

# Primitive Reflex Integration for Concussion — A New Use for an Old Technique

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## Learning Objectives

- Demonstrate intermediate-level knowledge of primitive reflexes and their role in the concussed population
- Demonstrate a functional understanding of vertical integration and the impact disruption can cause
- Provide accurate and effective patient education for rehab purpose and home exercise program instruction
- Effectively perform and interpret results from the Primitive Reflex Screening Tool
- Effectively implement the Primitive Reflex Integration treatment protocol



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## Why Haven't PR Been Promising Before?<sup>35</sup>

- Primitive Reflex use prior in TBI
- Too low-level
  - Palmar, snout, suck, rooting
  - Reflexes utilized only to determine brainstem activity
  - Lack of communication between providers



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## Thank you to our FCOVDs!

- PRs have been used to treat developmental delays in children
  - Cerebral Palsy
  - Behavior disorders- ADD/ADHD
  - Reading and writing difficulties
  - Vision therapy
- Still not WELL understood
  - Population not ONLY concussion!




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## Impact on Visual System

- Individuals with abnormal reflexes but normal acuity have been shown to have difficulties with oculomotor and visual-perceptual skills
  - 80% of our vision comes from the neural pathways including visual processing, eye tracking, accommodation and focusing




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## Relating to Brain Injury

- Using research associated with reflex integration in children and re-emerging reflexes in adults with frontal lobe damage
- Due to changes to the central nervous system rostral to the spinal cord<sup>26</sup>
  - Most common in neuro-degenerative diseases with frontal lobe damage- Parkinson's and Alzheimer's
  - Can occur due to injury, trauma, toxins or stress

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## How we WERE using PRI in our clinic

- Only with people with severe injuries
- People who weren't getting better
- Low tolerance to convergence/divergence
  
- Was cumbersome to screen
- Understanding was poor



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## Disinhibition?

- Student needed in-service idea & I needed info!
- Because of outcomes started screening everyone
  - New treatment paradigm for concussion/mTBI

Ultimately, there is a lot we still don't know!

Our vision therapy visits reduced by 40% after initiating PRI therapy in the protocol.



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## Retrospective Study

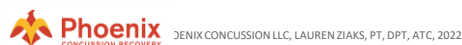
Published study in 2021 – first to introduce concept of Primitive Reflex Disinhibition and Concussion.

*Ziaks L, Brown C, Iversen M. Physical Examination Findings in Patients with Protracted Concussion and the Impact of an Integrative Concussion Rehabilitation Protocol. IJAHSP. 2021; 19(1)*

Retrospective case series of 82 patient who completed 2+ phases of treatment protocol.

2 groups – Group 1 had repeat assessment, Group 2 self d/c prior to repeat assessment

- No significant changes at baseline between groups



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## Comparison data – see article

	Group 1	Group 2	Statistics
Age	23.5	17.5	p = 0.46
Days to eval	21.50	24.50	p = 0.98
Days for integ.	23	28	p = 0.49
3+ reflexes +	32 (94.1%)	46 (95.8%)	p = 1.0
Subj report sig change	23 (79.3%)	37 (82.2%)	p = 0.75
Attended visits	7, 3 following PRI	6.5, 1.5 following	p = 0.46



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## Group 1 Data

Outcome	Group 1	Statistic
PCSS	-21 (IQR -42 to -8)	MCID 6.8
DHI	-27 (IQR -10 to -36)	MDC 17.8, MCID 19
ABC**	8.5 (IQR 1.8-22)	MDC 9
aTBI Vision Questionnaire	16.5	N/A



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Reflexes for Vision & Attention<sup>25,36-38</sup>



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Primitive Reflex	Purpose of Reflex	Appears	Should Integrate By:	Signs of Retention
<b>Moro Reflex</b>	Primitive Fight or Flight Reaction	Birth	2 to 4 Months	Hyper Sensitivity, Hyper Reactivity, Poor Impulse Control, Sensory Overload, Social & Emotional Immaturity
<b>Rooting Reflex</b>	Automatic Response to Turn Towards Food	Birth	3 to 4 Months	Fussing Eating, Thumb Sucking, Dribbling, Speech and Articulation Problems
<b>Palmer Reflex</b>	Automatic Flexing of Fingers to Grab	Birth	5 to 6 Months	Difficulty with Fine Motor Skills, Poor Manual Dexterity, Messy Handwriting
<b>ATNR</b>	To Assist Baby Through Birth Canal and Develop Cross Pattern Movements	Birth	6 Months	Poor Eye-Hand Coordination, Difficulty with Handwriting, Trouble Crossing Vertical Mid-line, Poor Visual Tracking for Reading and Writing
<b>Spinal Gallant Reflex</b>	Assist Baby with Birth Process	Birth	3 to 9 Months	Unilateral or Bilateral Postural Issues, Fidgeting, Bedwetting, Poor Concentration, Poor Short Term Memory
<b>TLR</b>	Basis for Head Management and Postural Stability Using Major Muscle Groups	In Utero	3 1/2 Years	Poor Muscle Tone, Tendency to Walk on Toes, Poor Balance, Motion Sickness, Spatial Orientation Issues
<b>Landau Reflex</b>	Assist with Posture Development	4 to 5 Months	1 Year	Poor Motor Development
<b>STNR</b>	Preparation for Crawling	6 to 9 Months	9 to 11 Months	Tendency to Slump While Sitting, Poor Muscle Tone, Poor Eye-Hand Coordination, Inability to Sit Still and Concentrate

Brain Balance Achievement Centers<sup>39</sup>



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Functional Understanding

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- Moro:
  - Motion sickness, clumsy kid – poor balance/coordination – frequently stubs toes etc. Mood swings and distractible.
- Galant:
  - Postural difficulties, attention deficits, sitting still in class, associated with bedwetting
- STNR:
  - Muscle tension – neck pain, stiffness. Kids who can't sit still in class, constantly moving/rocking or fidgeting.

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## ATNR and TLR<sup>40</sup>

### ATNR & TLR

#### Hinder functional activities

- Rolling, hands to midline, hands to mouth (exploring!)
- 50% kids with ATNR dx or display sx of dyslexia\*\*

#### Can → structural deformity:

- ATNR and scoliosis
- Both – subluxation of femoral head – dislocation – seen functionally as W sit?

### ATNR

Limited in more mature motor mvts – crossing midline (kick ball across body to opp side), coordination, eye tracking and hand-eye coordination

Discrepancy with oral and written performance

Conflict with reading and writing abilities if present >6-7months\*\*



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## Moro Reflex

- Primitive flight or fight reaction
- Automatic reaction to a sudden change in sensory stimulation
- Present from birth to 2-4 months
- Often a precursor to inhibiting other primitive reflexes



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## Moro Reflex: Signs of Retention



Poor balance and coordination



Difficulty with vision, reading or writing



Easily fatigued



Sensory overload / Hypersensitivity



Mood regulation:

Hyper-activity, Poor impulse control, Social and emotional immaturity



Difficulty sleeping

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## Asymmetrical Tonic Neck Reflex (ATNR)

Assists the baby through the birth canal and develop cross pattern movements

Activated when baby's head is turned to one side and arms and leg on that side will extend while the opposite limbs bend

Present birth to 6 months



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## ATNR: Signs of Retention

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Poor concentration

Balance deficits

Difficulty crossing vertical midline

Visual tracking issues

Difficulty with hand-eye coordination

Messy handwriting – inconsistent handwriting or changes

Poor sense of direction



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## Symmetrical Tonic Neck Reflex (STNR)

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Preparation for crawling

While in prone head is flexed- arms bend and legs extend; while supine head is extended arms straighten, and legs bend

Present briefly at birth and then reappears at 6-11 months



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## STNR: Signs of Retention

- Headaches related to increased muscle tension
- Poor hand-eye coordination
- Difficulty/inability to sit still and concentrate
- Vision disorders
- Slumping, poor posture
- W sitting



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## Tonic Labyrinthine Reflex (TLR)

Assists with head management, rolling over, crawling, creeping, standing and walking

Initiates in supine when head is flexed and legs flex and arms flex into "fetal position"

Initiates in prone when head is extended, and arms and legs extend into "superman position."

In utero, reemerges interm over 3-5 years



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## TLR: Signs of Retention

- Difficulty with balance
- Visual deficits with tracking and convergence
- Visual perceptual difficulty
- Motion sickness
- Poor sequencing
- Poor sense of time
- Decreased muscle tone
- Toe walking



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## Spinal Galant Reflex

Assists in the birthing process, crawling and creeping

Hip rotation when back is touched on either side of the spine

Present Birth to 3-9months



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## Spinal Galant Reflex: Signs of Retention

- Poor concentration
- Poor short-term memory
- Fatigue
- Fidgeting/ inability to sit still
- Sensitivity to clothing touching the skin
- Unilateral or bilateral posture issues
- Bedwetting
- Irritable Bowel Syndrome



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Questions?

Thank you!  
Remember to complete all parts of the  
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