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Neurophysiological Perspectives of Sensory Integration, Motor Dysfunction and Cognitive Impairment among Children with Attention Deficit Hyperactivity Disorder: A Narrative Review

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ABSTRACT

Introduction: Attention Deficit Hyperactivity Disorder (ADHD) is being increasingly recognised as a heterogeneous neurodevelopmental disorder that transcends beyond the core behavioural symptomatology. Children with ADHD exhibit issues with sensory integration and motor planning, along with impairment in the cognitive domain, pertaining chiefly to attention control. An understanding of the neurophysiological mechanisms that underlie the interactions between sensory-motor function and cognition is needed for a comprehensive understanding of the disorder.

Aim: This review aims to synthesise current evidence on the neurophysiological manifestations and identify their impact on sensory integration deficits, motor dysfunction, and cognitive impairment among children with ADHD.

Materials and Methods: A narrative review of the literature was conducted across PubMed, Scopus, and Web of Science databases. The inclusion criteria focused on studies in sensory processing, motor function, and cognition among children with ADHD and their corresponding neurophysiological mechanisms. Data were extracted and synthesised from neurodevelopmental studies, neuroimaging and electrophysiological findings for functional outcomes.

Results: Neurophysiological findings demonstrate disruption in cortical and subcortical connectivity and defects in temporal processing affecting neural synchronisation. The findings from this review are indicative of atypical sensory processing and motor coordination difficulties in ADHD, which correlate with deficits in executive function and attention regulation, making it harder for children to learn and carry out motor-related activities and ability to perform everyday tasks effectively.

Conclusion: There is a favourable association between somatosensory discrimination and motor planning that leads to sensory processing differences among children with ADHD. Recognising these interactions may aid in improving understanding of ADHD pathophysiology and provide direction for developing more targeted neurorehabilitation approaches to improve functional outcomes among these children.

Keywords: Brain, Cognition, Quality of Life, Motor function, Sensory Integration.

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