

Relationship of Retained Primitive Reflexes and Handwriting Difficulty in Elementary-Age Children

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PURPOSE: Primary school children are often referred to Occupational Therapy for handwriting difficulties. Handwriting training programs improve handwriting, but many continue to struggle with handwriting legibility and speed (Case-Smith, 2002). As handwriting is the primary method used to demonstrate abilities and knowledge in specific academic content areas (Case-Smith, 2002), poor or slow handwriting can be detrimental to school-based performance and result in academic failure, poor self-esteem, and limit participation in school-based activities (Case-Smith et al., 2011). Retained primitive reflexes may be one factor affecting handwriting that is not typically addressed. The typical integration of primitive reflexes allow the development of coordinated voluntary movement and mature postural reflexes. Primitive reflex retention has been found to be significantly associated with various problems, including gross motor deficits, lack of fine motor coordination, visual-perceptual deficits, behavior problems, and poor reading performance (McPhillips & Jordan-Black, 2007). If such reflex retention is found to be related to poor handwriting, adding reflex integration intervention to handwriting training may be more effective for these children than handwriting training alone. The purpose of this study is to determine if poor handwriting in early primary school children is related to primitive reflex retention.

DESIGN: A cross-sectional, observational cohort study.

METHOD: Seventy-four children, aged 7-9 years without diagnosed developmental delay or cognitive impairment, brain injury, or uncorrected known visual impairment, completed the Evaluation Tool of Children's Handwriting (ETCH), and the College of Optometrists in Vision Development Quality of Life Outcome Assessment (COVD-QOL). The asymmetrical tonic neck reflex (ATNR), symmetrical tonic neck reflex (STNR) and tonic labyrinthine reflex (TLR) were performed per Goddard (2002) and scored 0-3 (0 = no reflex elicited). A score of >1 in at least one reflex indicated reflex retention. Handwriting deficit was indicated by ETCH a score of .75 for word legibility and .76 for letter legibility on the ETCH, and a score of >19 indicates visual concerns on the COVD-QOL.

RESULTS: A total of 41 students showed difficulty with word or letter legibility or both, 29 had vision problems, and 35 demonstrated retained reflexes. A Chi-Square test indicated that those children with retained primitive reflexes were more likely to also have below typical word and letter legibility scores (word legibility: $\chi^2(df = 2, N = 74) = 36.52, p < .000001$; letter legibility: $\chi^2(df = 2, N = 74) = 39.95, p < .000001$). The significant multiple linear regression with both COVD-QOL and retained primitive reflexes as predictor variables and letter legibility as the dependent variable accounted for 60% of the variance, but only the primitive reflex B-coefficient was significant ($B = -.678, p < .05$), indicating that for every 1 point reflex score increase, the letter legibility score decreased by .68. Similar results were found with word legibility ($R\text{-square} = .593$; reflex B = $-.732, p < .05$).

CONCLUSION: Primitive reflex retention was related to difficulties in handwriting. This suggests that some children with poor handwriting may benefit from reflex integration intervention to foster good handwriting. However, reflex integration should not be provided alone, instead being added to an occupation-based intervention, such as typical handwriting instruction. As these findings were only obtained in one school district, findings require replication in a larger sample. If replicated, such results argue for testing the efficacy of paired reflex integration and handwriting interventions.

References

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