

## **Acute Improvement in Alertness and Cognition Following Methylphenidate in ADHD Predicts Chronic Improvement**

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**BACKGROUND:** ADHD of childhood origin is characterized by excessive inattention, impulsivity and hyperactivity. Associated features may include specific educational underachievement, mood disorder and cognitive deficits in auditory or visual attention, learning, recall and alertness (Weinberg & Brumback, 1991). The extent to which acute dosages of psychostimulants may correct any of these manifestations and chronically maintain those effects has not been previously reported.

**METHOD/DESIGN:** From a database of almost 200 subjects, a retrospective analysis of 10 right-handed boys between 7 & 9 years of age who met DSM-IV criteria for ADD and who had been assessed by DSM-IV rating scale, Conners Hyperactivity Index and Achenbach Child Behavior Checklist were selected. Baseline assessment included measures of intelligence, academic skill and mood. Cognitive assessment included at least Rey AVLT, Three Letter Cancellation Task and Digit Span. Alertness was assessed by pupillometry (Duane & Berman, 1992; Keegan & Merritt, 1995; Duane, Clark, Gottlob, 1996). One to four weeks post baseline assessment and with repeat pupillometric evidence of non-alertness, subjects received acute doses of methylphenidate (MPH) 7.5mg. Alertness as manifested by improved pupil stability was substantiated one hour post dose. If not achieved, supplemental 2.5 to 5mg dosages were then given. Once alertness was achieved, cognitive measures were reassessed in alternate format. Effects on cognition were compared acutely while effects on behavior, as well as cognition, were reassessed three to six months post chronic use of MPH in divided doses ranging from 10 to 20mg per day.

**RESULTS:** Analysis showed that in 8 of the 10 subjects, 1 or more of the cognitive measures improved acutely simultaneously with gaining alertness. Three to six months later, all 8 showed continued positive effects on cognition. In 7 of these 8, inattention scores were improved on behavioral rating scales. Hyperactivity improved in 6, while in 4 impulsivity was lowered. Academic skills showed variable degrees of improvement, but in none was there academic or cognitive regression or tics.

**CONCLUSION:** These data suggest acute improvement in alertness/cognition with test doses of MPH offers reasonable prediction of longer-term benefit in attention but less predictive of other behavioral effects. This diagnostic/assessment approach improves accuracy in determining effective psychostimulant dose in ADHD.

Poster presentation: American Neuropsychiatric Association Meeting, Orlando, Florida, February 3, 1997.

Duane DD, Johnson CM, Clark M. Acute improvement in alertness and cognition following methylphenidate in ADHD predicts chronic improvement. Abstract. *J. Neuropsychiatry Clin. Neurosciences*, 1997, 9:141-142.