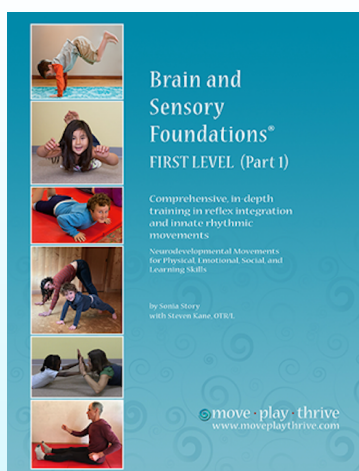


## Boost Learning and Well-Being with Neurodevelopmental Movements



For SPED Homeschooling Families  
Presented by Sonia Story, MS

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### Sonia Story, M.S.

Neurodevelopmental & Integrative Movement Educator

- Extensive training and work with school-age children
- Developer of the Brain and Sensory Foundations® curriculum
- Wrote **Evidence eBook** with supporting research, relevance, and rationale
- Master's Degree in Movement Science



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# What are neurodevelopmental movements?

Crucial for maturity of the brain, body, and sensory systems



***Innate movements of womb and infancy that build the brain, body, and sensory systems***

- Innate rhythmic movements.
- Infant reflexes—primitive and postural.  
*Involuntary movements in response to a sensory stimulus*
- Developmental movements



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## Which babies are lacking in neurodevelopmental movements?

\*Photos from  
Kathleen  
Porter, author  
of *Healthy  
Posture for  
Babies and  
Children*  
[www.kathleenporter.com](http://www.kathleenporter.com)



- Posture
- Core strength
- Balance
- Muscle development
- Sensory development
- Focus
- Speech
- Social-emotional skills
- Learning

All depend on innate infant movements

**Without innate movements, full development cannot take place—**poor focus, sensory discomfort, inability to be still, and anxiety are common.

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## Motor deficits can be carried from infancy onward

Without intervention, most children do not grow out neurodevelopmental deficits  
(Adamović, 2022; Salavati, 2021; Grzywniak, 2016)



Photos from Kathleen Porter, author of *Healthy Posture for Babies and Children* [kathleenporter.com](http://kathleenporter.com)

Out of 120 school children in the UK between the ages of four and five, only three had no signs of motor abnormality (Goddard Blythe, et al., 2022).



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## Why Are Neurodevelopmental Movements Important?

Nearly all of our functioning depends on the neurodevelopmental foundation

Incomplete neurodevelopmental movements are associated with:



- Physical challenges—posture, sensory, motor, pain
- Social-emotional challenges
- Cognitive deficits

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## Are deficits in early motor skills connected to anxiety?

Gross motor performance in infancy and early childhood was predictive of the levels of anxious and depressive symptomatology for children between the ages of 6 to 12 years (Piek et al., 2010).



Human Movement Science  
Volume 29, Issue 5, October 2010, Pages 777-786



### Do motor skills in infancy and early childhood predict anxious and depressive symptomatology at school age?

Jan P. Piek , Nicholas C. Barrett, Leigh M. Smith, Daniela Rigoli, Natalie Gasson

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## Brain and Sensory Foundations®

### Brain and Sensory Foundations, First Level In-Depth Training • Live Support • Bonus Resources



### Help for:

- Anxiety
- Overwhelm
- Sensory Issues
- Balance/Posture/Stamina
- Learning challenges
- Pain relief
- Speech issues
- Sleep
- Focus & Attaining Goals

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## Incomplete neurodevelopmental movements are associated with physical challenges



- **Balance deficits** (Bob et al., 2021; Niklasson, et al., 2017; Wahlberg & Ireland, 2005)
- **Coordination issues** (Gieysztor et al., 2020; Grzywaniak, 2017, Niklasson et al., 2017)
- **Gross motor deficits** (Preedy et al., 2022, Pecuch et al., 2021, Gieysztor et al., 2018)
- **Fine motor deficits** (Brown, 2010)
- **Abnormal walking gait** (Gieysztor et al. 2020)
- **Visual motor skills deficits** (Domingo-Sanz, 2024; Domingo-Sanz, 2022; Andrich et al., 2018; Gonzales et al., 2008, McPhillips et al., 2000)

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## Incomplete neurodevelopmental movements are associated with social-emotional challenges



- **Poor Attention and Opposition/Defiance** (Hickey & Feldhacker, 2022)
- **Weak emotional regulation** (Grzywaniak, 2017)
- **Anxiousness** (Carter, 2020)
- **Severe emotional and behavioral challenges** (Taylor et al., 2020)

*In a study of 120 apparently healthy children (ages 3-8) without neurological disability in Córdoba, Spain, 89.5 % had incomplete neurodevelopmental movements. (León-Bravo et al., 2023).*

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# Incomplete neurodevelopmental movements are associated with cognitive challenges

- **Reading** (Feldhacker et al., 2021; McPhillips & Jordan-Black 2007; McPhillips et al., 2000)
- **Writing** (Richards et al. 2022)
- **Mathematics** (Oliver, 2020)
- **Developmental language disorder** (Matuszkiewicz & Gałkowski, 2021)

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## Success Stories

Parents are “joyfully amazed” as 10-year-old boy makes big gains in academics, social engagement, coordination, and stamina with primitive reflex integration activities.


This little boy – diagnosed with moderately severe ADHD, a receptive language disorder, and obsessive compulsive disorder – struggled with staying calm and getting along with others, as well as poor gross motor skills. In addition, he was testing up to two years below grade level. His mom had tried a range of therapies without much success, and then tried rhythmic movements and primitive reflex integration. See how neurodevelopmental movements helped him make great strides in all of these areas!

Submitted by Beth Dougherty, mom

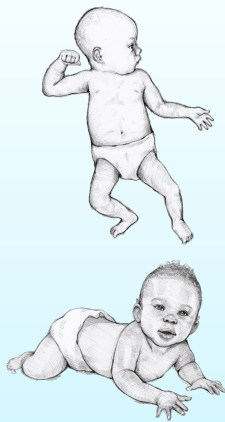


Before	After
History of testing up to two grades behind	Testing at grade level in every area except one
Struggled being calm	Much calmer
Struggled with gross motor skills	Able to catch a ball, has better balance, riding a bicycle
Struggled getting along with others	Joining activities with more awareness of his behavior around others

## From IEP to All As and Bs on report card

 <p>Dismissed from Speech Therapy! Huge Physical &amp; Academic Success</p> <p>Submitted by Jennifer Davis, Mom and COTA/L</p> <ul style="list-style-type: none"> <li>• Medically diagnosed ADHD</li> <li>• Results in 6 months</li> <li>• 5 to 15 minutes per day</li> </ul>	Before	After
	Fearful of going anywhere in public without her mom	Able to visit the restroom on her own
	Struggled with balance, skipping, hopping, and toe walking	Much less clumsy and has stopped running into things around the house; also shows improved gait pattern and stronger heel strikes
	Struggled with writing fluency	Can write multiple paragraphs that are on topic, flow well, and use much more mature language and correct verb tense usage
	Struggled with math	Scored an 'A' on a math test for the first time; also, mental math has improved significantly
	Struggled with focus	Studying on her own without prompting, using much more mature language and vocabulary, and has all A's and B's on her report card
	Required speech therapy since age 3	School speech pathologist says Reagan has met her goals for understanding and using analogies and idioms, Dismissed from speech therapy

## Neurodevelopmental Movements—Key to Wellbeing



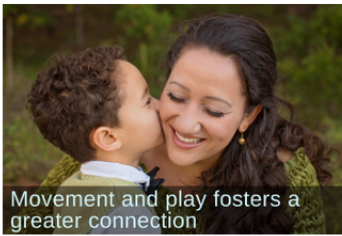
We can use Neurodevelopmental Movements *at any age or stage of life* to boost development and improve:

- Physical abilities
- Social-emotional maturity
- Cognitive function

(Goddard Blythe, 2023; McGlown, 1990).



# Neurodevelopmental movements help mother and son



Movement and play fosters a greater connection

“Doing this with my son was special and helped me feel more connected to him and more playful with him.”

Before	After
Son—Anxiety, especially related to new experiences	More relaxed and connected to his parent; decreased anxiety around new experiences
Son—Auditory processing challenges (difficulty attending to his name and 2-step directions) due to internal distractions)	Improved listening
Son—Working on fine motor skills	Mastered writing his name and has improved drawing; more developed grasp
Mom—Sensitive to loud noises and light; struggled with multiple loud, busy environments or trying to complete a task when son was loud	Multi-sensory environments felt easier and less overwhelming (e.g., large family gatherings and making dinner when son was loud)

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## Key Improvements with Consistent Neurodevelopmental Movements

- Better sleep
- Release fight, flight, and freeze states
- Calming—Anxiety reduction
- Boost mood
- Decrease pain
- Address sensory processing issues
- Emotional regulation
- Bonding
- Focus
- Learning



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# Brain and Sensory Foundations®

## Get the Support You Need for Success

### Brain and Sensory Foundations, First Level

In-Depth Training • Live Support • Bonus Resources



- Online on-demand 24/7
- Phone support
- Email support
- Live Q & A Sessions
- Student support group
- **Roadmap to Reflex integration—Flow Chart**
- Ability to schedule private sessions (additional cost)

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Addressing  
neurodevelopmental  
movements is part of  
many modalities

Works for all ages  
and ability levels



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# Innate Rhythmic Movements reduced unintegrated reflexes and improved reading for school children Only 5 minutes per day, 4 days per week

**Journal of  
Neurology & Experimental Neuroscience**

<https://doi.org/10.17756/jnen.2023-103>

Research Article

Open Access

## Primitive Reflex Integration and Reading Achievement in the Classroom

Tessa M Grigg<sup>1</sup>, Ian Culpan<sup>2</sup>, and Wendy Fox-Turnbull<sup>3</sup>

<sup>1</sup>College of Education Health and Human Development, University of Canterbury

<sup>2</sup>College of Education Health and Human Development, University of Canterbury

<sup>3</sup>Wendy Fox-Turnbull, Division of Education, Waikato University

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### FREE REFLEX INTEGRATION CHART: Possible Long-Term Effects of Unintegrated Infant Reflexes

Possib	Possib	Possib	Possib	Possib	Possible Long-Term Effects of Unintegrated Infant Reflexes
<p><b>Moro Reflex</b> Startle reflex</p>	<p><b>Rooting Reflex</b> Feeding reflex</p>	<p><b>Sucking Reflex</b> Feeding reflex</p>	<p><b>Spinal Neck Reflex</b> Feeding reflex</p>	<p><b>Palmar-Plantar Reflex</b> Feeding reflex</p>	<p><b>Reflexes from the Brain and Sensory Foundations First Level Course</b></p> <p><b>Tonic Labyrinthine Reflex (TLR)</b> Balance and coordination problems Directional problems Reluctant to walk Shaky lower extremities Difficulty judging distances, depth, space and control</p> <p><b>Asymmetrical Tonic Neck Reflex (ATNR)</b> Poor focus Difficulty crossing the midline and working in the middle Poor gross and fine motor skills Difficulty with bilateral coordination</p> <p><b>Symmetrical Tonic Neck Reflex (STNR)</b> Stagnant posture Head sways, especially in open space Poor hand-eye coordination Upper lip is stiff, not difficult to move freely</p> <p><b>Startle Reflex</b> Fear of heights "W" sitting Motion sickness Visual, auditory, auditory difficulties Tendency to be over-sensitive Self-protective</p> <p><b>Rooting Reflex</b> Difficulty looking up and down and Difficulty following through on or Intentional movements Poor core strength</p> <p><b>Sucking Reflex</b> Challenges with handwriting Difficulty crossing space through writing Poor bilateral integration (poor coordination of left and right sides) Motor plan</p> <p><b>Spinal Neck Reflex</b> Difficulty with fine motor skills Difficulty with spatial reasoning and writing Poor gross and fine motor skills Poor to some extent of bilateral integration Back and shoulder tension</p> <p><b>Palmar-Plantar Reflex</b> Visual disorders Head swaying on neck Chronic stress state Difficulty crossing from a childhood</p>

Get the full  
checklist  
here!

### Free Printable Chart

Beautiful drawings of 22 baby reflexes and responses.

Full checklist helps to recognize possible challenges related to neurodevelopmental foundation.

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