

# The Role of Neurofeedback in the Treatment of ADD

by Dr. David Rabiner

(This articles has been edited/shortened by David Dubin, MD)

Neurofeedback - also known as EEG Biofeedback - is an approach for treating ADD. Individuals are provided with real-time feedback about their brainwave activity and taught to use that information to modulate that activity

**As a treatment for ADD, neurofeedback is based on findings that measurements of brain activity in many individuals with ADD indicate reduced activity in the prefrontal region and frontal lobes (cortical slowing). Neurofeedback treatment is designed to train individuals to increase the production of brainwave patterns that reduce or eliminate this cortical slowing, and thus reduce or eliminate many associated ADD symptoms.**

Within the medical and scientific communities, a diverse range of viewpoints exists on the utility of neurofeedback treatment for ADD. **Most ADD experts would agree that additional controlled studies are required to *unequivocally* (italics mine—dd) establish the efficacy of neurofeedback treatment for ADD.**

**However, recently conducted investigation -- The Effects of Stimulant Therapy, EEG Biofeedback & Parenting Style on the primary symptoms of ADD (Monastra et. al.) --represents a significant step in this direction.** Participants were 100 children (83 boys and 17 girls) with an average age of 10 (range 6-19). Each child was diagnosed with ADD and treated at the Family Psychology Clinic, a private outpatient psychological clinic in upstate New York. The ADD diagnosis was established using a structured interview and standardized parent and teacher behavior rating scales.

After each child/teen was diagnosed, his or her parents were informed of a comprehensive treatment approach that included stimulant medication, parent counseling, school consultation to establish and monitor a program of academic support, and neurofeedback. Approximately half of the participants opted to include neurofeedback as part of their child's treatment.

Information presented indicates that the two groups (i.e. children whose treatment included neurofeedback and those who did not) did not differ in age, gender composition, IQ, or socioeconomic status. In addition, the representation of the different ADD subtypes (i.e. inattentive and combined) was virtually identical.

## **Treatment**

Participants received treatment over the course of 12 months. The different treatment components are described below.

*Stimulant medication:* All participants received treatment with Ritalin throughout the year.

*Parent Counseling:* Parents participated in a ten-session parenting class, followed by individual consultation on an "as-needed" basis.

*School Consultation:* At the conclusion of the diagnostic evaluation, parents were informed about procedures to obtain special educational services for their children under the appropriate federal regulations. For each group, the mean number of on-site consultations during the treatment year was 3.

*Neurofeedback:* For children whose parents elected to include neurofeedback in their child's treatment, "attention training" sessions lasting 30 to 40 minutes were conducted on a weekly basis. Training continued until the patient no longer exhibited abnormal cortical slowing. The average number of sessions required to reach this criterion was 43.

As is evident from the above discussion, the overall treatment regimens for the two groups of children appear to have been virtually identical, except for the inclusion of neurofeedback treatment in one of the groups. Because the groups did not differ in systematic ways before treatment began, the researchers could evaluate whether including neurofeedback training made any appreciable difference in the children's outcomes.

## Results

A comprehensive set of treatment outcome measures was collected including: 1) parent and teacher ratings of inattentive and hyperactive/impulsive behavior using the Attention Deficit Disorder Evaluation Scale (ES), a widely used standardized behavior rating scale; 2) the children's scores on the TOVA; and 3) the children's Attention Index score, based on a QEEG scan. Each measure was collected twice: once when participants were still on medication and a second time after they had been off medication for an entire week.

### **Outcomes when children were still on medication**

As predicted, TOVA scores at the first outcome assessment were well within the normal range for both groups. In contrast to expectations, parent and teacher ratings of ADD symptoms remained in the clinical range for children who had not received neurofeedback. **For participants whose treatment included neurofeedback, however, parent and teacher ratings of ADD symptoms were all in the normal range and were significantly better than ratings for the other participants.**

Similar results were obtained on the outcome measures taken after the children had been without medication for an entire week. As before, children whose treatment had not included neurofeedback continued to show significant ADD symptoms according to parent and teacher ratings. Their TOVA results fell in the clinical range on 3 of the 4 subscales.

In contrast, parent and teacher ratings of the neurofeedback group all remained within the normal range, as did their TOVA results. Furthermore, the QEEG scan showed that the average Attention Index score for the neurofeedback group was also within the normal range, indicating that the cortical slowing characteristic of ADD that was present at the beginning of treatment was no longer evident. As expected, the average Attention Index scores for participants not receiving neurofeedback continued to indicate significant cortical slowing.

## Summary and Implications

**These results provide compelling evidence that incorporating neurofeedback into a comprehensive treatment approach for ADD can yield important benefits.**

As discussed above, only the participants whose treatment included attention training via neurofeedback showed behavioral improvement upon follow up, and these benefits were evident even after medication was discontinued. These children were doing substantially better --according to both parents and teachers--than participants who had not received neurofeedback. In addition, the pattern of cortical slowing that is found in many individuals with ADD, and which is specifically targeted by neurofeedback, was no longer evident. This suggests that the gains associated with neurofeedback training cannot be attributed to the placebo effect, but instead reflect meaningful changes in EEG activity. This is a very impressive set of findings.

**This is an important study that makes a significant contribution to establishing a clear place for attention training using neurofeedback in the treatment of ADD.** One hopes that subsequent studies building on this impressive piece of work, and which incorporate important controls such as random assignment that were not possible in this investigation, will soon be forthcoming.

### About The Author

Dr. David Rabiner is a Senior Research Scientist conducting research on ADD and children's social development at Duke University.

<http://www.attention.com/library/articles/article.jsp?id=744&parentCatId=4&categoryID=20>

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