Article

Can Replicating Primary Reflex Movements Improve Reading Ability?

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Abstract

Background: Poorly integrated and inhibited primitive reflexes can impact an individual's visual development, balance system and academic performance, most notably in the area of reading. Children diagnosed with reading learning disabilities were assessed in the areas of oculomotilities, tonic reflexes, balance and fine motor. They were also given a headache questionnaire. Students participated in a movement program designed to decrease the amount of primitive reflex present, improve the balance and visual systems and reading ability.

Method: The study evaluated 22 students, ages 7 to 11, who were previously diagnosed with reading learning disabilities. All students were given a treatment program of repetition of primary reflex movements during one academic year.

Results: Students showed a marked decrease in the presence of primitive reflexes, improved balance and oculomotilities, a decrease in headaches and improved reading fluency.

Conclusion: The study showed that students diagnosed with a reading disability may have persistent primitive reflexes, balance and oculomotor dysfunctions. A movement program can improve these dysfunctions and increase reading fluency.

Keywords

primitive reflex, oculomotilities, balance, fine motor, reading learning disability

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Introduction

Neurodevelopmental/reflex delay is a concern for professionals that work with children. Primitive or primary reflexes are reflexes present at birth and become suppressed and integrated within the first year of life. Persistence of these reflexes is considered a neurodevelopmental/reflex delay. This primary reflex system was initially evaluated as part of the developmental assessment. The role of this reflex system became an interest for clinicians working with children with cerebral palsy and later those who worked with children with learning difficulties.

The primary reflexes are assessed during an infant neurological examination. The reflexes disappear with neurological and physical maturation. They become suppressed as higher cortical levels develop.[1] Fishman[2] calls the reflexes, developmental reflexes, and persistence often indicates neurological dysfunction. Goddard[2] feels that persistence of the reflexes beyond 6-12 months suggests immaturity of the central nervous system and may prevent development of postural reflexes. She suggests specifically that persistent asymmetrical tonic neck reflex, ATNR, would contribute to poor pursuit eye movements and that the tonic labyrinthine reflex would play a role in difficulties with the visual perceptual system. Morrison[3] believes the presence of these reflexes would be a factor in perceptual processing problems that are the basis for learning disabilities.

Assessment of tonic reflexes was made as early as 1926 and treatment began to evolve in 1943.[4] The initial treatment was focused on children with cerebral palsy.[5]

The consequences of persistent primary reflexes has been investigated in children with specific reading difficulties by McPhillips.[6] He assessed reading, spelling, a primary reflex with the asymmetric tonic neck

reflex (ATNR), eye tracking with the Ober 2, and two phonological tests. The treatment consisted of the repetition of primary reflex movements. The children were assigned a specific movement sequence to be repeated at home 10 minutes a day. They were evaluated every two months for a period of 12 months. The experimental group showed a significant decrease in the level of persistent primary reflex, a greater increase in reading scores, and a significant decrease in saccadic frequency. Morrison[7] evaluated the ATNR in 19 learning disabled children. He found the persistence of the reflex equal to a mentally retarded sample and present more frequently than in a developmentally normal sample. Assessment of primary reflexes has also become a part of visual development evaluations.[8,9]

Methods

We evaluated 22 subjects diagnosed with a learning disability in reading to determine if primary reflexes were still present. Ten of the subjects were serviced in a self contained special educational classroom, and 12 of the subjects were in a regular education setting. The 22 subjects varied in age from 7 to 11. The learning disability in reading was defined as reading more than one year below grade level. The self contained classroom was for children that were classified as needing special educational services on a continuous basis throughout the entire school day. Both groups of students received reading intervention based on their individuals needs. Each group received the same amount of reading intervention. The regular education reading learning disabled group received pull out services and the self contained reading learning disabled group received classroom intervention.

The assessment included two tests of balance, three tonic reflexes, two oculomotor tests, two fine motor tests and a headache questionnaire. The balance tests were the Tandem and the Fog walks. The reflexes included the asymmetrical tonic neck reflex tested in the quadruped position (ATNRAT) (the Ayres Test), asymmetrical tonic neck reflex standing position (ATNRSCH) (the Schilder's Test), symmetrical tonic neck reflex tested in the quadruped position (STNR), and tonic labyrinthine reflex (TLR). The oculomotor tests were nearpoint of convergence (NPC) and pursuit eye movements. The fine motor tests were the Tansley and Bender. Nearpoint of convergence was tested using a difference score between the point at which a target split as it approached the bridge of the nose and the point at which at was perceived as one or was clear as it was drawn away from the bridge of the nose. All the other tests administered were scored based upon a 5-point Likert Scale with a score of 0 indicating no abnormality and a score of 4 indicating the highest degree of abnormality. Upon completion of the test battery, all students were given a treatment regime, there was no control group. The treatment consisted of the repetition of primary reflex movements practiced five to 10 minutes a day five times a week during the school day that took place over the course of one academic school year.

Results

The treatment was completed in approximately nine months and the same battery of tests was repeated. The results are shown in Table 1.

Table 1.
Means and Standard Deviations
Matched Sample Experimental Subjects

Individual Differences	Fall Scores		Spring Scores		Level of Significance
	M	SD	M	SD	Sig. (2-tailed)
Tandem	1.91	0.87	0.66	0.85	.000
Fog	1.73	0.59	0.55	0.65	.000
ATNRAT	2.84	0.71	1.10	0.83	.000
ATNRSCH	2.66	0.57	1.18	0.82	.000
STNR	1.68	0.78	0.41	0.67	.000
TLR	2.00	0.82	1.05	0.67	.000
Pursuit	2.66	0.50	1.34	0.70	.000
NPC	7.73	5.82	3.10	1.48	.000
Tansley	1.41	0.90	0.82	0.84	.000
Bender	2.00	0.98	1.43	1.00	.001
Headache	3.05	1.09	0.77	1.07	.000

The t-test was used to show the comparison between the performance in the fall and spring. Using this measure, improvement in everyone of the tests was found to be statistically significant at the .05 level.

We were also able to obtain fluency scores for the 12 regular education reading learning disability students and compare them to a control group. Both groups were in the same school, in a regular educational setting, and diagnosed with a reading disability. The fluency test given was a school wide reading inventory that assessed student's words per minute. It is given in the fall, winter and spring by each classroom teacher. The teachers had no knowledge of which students were in the study. Subjects were matched based on having a reading learning disability diagnosis, grade, age and fall pretreatment fluency scores. The 12 control students did not receive our treatment regiment, but did receive the same special education pull out reading remediation services as the experimental group. Table 2 shows the results of the test scores. A paired sample T-Test was conducted to ascertain if the differences in fluency scores on the tests administered by the school during the course of the academic year (fall, winter and spring) were

statistically significantly different between the two groups. The fluency scores are listed as mean difference scores between the two groups respectively. The experimental group began treatment with a fluency score that was 12.40 words per minute more than the control, which is why it is a negative number. It was however not found to be statistically significantly. The scores listed represent the difference in fluency scores during three testing periods throughout the year. The "difference" score represents the difference between the scores in the fall and the final post treatment scores obtained in the spring. The experimental participants were higher than the controls on each testing occasion which is reflected in the negative mean difference score.

Table 2.
Mean Difference in Fluency Scores
Matched Sample Experimental Subjects

Individual Differences	Matched difference		Level of Significance
Reading Fluency:	M	SD	Sig. (2-tailed)
Fall	-12.40	29.30	.138
Winter	-25.70	27.44	.016
Spring	-34.20	26.63	.003
Difference Score	-22.00	21.78	.011

Discussion

Although the study did not have a control group for the test battery, the improvement in the scores in of all of the tests was significant following treatment. The use of the treatment also showed an increase of 22 words per minute when compared to a control group for reading fluency. This data suggests continued work with this test battery and treatment regiment to improve reading ability is warranted.

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