Improving Awareness, Identification, and Treatment of Motor Impairments in Autism

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Autism represents a heterogenous group of neurodevelopmental disabilities characterized by the presence of social communication impairments and focused and repetitive behaviors.[1] Motor impairments are also a frequent co-occurring behavioral and neurologic condition in autistic individuals. These motor impairments include delayed motor milestones, atypical gait, poor visual motor coordination, and difficulties with balance and postural control.[2,3] Recent large-scale national cohort and database studies have estimated that motor impairments can affect 35% to 87% of autistic individuals across a lifespan.[4,5] Furthermore, motor impairments have been posited to be one of the earliest signs of atypical development in autism and can negatively impact the development of social communication, adaptive function, and participation in physical activity.[6–9] Thus, identification of and interventions for motor impairments can improve multiple neurodevelopmental and physical health outcomes. Despite their prevalence and pervasive nature, motor impairments remain under recognized and under screened by clinicians and researchers. One reason for this gap is that motor impairments are listed as an associated condition in the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, with no standardized guidelines on how to evaluate or categorize these impairments. In addition, current standardized motor assessments are not tailored for autistic individuals and intellectual disability and do not capture the heterogenous nature of motor impairments that can be seen in autistic individuals.[10,11] There is a need for more objective motor measures that can evaluate autistic individuals across a life span with a range of intellectual abilities. These objective measures can improve our ability to characterize motor impairments in autism which, in turn, can improve: (1) screening guidelines for clinicians, (2) evaluation of outcomes of motor-based interventions, and (3) referral to more targeted motor interventions.

The Autism Intervention and Research Network (AIR-P) neurology node is uniquely positioned to address these gaps in the field. The neurology node aims to (1) use objective quantitative and qualitative motor measurement methods to improve motor phenotyping across the lifespan, (2) evaluate the benefits of motor-based physical activity interventions on motor skills, adaptive functioning, and physical health outcomes, and (3) disseminate evidence-based information to caregivers and clinicians to improve

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screening of motor impairments and referral to interventions.

Given the AIR-P's focus on physical health outcomes and well-being, it is also important to elaborate on the second aim of the neurology node, which includes evaluation of the benefits of motor-based physical activity interventions for autistic individuals. Motor impairments can pose a barrier to engagement in physical activity and organized physical activity programs (eg, soccer, dance, tennis, or yoga). It has been reported that only 14% of autistic youth meet the recommended 60 minutes of physical activity a day.[12] Decreased levels of physical activity can compound co-occurring medical conditions already prevalent in autism such as obesity, lower bone mineral density, and hyperlipidemia.[13] Engagement in organized physical activity also provides opportunities for developing peer relationships.[14] Barriers to engagement in sports represent missed opportunities for autistic individuals to benefit from these meaningful social experiences. Additional barriers to inclusion of autistic youth in organized physical activity programs include caregiver reports of lack of awareness and accessibility of these programs and limited training of staff to support autistic individuals.[9,12] The AIR-P neurology node will directly address these issues by conducting clinical intervention studies to evaluate the benefits of motor-based physical activity for autistic individuals. The first phase of this work is underway and is focused on evaluating the benefits of an expressive movement-based dance program on motor skills, physical activity level, social communication, quality of life, and adaptive function.[15] The goal of this work is to provide evidence-based recommendations to caregivers, clinicians, and community providers on how to refer and support autistic individuals in organized physical activity programs.

The AIR-P neurology node will use a multifaceted approach to address gaps in identification, awareness, and interventions for motor impairments in autism. Specifically, the node will use methods to improve motor phenotyping in autistic individuals, evaluate motor-based interventions, and disseminate this knowledge to the community at large. The data gathered from the neurology node can help inform other nodes and researchers engaged in the AIR-P network and ultimately build the evidence needed to improve the diagnostic and treatment approach for this prevalent co-occurring neurologic and behavioral condition in autism.

ABBREVIATIONS

AIR-P: Autism Intervention Research Network on Physical Health
OPA: organized physical activities

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