Clinical Validation of Eye Vergence as an Objective Marker for Diagnosis of ADHD in Children

Paloma Varela Casal, Flavia Lorena Esposito, Imanol Morata Martínez, Alba Capdevila, María Solé Puig, Núria de la Osa, Lourdes Ezpeleta, Alexandre Perera i Lluna, Stephen V. Faraone, Josep Àntoni Ramos-Quiroga, Hans Supèr, Jose Cañete

Journal of Attention Disorders, 2018
DOI: https://doi.org/10.1177/1087054717749931

Abstract

Objective:
ADHD youth show poor oculomotor control. Recent research shows that attention-related eye vergence is weak in ADHD children.

Method:
To validate vergence as a marker to classify ADHD, we assessed the modulation in the angle of vergence of children (n = 43) previously diagnosed with ADHD while performing an attention task and compared the results with age-matched clinical controls (n = 19) and healthy peers (n = 30).

Results:
We observed strong vergence responses in healthy participants and weak vergence in the clinical controls. ADHD children showed no significant vergence responses. Machine-learning models classified ADHD patients (n = 21) from healthy controls (n = 21) with an accuracy of 96.3% (false positive [FP]: 5.12%; false negative [FN]: 0%; area under the curve [AUC]: 0.99) and ADHD children (n = 11) from clinical controls (n = 14) with an accuracy of 85.7% (FP: 4.5%; FN: 19.2%, AUC: 0.90).

Conclusion:
In combination with an attention task, vergence responses can be used as an objective marker to detect ADHD in children.