WHAT IS NEUROFEEDBACK?

Neurofeedback is a form of brain training, where the individual is stimulated to reduce or enhance activity of particular brainwaves via visual and audio reinforcement on a computer. The aim of neurofeedback is to improve attention and behavioural control by teaching the patient via visual and auditory reinforcement to regulate levels of activity in the brain. Neurofeedback is based upon the operant conditioning paradigm.

QEEG ASSESSMENT

Every client who wishes to undertake neurofeedback training initially undergoes a quantitative EEG assessment (qEEG). The qEEG is a 19-lead noninvasive, painless assessment which assesses all areas of the brain and in particular detects the areas of the brain that should be targeted for training. This assessment is then compared to a database containing data on healthy individuals. This will demonstrate which areas are functioning well and which are below optimum performance. This data, and completion of some questionnaires, are used to compile a comprehensive report including the individual's unique brain profile.

A qEEG is also part of our comprehensive clinical assessment as in isolation the qEEG cannot be used to diagnose neurodevelopmental disorders. However, as qEEG results are compared to a database of age equivalent peers, it is possible to evaluate if the individual's symptoms are associated with a neurodevelopmental condition (Monastra, 2008).

Many research studies have examined the specific brain wave patterns detected by qEEGs that are associated with various neurodevelopmental disorders. Specific patterns include excessive theta activity and reduced beta activity in frontal brain regions of individuals with ADHD; excessive theta and decreased alpha activity with individuals with learning difficulties (Chabot, Michele & Prichep, 2005); and reduced alpha and excessive beta activity in individuals with Autistic Spectrum Disorder. As well as identifying activity patterns associated with clinical disorders, gEEG data can also help

Beta (12.0 - 25.0 Hz)

Beta 3 (18.0 - 25.0 Hz)

1 2



1 2 3



1 2

Beta 2 (15.0 - 18.0 Hz)



QEEG recording from a 14 year old ADHD patient prior to neurofeedback.

1 2



NEUROFEEDBACK AND ADHD

The Learning Assessment and Neurocare Centre have provideda neurofeedback service since 2009.

Neurofeedback training is based upon the principal of operant conditioning, where individuals are taught to control their brain activity, and the brain is conditioned to function in a more effective way. For individuals with the typical ADHD dysregulation of excess slow wave activity in the front of the brain, neurofeedback aims to decrease the amount of slow wave activity and increase other brain wave activity, enabling them to sustain attention.

The evidence for this treatment has been gathering for many years, and recent studies report a sound evidence base and suggest neurofeedback can normalise an individual's brain activity pattern as well as reduce their ADHD symptoms (Arns et al., 2009). Monastra (2001, 2005) found that after an average of 43 neurofeedback sessions, 75% of patients had normalised brain waves, gains which were sustained at a 3 year follow up point, suggestingthat neurofeedback is an effective long term treatment strategy.

Neurofeedback is a particularly good option if an individual has been unresponsive to pharmacological treatments such as stimulant medication or who have experienced side effects to medication (Monastra, 2005a).

The majority of research concerning neurofeedback has taken place in clinical settings, however, there is evidence that it is effective in other situations including at school. However, we are finding that many individuals are wishing to complete the therapy at home with the flexibility of being able to complete neurofeedback when it is most convenient for them, and as often as they wish. As such we offer a home/distance neurofeedback training programme, however the scientific evidence of this specific

approach is still being developed (Vernon et al., 2004; Rutterford, Anderson, & Venables, 2008).

QEEG recording from a 14 year old ADHD patient after a course of neurofeedback.





NEUROFEEDBACK SESSION

During a neurofeedback session, an individual has 2-3 EEG sensors put on the scalp in locations identified by the qEEG assessment., When the individual produces the correct brain waves, they are rewarded by a visual movement or auditory sound, therefore reinforcing the behaviour/brain-state. In other words, you are playing a game or watching a video by using your



Electrical sensors on scalp and ears

brain waves instead of your hands. As the patient has more training sessions, the brain has to work harder to get rewarded. On average, an individual would expect to have 40 sessions of neurofeedback treatment with each session approximately one hour long and occurring at least once a week.

When the neurofeedback sessions have been completed, another qEEG can take place. This can be compared to the original qEEG and will be able to show the progress that has been made during the training sessions. Neurofeedback has been shown to be successful for both children and adults with a variety of difficulties.

Neurofeedback is not a quick solution because training can take some months to complete. However, it has been found that some individuals have been able to reduce their medication or in some circumstances completely stop the use of medication after having neurofeedback.

SIDE EFFECTS

There are very few side effects associated with neurofeedback as the brain activity changes that are taking place are continuously monitored. Monastra et al., (2003) reported transitional side effects when a patient was treated with both stimulant medication and neurofeedback. These side effects included irritability and moodiness. However, these side effects were overcome when the dose of stimulant medication was reduced. Other reported side effects include headaches and dizziness, both of which were overcome by having a rest after receiving neurofeedback or something to eat (Monastra et al., 2005). When given a choice of strategies to use to help individuals with ADHD, it has been reported that twice as many parents preferred neurofeedback over medication (Fuchs et al., 2003).

TESTIMONIALS

"Our son is 12. He had ADHD diagnosed when he was 6 and had been on methylphenidate every school day since then. We live in Liverpool so there



was no way we could attend for sessions. We have been doing 2 sessions a week for the last 8 months. He has been able to stop his methylphenidate and is much more confident socially and has learned new skills like badminton and skiing that he just didn't have the patience off medication to try. We had an excellent service - everyone was really friendly and helpful especially when I was struggling with the practical aspects of home training. I got detailed and helpful feedback by email every week while doing the training and Dr. Rutterford was also available on the phone when a more in depth discussion was needed. In summary I think that the neurofeedback has been really worthwhile."

"I was diagnosed with ADHD and mild depression in 2006 and naturally my psychiatrist provided me with drugs to help alleviate the problems I was experiencing. I soon discovered however that drugs do not work. They don't teach you how to take control of your symptoms through training your mind. I then began my journey of self improvement and discovered neurofeedback. After 2 months of home training, I improved tremendously in terms of my ability to maintain an attentive and relaxed state of mind. Also, I'm not as impulsive, as I now think before spending money, and my mood has improved. I have the confidence now to go on to better things. If you have have any mental or stress related illness, then neurofeedback sessions should be your top priority.

"Before I had the qEEG test I did not understand why I had such a poor attention and concentration span and unusual high levels of energy that prevented me from achieving my full potential throughout my education. Having the test confirmed that it was in fact ADD that I have. Knowing this now has given me peace of mind, especially knowing that there is a healthy form of treatment available. Since all advice and service given has been extremely helpful I would definitely recommend this service to others who believe that they may have ADHD or ADD."

WHERE CAN I FIND FURTHER INFORMATION?

If you would like to know more about our Neurofeedback service at LANC, please contact Dr Neil Rutterford: Tel: 01403 240002 Email: <u>dr.rutterford@lanc.uk.com</u>

Additionally, you may be interested to look at the following websites PeakMind – <u>www.peakmind.co.uk</u> BrainClinics – <u>www.brainclinics.com</u>

