

An Overview Of Alpha-Theta Neurofeedback And Its Treatment Effectiveness For Substance Abuse"

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Neurofeedback, also known as EEG biofeedback, has been used successfully for the treatment of substance abuse for over 25 years. Built on the work of Kamiya and Green (Budzynski, 1999), Eugene Peniston published a series of papers using alpha-theta neurofeedback with a Veteran's Administration (VA) population of Vietnam War veterans diagnosed with alcohol abuse and post-traumatic stress disorder (PTSD) (Peniston & Kulkosky, 1989; Peniston & Kulkosky, 1990; Peniston, Marrinan, Deming, & Kulkosky, 1993). These important 'Peniston papers' no doubt facilitated a wave of EEG practitioners who rely on alpha-theta neurofeedback, or its modified forms, to treat substance abuse (as well as PTSD) that continues to this day.

Peniston's Alpha-Theta Protocol

Peniston & Kulkosky used a multi-modal protocol that called for initial peripheral temperature biofeedback training, autogenic training, and breathing exercises to induce relaxation followed by approximately 30 thirty-minute sessions of EEG biofeedback. Patients learned to increase theta and alpha in occipital regions during eyes closed training to induce a hypnagogic state. Mental imagery scripts based on drug and alcohol rejection scenes, treatment goals, and lifestyle changes developed prior to neurofeedback were read to subjects during the initiation of the alpha-theta training session. The 1989 Peniston and Kulkosky study detailed positive results with this protocol after 15 sessions, and in 1990, Peniston & Kulkosky reported "...fundamental changes in alcoholic personality variables following alpha-theta EEG biofeedback" (p. 37).

Alpha-Theta Neurofeedback Mechanism of Action

The exact mechanism of alpha-theta neurofeedback remains elusive, but there is much speculation and ongoing research (Mark Johnson, personal communication). Peniston, Marrinan, Deming, & Kulkosky (1993) found that a phenomenon known as a crossover (i.e., theta amplitude exceeds alpha amplitude), where participants may experience vivid, healing emotional experiences, contributed heavily to treatment success. Another possibility for these dramatic results advocated by Peniston and Kulkosky (1989; 1990) is that alpha-theta neurofeedback counteracts increased beta-endorphin levels related to the stress of abstinence. However, at the present time, the precise mechanism(s) of action in the Peniston Protocol remain unknown (Gruzelier & Egner, 2005).

How Effective Is Alpha-Theta Neurofeedback?

The Peniston Protocol and the Scott and Kaiser Modifications of the Peniston Protocol (discussed below) are effective treatments when defined as long term abstinence. Reports of approximately 50% – 80% success inpatient (Burkett, Cummins, Dickson, & Skolnick, 2005; Scott & Kaiser, 1998; Scott, Kaiser, Othmer, & Sideroff, 2005) and 70% success outpatient (Callaway & Bodenhamer-Davis, in press) using various definitions of “treatment success,” “abstinence,” and “relapse.” Participants that complete a Peniston Protocol program can experience the “Peniston Flu,” an effect in which nearly 50% of subjects experience an allergic reaction to their abused substance (Demos, 2005). This attests to the powerful effects that are possible with alpha-theta neurofeedback.

Scott and Kaiser Modifications of the Peniston Protocol

Researchers hoped that the Peniston Protocol could produce similar successful outcomes with other substance abuse disorders. However, only limited success in patients with other drug addictions, such as cannabis dependence and stimulant dependence, would be realized using the Peniston Protocol (Sokhadze, Cannon, & Trudeau, 2008). Scott and Kaiser (1998) eventually discovered that patients with polysubstance (i.e., cocaine and methamphetamine) abuse in an in-patient setting demonstrated marked improvement with the addition of SMR-beta enhancement to the protocol prior to alpha/theta training. Patients completed 10 to 20 SMR-beta neurofeedback sessions over the first 10 days of treatment followed by 30 alpha/theta sessions. Scott and Kaiser believed that an SMR-beta protocol increased treatment stay over and above the effects of alpha/theta neurofeedback when compared to control subjects. Patients that completed this program had significantly decreased scores on multiple mood and personality scales on the Minnesota Multiphasic Personality Inventory II (MMPI-2), increased attention, and greater likelihood of permanent abstinence. Their modified alpha-theta protocol became known as the Scott and Kaiser Modifications of the Peniston Protocol.

A more recent investigation into polysubstance abuse using the Scott and Kaiser Modifications of the Peniston Protocol was completed (Scott, Kaiser, Othermer, & Sideroff, 2005). Again, significant improvements on multiple measures were realized, including increased attention and concentration scores on the TOVA, reduced psychopathology as measured by the MMPI-2, improved treatment completion rates, and 77% abstinence after 1 year. Burkett, Cummins, Dickson, and Skolnick (2005) integrated the Scott and Kaiser Modifications of the Peniston Protocol into a faith-based inpatient treatment facility for homeless crack cocaine dependent persons. The researchers reported 49% complete abstinence from crack cocaine and 40% partial relapse (crack cocaine used 1 – 9 times) with only 10% full relapse after one year. Additionally, they found significant improvements in treatment retention rates, establishment and maintenance of a regular residence, and holding a steady job or attending school, as well as decreased depression and anxiety, and reduced rearrest rates.

Summary

The research discussed herein suggests that Alpha-theta neurofeedback may be an effective treatment for notoriously difficult-to-treat substance abuse populations known for high relapse rates. It is important to note that these studies have their limitations, some

significant, especially for those who place importance on randomized double blind designs. The complexities of alpha-theta neurofeedback unfortunately do not easily lend itself to blinded designs. Nonetheless, ingenious neurofeedback research designs have been published of late; for example, read “HYPERLINK "<http://www.bmedreport.com/archives/5153>" [Neurofeedback Significantly Improves Sleep In A Small Group Of Insomniacs](#).” Perhaps researchers will eventually create a novel way to isolate the effects of alpha-theta neurofeedback while controlling for extraneous variables. Until then, I believe that the published research so far justifies alpha-theta neurofeedback as a viable treatment option for persons who abuse substances, particularly for those who have not responded to other treatments.

Enjoy.

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