

## **Neurofeedback in FTD and PSP Patients: a New Therapeutic Tool in the Treatment of Emotion Recognition? A Proof-of-Concept Study.**

Thierry, Hergueta; Gunther-Cohen, Nathalie; Chamayou, Céline; Bonnet, Anne Marie; Bloch, Frédéric; Wargon, Isabelle; Le Ber, Isabelle National Center on Rare Dementias - Department of Neurology, France

**Introduction:** Neurofeedback (NF) is a non invasive technique allowing the brain to regulate cerebral activity. Johnston *et al.* showed that trained healthy subjects were able to self-regulate their emotion networks by using NF technique in precuneus and medial prefrontal cortex as well as in ventral striatum. Linden *et al.* found the same result in depressed patients. In recent studies, patients with frontal hypoperfusion due to Asperger or Autism syndrome, ADHD or schizophrenia showed improvement on attention, social interaction and global behavior using NF. We make the hypothesis that NF could improve attention and emotion recognition in FTD and PSP which are rare disabling disorders with no curative treatments.

**Objective:** The aim of this proof-of-concept study was to compare the effects of neurofeedback on attention and emotion recognition in FTD and PSP patients.

**Patients and Method:** Four PSP patients were compared to four FTD patients on 35-Ekman test and behavioral assessment by their spouses. All the patients participated to 6 thirty five minutes weekly sessions of neurofeedback (Neuroptimal). Patients were seated in an armchair listening to classical music with headphones. Cerebral activity was registered with 2 sensors places on the scalp (C3-C4) and 3 on the ears. Patients were not aware of the feedback (brief interruption of the music) given by the device occurring after a sudden variation of amplitude of cerebral activity.

**Results:** FTD and PSP patients had the same abnormal score to the Ekman test (35) at baseline (17.5; 8.6). Emotion recognition improved significantly in both groups (25.1; 4.2  $p = .02$ ). Spouses reported an improvement in attention (48%), social interaction/empathy (48%), opposition behavior (33%) and depression (72%).

**Conclusions:** Neurofeedback improves emotion recognition and social interaction as well as mood and seems to be an interesting therapeutic tool in the management of frontal syndrome in FTD and PSP patients. A randomized blinded study is currently in progress in our center to exclude possible “placebo” effects of the relaxation.