Use of EEG Beta-1 Power and Theta/Beta Ratio Over Broca's Area to confirm Diagnosis of Attention Deficit/Hyperactivity Disorder in Children.

Sangal RB, Sangal JM.


Abstract
The Food and Drug Administration has approved a medical device using the electroencephalogram (EEG) theta/beta ratio (tbr) to help assess pediatric attention deficit/hyperactivity disorder (ADHD). Tbr is reported to be higher in ADHD, with increased theta and decreased beta. This study examined theta and beta-1 power differences between ADHD and normal children, during tasks of selective attention, and elucidated topographical differences. EEGs were collected from 28 normal and 58 ADHD children, aged 6 to 14 years, using 31 scalp electrodes during auditory and visual tasks requiring selective attention. Spectral analysis was performed. Tbr was higher in ADHD than in normal children (2.60 vs 2.25, P = .007), with lower beta-1 (3.66 vs 4.22, P = .01), but no difference in theta power. There was lower beta-1 (P < .001) and higher tbr (P = .002) over Broca's area (electrode locations F7 and FC5). Beta-1 power over Broca's area was the best diagnostic test, with sensitivity 0.86 and specificity 0.57. Tbr is higher and beta-1 power lower in ADHD than in normal children, especially over Broca's area. Beta-1 power and tbr assist in confirming the diagnosis of ADHD in a sample with moderate pretest probability of ADHD.