Brewer JF, Crumley JP, Fannon SK, Offringa AO, Womble EA. THE EFFECT OF NEUROSENSORIMOTOR REFLEX INTEGRATION IN PEDIATRIC TOE-WALKING ON SENSORY PROCESSING, FOOT POSTURE, COORDINATION, BALANCE, AND GAIT. Hardin-Simmons University Department of Physical Therapy.

PURPOSE: The purpose of this study was to determine if reflex integration is an effective method for improving sensory integration, foot posture, coordination, postural control, balance, and gait in toe-walkers.

SUBJECTS: Ten-year-old fraternal twins, n=2, (F=1, M=1) with idiopathic and congenital (cerebral palsy) toe-walking.

METHODS: Parents and subjects signed a consent form. The 8-week training program consisted of week 1 baseline (3 trials), 6 weeks of Masgutova Neurosensorimotor Reflex Integration® (MNRI) intervention (8 trainings, 2 assessments, daily home program of 6 exercises), and week 8 post-test data collection. Retest baseline data collection for the carry over effect occurred 2 weeks post-test. Baselines consisted of Sensory Processing Measure (home and school versions), Bruininks-Oseretsky Test of Motor Proficiency 2nd edition, 2 Minute-Walk-Test (2MWT), Observational Gait Scale (OGS), Foot Posture Index 6th edition (FPI-6), and Biodex Biosway® limits of stability in dynamic standing balance. Six developmental reflexes [spinal galant, spinal perez, symmetrical tonic neck reflex (STNR), asymmetrical tonic neck reflex (ATNR), crossed leg extension, and Babinski] were tested to determine if the reflex was present (age-appropriate), developed and functional, and integrated with sensorimotor functions and skills used in movement, physical development, and learning. A two-band standard deviation method of analysis was used to determine statistically significant changes.

RESULTS: Data from idiopathic subject was not included due to a lack of pre-post primitive reflexes elicitations. Prior to MNRI, congenital subject demonstrated spinal galant, spinal perez, STNR, and Babinski reflexes. After MNRI, statistical significance occurred in 2MWT distance/speed (*Pre-M=558, Post-M=614, SD=5.74*), reflex presentation (*Pre-M=11.5, Post-M=9.5, SD=0.71*), OGS (*Pre-M*=11.67, *Post-M*=14, *SD=0.94*) with increase initial heel contact and decrease in timing and frequency of early heel rise, and BOT (*Pre-M=4, Post-M=16, SD=1.41)*. Clinical importance was seen with decrease FPI-6 (*Pre-M*=7, *Post-M*=4), depicting a change from a pronated foot position to a more neutral position.

CONCLUSION: Our findings suggest the MNRI treatment method may clinically improve reflex integration, foot posture, gait (distance, speed, and heel-contact), and balance with a congenital toe-walker. However, further research with more subjects, prolonged treatment time, and strict adherence to the home program would be necessary to denote any further statistical significance of the MNRI method on pediatric toe-walking.

CLINICAL RELEVANCE: In idiopathic and congenital pediatric toe-walking, there appears to be dysfunction of developmental reflex integration that may result in motor function and sensory processing deficits that may impact foot posture, balance, and gait.

By utilizing neurosensorimotor reflex integration techniques, progressing reflexes to the appropriate functional level may lead to improved motor and sensory functioning.