affected cognitive areas.
Symptoms of Dementia

- Memory loss
- Decreased understanding / ability to learn
- Reduced thinking speed
- Attention problems
- Difficulties finding the right word
- Lack of judgment / reason
- Difficulties retaining or recalling past experiences
- Disoriented in time, place and in person
- Losing interest in social activities
- Incontinency
Symptoms of Dementia

- Disorganized, restless behavior
- Sudden mood swings (tears or anger)
- Depression
- Anxiety
- Psychosis (delusions of persecution)
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Treatment for Dementia

In exceptional cases of Dementia, dietary supplements and surgery can help. However, more often Dementia is progressive and there isn’t a ‘cure’.

Medication is mostly prescribed to modify risk factors, prevent symptoms getting worse or for coexisting conditions, such as Depression and Anxiety.

Psychological treatments, such as Cognitive Stimulation, Reality Orientation Therapy, Validation Therapy and Behavioral therapy can provide support in dealing with the symptoms of Dementia.
Neurofeedback and Dementia

Neurofeedback isn’t a ‘cure’ either and it cannot reverse structural damage or deterioration in the brain, such as that occurring with Alzheimer’s disease, where brain cells are lost. However, with Neurofeedback training the function of the healthy parts of the brain can be maximized, physiological self-regulation can be maintained and the onset of some symptoms can be delayed.

It should be noted though, that with Dementia, Neurofeedback has to be applied frequently and maybe even indefinitely to sustain improvement and prevent relapse.

It is very likely that Neurofeedback will become a regular part of elderly care in the future, to fight against the decline of mental faculties and prolonging healthy brains in humans. At this time, however, it is considered experi

This 2008 study describes how Neurofeedback was used with elderly people judged at risk of developing Dementia, which improved their verbal comprehension and associated brainwave patterns:

Quiet Mind Foundation 2009

Presented at the International Conference on Alzheimer's Disease in Vienna, Austria

Reported that 40 sessions of biofeedback training conducted twice weekly with QEEG and NPE's before and after 40 session revealed significant improvements in verbal memory, orientation, list recall, prose memory, visual memory, and behavioral ratings of executive function.


This 2009 study found that the memory of Dementia patients was “significantly improved” following Neurofeedback training, and observed that it was more effective for patients at an early stage of dementia:

Luijmes, R. E. The Effectiveness of Neurofeedback on Cognitive Functioning in Patients with Alzheimer’s Disease.

This recent thesis describes a study in which 10 patients with Alzheimer's Disease were treated with Neurofeedback, and concluded that “Neurofeedback has a positive effect on the cognitive performance of patients with Alzheimer’s Disease”:
Introduction

“As individuals age, their physical, physiological and psychological functions begin to deteriorate, which results in the progressive loss of competence”. “It becomes increasingly important to understand how cognitive functioning can be preserved and promoted in old age.

Research has consistently shown the effectiveness of Neurofeedback for healthy young adults. But, there is little research with older adults.

One set of experiments has demonstrated that individuals from age 70-78 increased speed of information processing and resistance to interference (i.e. attention to task) with peak alpha frequency training.

Another group demonstrated that feedback training to reduce the overall theta power in “normal elderly participants” improved performances on a number of measures compared to placebo, including the Verbal Comprehension Index and Verbal IQ scores of the WAIS-III, total scores on attention, executive function and memory functions.
Tests employed:

**Attention Network Test (ANT)**

- which assesses the alerting component) the ability to prepare and sustain alertness for processing high priority signals. This involves the thalamic, frontal and parieto regions

The orienting component which is the component that allows one to attend to target items overtly or covert and improves processing efficiently. This involves the superior parietal lobe, temporoparietal junctions and superior frontal cortex

The executive attention component or conflict resolution which involves the anterior cingulated cortex and lateral prefrontal cortex

The ANT is a complex design involving flashing images on a computer screen with a task to pick out when selected designs appeared to replace a fixed + sign but not false cues.

**Sternberg memory test** a computer-based word-recognition test, involving a series of word lists in which one word from a prior list may be repeated, or not.
Neurofeedback

The neurofeedback (12 sessions, eyes-open training) was based on midline theta (4-7 Hz) with a roller coaster display in which the speed (and sound) increased with the intensity (power) of the theta signal.

SHAM

EEG band randomly selected and changed in each of the 12 SHAM sessions; subjects were blind to the conditions of the feedback.
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<tr>
<th>8 Elderly Adults with SHAM Neurofeedback</th>
<th>8 Elderly Adults with Real Neurofeedback</th>
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<tr>
<td>8 Young Adults with SHAM Neurofeedback</td>
<td>8 Young Adults with Real Neurofeedback</td>
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RESULTS
CHANGES IN COGNITION
As one might expect with such a complex experimental design, Wang and Hsieh developed a mass of data:

At baseline (pre-training) the older subjects had slower reaction times but higher accuracy scores on the ANT than the younger group; but the elders were slower and less accurate on the memory lest (the Strindberg word recognition test).

RESULTS OF TRAINING: There was a trend (p=0.6) toward neurofeedback resulting in quicker reaction times, young and old.
ATTENTION RESULTS: The ANT results were also broken down into effects testing three spheres of attention: 1) the alerting network, 2) the orienting network, 3) the conflict network. Here only statistically significant results will be noted.

1) “Neurofeedback has no effect on the alerting effect.”

2) “Only the older Neurofeedback group was able to improve orienting function…via Neurofeedback training.”

3) “Both Neurofeedback groups were able to improve executive function (i.e., reducing conflict score) through 12 sessions of Neurofeedback training.”

MEMORY RESULTS: Of the four test groups, the older subjects who received Neurofeedback had a significant improvement in the memory-testing (Sternberg recognition test); the other groups did not show statistically significant training effects.

Neurofeedback on theta activity led to measurable increase of eyes-open theta activity for both older and younger subjects. Sham feedback did not have that effect, and it was not attributable to inhibition feedback in other bands. Training effect was confirmed by analysis showing increased theta activity correlating with increased number of training sessions
In 2009 a patient was referred to me due to significant changes in impulse control and social behavior.

Based on the NPE and a QEEG showing significant frontal ant temporal slowing I diagnosed frontal temporal demential
Early Diagnosis

* MRI’s and CT scans were negative for changes until 2014 when an MRI showed the frontal and temporal atrophy. At that point, 5 years after my initial diagnosis, the medical profession finally concurred with my diagnosis.
But, medical professionals from the Mayo Clinic were confounded by the fact that the patient who shows physical signs of dementia no longer shows behavioral or cognitive signs when assessed.
My treatment program with this patient was to encourage healthy areas of the brain to take over the functions of areas that were impaired. This protocol involved daily neurofeedback at home utilizing the Play Attention to increase SMR and improve attention and memory skills, combined with daily use of the Alpha Stim to modulate mood swings, and daily use of Cognitive Training Games to improve reasoning and executive functioning.
At this time, the patient’s hand and head tremors have increased significantly, and her balance has deteriorated significantly. These are lower brain functions not affected by neurofeedback.

But, she is still scoring normal of assessment of cognitive functioning and psychological functioning.
Not a Cure

While a program such as this is not a cure. It may be important in providing individuals increased time in the community and at home with their families. Certainly, in this one case, medical professionals were amazed that the patient was still coherent and not institutionalized.
For further questions

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