

# Effectiveness of neurofeedback versus medication for attention-deficit/hyperactivity disorder

Sudnawa KK, Chirdkiatgumchai V, Ruangdaraganon N, Khongkhatithum C, Udomsubpayakul U, Jirayucharoensak S, Israsena P.

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Abstract

## BACKGROUND:

Neurofeedback (NF) is an operant conditioning procedure that trains participants to self-regulate brain activity. NF is a promising treatment for attention-deficit/hyperactivity disorder (ADHD), but there have been only a few randomized controlled trials comparing the effectiveness of NF with medication with various NF protocols. The aim of this study was therefore to evaluate the effectiveness of unipolar electrode NF using theta/beta protocol compared with methylphenidate (MPH) for ADHD.

## METHODS:

Children with newly diagnosed ADHD were randomly organized into NF and MPH groups. The NF group received 30 sessions of NF. Children in the MPH group were prescribed MPH for 12 weeks. Vanderbilt ADHD rating scales were completed by parents and teachers to evaluate ADHD symptoms before and after treatment. Student's t-test and Cohen's d were used to compare symptoms between groups and evaluate the effect size (ES) of each treatment, respectively.

## RESULTS:

Forty children participated in the study. No differences in ADHD baseline symptoms were found between groups. After treatment, teachers reported significantly lower ADHD symptoms in the MPH group ( $P = 0.01$ ), but there were no differences between groups on parent report ( $P = 0.55$ ). MPH had a large ES (Cohen's d, 1.30-1.69), while NF had a moderate ES (Cohen's d, 0.49-0.68) for treatment of ADHD symptoms.

## CONCLUSION:

Neurofeedback is a promising alternative treatment for ADHD in children who do not respond to or experience significant adverse effects from ADHD medication.