

Primitive Reflex Training Research

Understanding Primitive Reflexes

The grasp and other primitive reflexes

- Published in 2003 in *Journal of Neurology, Neurosurgery, and Psychiatry*

Primitive reflexes are typically present in childhood, suppressed during normal development. In this review the paper discusses some historical aspects surrounding these reflexes, how they might be elicited and interpreted, and their potential clinical utility in modern neurological practice.

Retention Of Primitive Reflexes Is Linked To Difficulties In Reading

Primary reflex persistence in children with reading difficulties (dyslexia): a cross-sectional study

- Published in 2007 in *Neuropsychologia*

The study assessed the prevalence of a persistent primary reflex in a sample of children aged 7-9 years old. The results showed that retention of the asymmetric tonic neck reflex was predictive of attainments in reading, spelling, and verbal IQ. There were no differences between the performance of dyslexic and non-dyslexic children on any of the outcome measures. These findings suggest that for many children in mainstream educational programs, the attainment of core educational skills may be affected by the persistence of a brainstem-mediated reflex system that should have been inhibited in the first year after birth.

Prevalence of persistent primary reflexes and motor problems in children with reading difficulties

- Published in 2004 in *Dyslexia Studies*

These studies have shown that some children with reading difficulties have underlying developmental delay, which may be related to the persistence of primitive reflexes. This study investigated the prevalence of persistent primitive reflexes in a typically developing primary school population (aged 9-10 years). The results showed that retention of the asymmetric tonic neck reflex was found in higher levels in children with lower reading abilities compared to those with higher reading abilities. It was also found that there was a significant difference in motor abilities between the lowest and highest reading groups. These findings highlight the persistence of primitive reflexes in children with reading difficulties and provide further evidence of the association between movement difficulties and reading in young children.

The relationship between gross motor skills and academic achievement in children with learning disabilities

- Published in 2011 in *Res Development Disability*.

In children with learning disabilities a specific relationship was observed between reading and locomotor skills and a trend was found for a relationship between mathematics and object-control skills: the larger children's learning lag, the poorer their motor skill scores. This study stresses the importance of specific interventions facilitating both motor and academic abilities.

Retention Of Primitive Reflexes And Learning

Retained primitive reflexes and potential for intervention in Autistic Spectrum Disorders

- Published in 2022 in Frontiers Neurology

This paper provides evidence to support the contention that many aspects of Autistic Spectrum Disorder (ASD) are related to the interregional brain functional dysconnectivity associated with maturational delays in the development of brain networks. The study believes a delay in brain maturation in some networks may result in an increase in cortical maturation and development in other networks, leading to a developmental asynchrony and an unevenness of functional skills and symptoms. The paper supports the close relationship between retained primitive reflexes and cognitive and motor function in general and in ASD in particular provided an indication that the inhibition of retained primitive reflexes (RPRs) can affect positive change in ASD.

Measuring primitive reflexes in children with learning disorders.

- Published in 2017 in European Journal of Multidisciplinary Studies

The paper aims to show that the children with learning disabilities have a high level of unconstrained primitive reflexes and that their undeserved suffering also comes from the increased presence of instinctive reflexive movements. Also, their cognitive development is held "as hostage" by ... the reflexive movements for the creation of new nerve pathways and schemes. It was proven that children with learning disorders have a high level of retained primitive reflexes compared to other children. The findings of this study lead to the need for scientific research to inhibit the primitive reflexes at a young age, but also when they are present beyond their biological age.

Early learning in the balance: priming the first ABC.

- Published in 2000 in Supporting Learners

In this article, Sally Goddard Blythe makes a case for an approach to early years learning which takes full account of children's 'readiness' for the demands of formal schooling in terms of their neurological and physical development. Cogent arguments are presented for much more attention to be given to the development of motor skills than is currently the case and for opportunities for movement and physical education to be provided on a par with those provided for literacy and numeracy.

The effects of the primary movement programme on the academic performance of children attending ordinary primary school

- Published in 2005 in Journal of Research in Special Educational Needs.

The present study investigated the prevalence of a primary reflex (the Asymmetrical Tonic Neck Reflex) in children attending ordinary primary school and how this related to attainments in a number of academic areas. The effectiveness of a specific movement intervention programme in reducing primary reflex persistence and improving academic attainment was also evaluated. It was found that the movement intervention programme had a very significant impact on reducing the levels of ATNR persistence in children and that this was associated with very significant improvements in reading and mathematics, in particular.

Effects of replicating primary-reflex movements on specific reading difficulties in children: a randomised, double-blind, controlled trial

- Published in 2000 in the Lancet.

Children with specific reading difficulties have problems that extend beyond the range of underlying language-related deficits (eg, they have difficulties with balance and motor control). We investigated the role of persistent primary reflexes (which are closely linked in the earliest months of life to the balance system) in disrupting the development of reading skills. This study provides further evidence of a link between reading difficulties and control of movement in children. In particular, the study highlights how the educational functioning of children may be linked to interference from an early neurodevelopmental system (the primary-reflex system). A new approach to the treatment of children with reading difficulties is proposed involving assessment of underlying neurological functioning, and appropriate remediation.

Integration exercise programme for children with learning difficulties who have preserved vestigial primitive reflexes

- Published in 2017 in Acta Neuropsychologica

The main goal of the research was to determine the usefulness of the Integration exercise programme stimulating development in children with learning difficulties who have preserved vestigial primitive reflexes. Their symptoms included weak motor and visual-motor coordination, lowered visual and auditory analysis and synthesis which resulted in difficulties in reading and writing, disrupted emotional development, psychomotor hyperactivity, weak concentration and other symptoms. It was found that the Integration exercise programme is useful in therapy involving facilitation of development in children with learning difficulties, who exhibit various symptoms. Almost all the obtained results were statistically significant. The Integration exercise programme is particularly effective in the case of children exhibiting a whole set of symptoms along with learning difficulties, problems with concentration, weak emotion control, weak motor development, abnormal muscle tension, and weak motor coordination.

Retention Of Primitive Reflexes Is Associated With Attentional Problems

Primitive reflexes and attention-deficit/hyperactivity disorder: developmental origins of classroom dysfunction

- Published in 2004 in International Journal of Special Education

This study examined overlap of ADHD behaviors and retention of four primitive reflexes — Moro, tonic labyrinthine reflex (TLR), asymmetrical tonic neck reflex (ATNR), and symmetrical tonic neck reflex (STNR) — in boys aged 7-10 years. The results showed that boys diagnosed with ADHD had significantly higher levels of reflex retention than boys without an ADHD diagnosis. The results also indicated both direct and indirect relationships between retention of these primitive reflexes with ADHD symptomatology and mathematics achievement.

Asymmetric tonic neck reflex and symptoms of attention deficit and hyperactivity disorder in children

- Published in 2013 in International Journal of Neuroscience

This study examined the extent to which persisting primitive reflexes, specifically the asymmetrical tonic neck reflex (ATNR), is related to symptoms of ADHD in children aged 8-11 years and compared the results in age-matched children without ADHD. The results showed that ADHD symptoms are closely linked to the persistence of ATNR.

Retained primitive reflexes and ADHD in children

- Published in 2012 in Activitas Nervosa Superior

This study investigated the role that persisting primitive reflexes, specifically the Moro reflex and Galant reflex, play in ADHD. The results showed that school-aged children with ADHD (8-11 years) had higher levels of persisting Moro and Galant reflexes compared to a control group of age-matched children without ADHD.

Persistent childhood primitive reflex reduction effects on cognitive, sensorimotor, and academic performance in ADHD

- Published in 2020 in Front Public Health

A study was performed on 2,175 individuals between the ages of 3.2 and 22.04 years diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). The objective was to determine the efficacy of a hemispheric-based training program to reduce extant retained primitive reflexes (RPRs) and examine the relationship to motor function by metronome-based motor, DL, and cognitive tasks measured by subtests of the Wechsler Wide Range Achievement Test. After a 12-week program, RPR's were significantly reduced, as well as performance on all motor and cognitive measures significantly increased.

Timing deficits in ADHD: insights from the neuroscience of musical rhythm

- Published in 2018 in Front Computer Neuroscience.

This paper considers how the brain processes musical rhythm, ...and argues that it is (an) integrated approach that is needed to advance understanding of a complex, heterogeneous disorder such as ADHD.

Effect of sensory integration training on executive functions of children with attention deficit hyperactivity disorder

- Published in 2016 in Neuropsychiatric Neuropsychology.

The results of the statistical analysis indicate that sensory integration training influences the performance of students. This method can be used for the improvement of executive functions of students with ADHD.

Sensorimotor therapy: using stereotypic movements and vestibular stimulation to increase sensorimotor proficiency of children with attentional and motor difficulties

- Published in 2009 in Perceptual Motor Skills

These finding suggest that a comprehensive training program that includes primitive reflex integration may benefit typically developing children with sensorimotor difficulties and may serve as a complement to regular treatment of developmental coordination disorder, learning disability, or ADHD.

Principle of dissolution and primitive reflexes in ADHD

- Published in 2013 in Activitas Nervosa Superior.

Recent data suggests one of the important aspects of normal development that may play a role in ADHD, is the suppression of the ... primitive reflexes. The study indicated ADHD symptoms may present a compensatory process related to primitive reflexes, with higher levels of brain functions linked to coordination and balance due to insufficiently developed cognitive and motor integration.

Persisting primitive reflexes in medication-naïve girls with attention-deficit and hyperactivity disorder

- Published in 2013 in Neuropsychiatric Disease and Treatment.

The study showed that persisting primitive reflexes are closely linked to ADHD symptoms. The Asymmetric Tonic Neck Reflex and Symmetric Tonic Neck Reflex were tested in the study.

The effect of hemisphere specific remediation strategies on the academic performance outcome of children with ADD/ADHD

- Published in 2010 in Int Journal of Adolescent Medical Health.

Results measured after a 12-week remediation program aimed at increasing the activity of the hypothesized underactive right hemisphere function, yielded significant improvement of greater than two years in grade level in all domains except in mathematical reasoning. The 12-week program included sensory stimulation, motor training, aerobic strength and conditioning, reflex inhibition activities and Synchronized Metronome Treatment. Results are discussed in the context of the concept of functional dysconnectivity in ADD/ADHD children.

Retention Of Primitive Reflexes Is Correlated With Delayed Motor Development

Persistence of primitive reflexes and associated motor problems in healthy preschool children

- Published in 2018 in Archives of Medical Science

This study examined the occurrence of primitive reflexes in typically developing children aged 4-6 years old and analyzed the impact of retained primitive reflexes on psychomotor development. The results showed that retention of primitive reflexes negatively affects psychomotor skills and that the greater the intensity of the retained reflex, the lower the motor efficiency. The researchers recommend routine testing of primitive reflexes in children as well as therapies to facilitate normal integration of reflexes.

Early Motor Development, Including Balance And Coordination And Its Link To Academic And Cognitive Ability

Relationships between motor proficiency and academic performance in mathematics and reading in school-aged children and adolescents: a systematic review

- Published in 2018 in International Journal of Environmental Research and Public Health

This review article evaluated 55 published studies on the associations between motor proficiency and academic performance in math and reading in typically developing school-aged children and adolescents. Significant positive associations were evident between academic performance and components of gross motor proficiency including coordination and agility. Studies also suggest that motor skill interventions in primary school settings may have a positive impact on academic performance in math and/or reading.

Motor skills and exercise capacity are associated with objective measures of cognitive functions and academic performance in preadolescent children

- Published in 2016 in PLOS One

This cross-sectional study in 423 typically developing children at the third-grade level found that gross motor skills, including coordination, are positively correlated with academic performance in math and reading comprehension, as well as with several aspects of cognitive function including sustained attention, spatial working memory, episodic and semantic memory, and processing speed.

The relationship between gross motor skills and academic achievement in children with learning disabilities

- Published in 2011 in Research in Developmental Disabilities

This study found that 7- to 12-year-old children with learning disabilities showed poorer motor skills compared to age-matched typically developing peers. In addition, a relationship was found between gross motor skills and academic performance in reading in children with learning disabilities. These findings suggest the importance of specific interventions facilitating both motor and academic abilities in children with learning disabilities.

Preschool predictors of school-age academic achievement in autism spectrum disorder

- Published in 2017 in Clinical Neuropsychology

This study examined predictors of academic functioning in children with autism spectrum disorder, evaluating them at 2, 4, and 10 years of age. The researchers found that early motor functioning predicted later skills in mathematics, suggesting that interventions targeting motor skills may improve later academic achievement in mathematics in children with autism.

Relations for children in grades 2, 3, and 4 between balance skills and academic achievement

- Published in 1993 in Perceptual and Motor Skills

This study found significant associations between balance skills and academic achievement scores in reading and mathematics in 122 typically developing children in second, third, and fourth grades (7-11 years old). The role of early fine and gross motor development on later motor and cognitive ability Published in 2008 in Human Movement Science This study investigated whether early motor performance (from birth to 4 years old) predicted later cognitive performance of typically developing children once they reached school age (6-11 years old). The results showed a significant predictive relationship for gross motor trajectory and cognitive measures such as working memory and processing speed. The findings add to recent evidence showing a relationship between early motor development and later cognitive function.

The association between the early motor repertoire and language development in term children born after normal pregnancy

- Published in 2017 in Early Human Development

This prospective cohort study showed that the early motor repertoire (including motor optimality score and smooth and fluid movements) at 3 and 5 months of age was associated with better expressive language outcome at 4 and 10 years of age in typically developing children born after normal full-term pregnancy. These findings elaborate on what is known about early motor development in that it is tied not only to development of core cognitive functions but also to development of language.



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