YOUR DYSLEXIC CHILD

THE IMPACT OF NUTRITION, EXERCISE, AND OTHER HEALTH MEASURES ON READING SUCCESS

BY GEORGIE NORMAND, M.A.

Since dyslexia is neurobiological in origin and brain differences can be seen on MRIs as early as infancy, many parents wonder if there is any way to improve intervention outcomes through nutrition or other health related measures. In addition to structural brain differences, dyslexia is characterized by reduced plasticity and connectivity in the brain, all of which come together to make learning to read difficult.

These differences are not related to IQ and children with dyslexia may even score in the high IQ range while struggling to become proficient in reading. We know that early screening and evidence-based dyslexia interventions are critical for both preventing and remediating reading failure, but can other measures help to accelerate a child's progress in reading?

NUTRITION AND THE BRAIN

Even though the role of nutrition in dyslexia is an emerging science, from studies that already exist about nutrition and the brain, we can conclude that good nutrition can only help in dyslexia, as it helps with so many other aspects of overall health. The results from studies on nutrition and the aging brain present promising data on the link between nutrition and a wide range of brain functionalities. It is already well established that diet and nutrition play an important role in structural brain plasticity, the development of gray matter volume, and the maintenance of white matter integrity.

Much has been said about omega-3 supplementation for dyslexia. Even though recent evidence suggests there is a connection between defects in highly unsaturated fatty acid metabolism and neurodevelopmental disorders, when supplementation has been studied, evidence supporting it has been limited. More studies are needed before it can be recommended as beneficial for dyslexia.

Dyslexia frequently co-occurs with attention-deficit/hyperactivity disorder (ADHD), and problems with executive function are com-

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mon in both dyslexia and ADHD. A deficit in executive function impacts reading acquisition because it is involved in both self-regulation in behavior and in managing complex higher order cognitive processes like learning to read. A major study on nutrients necessary for executive function development and related brain connectivity identified specific nutrients and micronutrients that are associated with executive function development, but stopped short of recommending specific supplementation. In fact, the findings from supplementation studies tend to be very inconsistent and many of these nutrients are already contained in a normal healthy diet.

However, a study of diet in ADHD did find that those eating less fruits and vegetables were likely to have more severe symptoms of inattention. Learning to read requires focus. If your child has both ADHD and dyslexia, adding more fruits and vegetables to the diet may enhance the progress made during intervention.

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Anecdotally, and not surprisingly, students who are tutored after school (when they are generally tired and hungry) perform much better when they eat a non-sugary healthy snack right before the tutoring session. This may also help them to better retain what they learn in each session, an important consideration, since learning retention related to reading instruction is an ongoing challenge in dyslexia. So, even in the short term, good nutrition contributes to learning. This is a small step every parent can take to ensure that their child gets the most out of each tutoring session. This is supported by many studies on the relationship between nutrition and learning.

EXERCISE CAN MAKE A DIFFERENCE

Physical exercise increases brain function throughout life, and there are strong correlations between physical activity and academic achievement in school age children. This is especially true of aerobic exercise which positively impacts attention, processing speed, as well as executive and memory function – some of the most important baseline components for fluent reading.

Exercise also specifically targets one of the greatest barriers to retaining what has been learned during reading instruction – reduced neuroplasticity. Because of this feature of dyslexia, most dyslexic students require a repeated cycle of learning and relearning the same reading instruction content before it can be retained. For the best cognitive improvement, regular moderate-intensity exercise, rather than high or low-intensity exercise is recommended.

DYSLEXIA-RELATED ANXIETY AND DEPRESSION... IT'S REAL

Many dyslexic students struggle with anxiety and depression as they fall behind their peers in reading. They may lose ground in other academic areas as well, because reading is the basis for achievement in all academic subjects. Just learning the truth that their struggle is not related to intelligence, but represents a difference in the way they learn, helps many dyslexic children to overcome their low self-esteem. Their dyslexia may be accompanied by dysgraphia (difficulty with handwriting and writing skills) and dyscalculia (difficulty in grasping math concepts). Until their reading improves, they will especially struggle with word problems in math. These multiple challenges can create an avalanche of anxiety for the child, that leaves them in an overwhelmed state at the start of every new school day, and as they approach every new homework assignment.

Dyslexia-related depression and anxiety can be prevented with early screening and early evidence-based reading intervention. Many states are mandating early dyslexia screening in kinder-

garten, but parents should vigilantly watch their child's response to early reading instruction even in PreK. Dyslexia shows up very early in classroom instruction. Are they having trouble learning their letter names and sounds? Do they find it hard to blend several sounds together to make a word? Do they have an awkward pencil grip? Is there a family history of reading problems? Did the child experience early language delay? These are some of the early risk factors and signs that should trigger an immediate response from both the parent and the teacher.

Parents need to aggressively advocate for their child at school, at the very first sign of reading difficulty, and insist that there be no delay in testing and putting an IEP in place. They should not be persuaded to "wait and see" because this morphs into "wait to fail." The wait to fail approach is behind most of the depression and anxiety seen in dyslexic students. For parents with older struggling readers, it's never too late to advocate for your child.

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It's also important to help dyslexic children and teens identify, focus on, and develop their strengths and talents – especially while they are working on their reading proficiency. They need encouragement to pursue activities that will bring them the recognition and sense of achievement that every child needs. There are also many digital learning tools available that can be harnessed to keep learning stress-free.

WHAT ABOUT VISION THERAPY?

One of the more controversial topics in dyslexia treatment is the use of vision therapy (VT). VT has been the subject of many studies to evaluate its impact on dyslexia. While it's important to rule out vision problems early in a child's life, VT for dyslexia has not been supported by the research.

Interestingly, a study that appeared in a 2018 issue of JAMA Ophthalmology found that visual deficits like ocular motor tracking and vergence impairment are far more prevalent in school-age dyslexic children compared to children without dyslexia. But at this time, there are no studies that have found that using VT to address these deficits can remediate dyslexia. In fact, several randomized, controlled double-blind studies did not show that treatment consisting of repetitive ocular motor tasks do anything to improve learning disabilities, reading, dyslexia or ADHD.

By contrast, evidence-based reading intervention by itself has produced a long history of success for dyslexic students. Could it be that the intensity and visual focus required in dyslexia-related reading interventions indirectly address visual deficits, as well as, the phonological and fluency deficits in dyslexia? Certainly, more research is needed to answer this and other questions about visual deficits in dyslexia.

The American Academy of Pediatrics and the American Academy of Ophthalmology, along with several other related medical associations, issued a joint statement on vision therapy and dyslexia. According to their statement, scientific evidence does not support vision therapy as a treatment for dyslexia.

Multiple appropriately controlled studies have found that although convergence training reduces problems with binocular vision and fusion, these improvements do not lead to improved reading skills. The same is true for the use of colored lens or overlays, changes in font, and "brain training." According to the results and implications of one major study released in 2022, "there is little evidence that interventions that do not involve actual instruction in reading generalize to improve reading skills."

DYSLEXIA RESEARCH CONTINUES...

Although we've learned so much about dyslexia, there is still work to be done. Dyslexia is finally getting the attention it deserves in terms of research funding, legislation, and teacher training. In addition to evidence-based reading interventions, new research will continue to shed light on how health and nutrition can contribute to the formula for success. •

References

Al Dahhan, N.Z., Halverson, K., Peek, C.P., Wilmot, D., D'Mello, A., Romeo, R.R., Meegoda, O., Imhof, A., Wade, K., Sridhar, A., Falke, E., Centanni, T.M., Gabrieli, J.D.E., & Christodoulou, J.A. (2022). Dissociating executive function and ADHD influences on reading ability in children with dyslexia. Cortex, 153, 126-142.

Chaire, A., Becke, A., & Düzel, E. (2020). Effects of physical exercise on working memory and attention-related neural oscillations. Frontiers in Neuroscience, 14, Article 239.

Costello, S.E., Geiser, E., & Schneider, N. (2021). Nutrients for executive function development and related brain connectivity in school-aged children. Nutrition Reviews, 79(12), 1293-1306.

Fletcher, J.M., Lyon, G.R., Fuchs, L.S., & Barnes, M.A. (2019). Learning disabilities: From identification to intervention. NY: Guildford Publications.

Joint Statement: Learning disabilities, dyslexia, and vision. Reaffirmed 2014. https://www.aao.org/clinical-statement/joint-statement-learning-disabilities-dyslexia-vis

June 2022: Results and implications of the convergence insufficiency treatment trial – Attention and reading trial. Summary by Jack M. Fletcher, Ph.D. Texas Center for Learning Disabilities. https://texas-ldcenter.org/education-research-matters/item/june-2022

Lin, T. W., Tsai, S. F., & Kuo, Y. M. (2018). Physical Exercise Enhances Neuroplasticity and Delays Alzheimer's Disease. Brain plasticity (Amsterdam, Netherlands), 4(1), 95–110. https://doi.org/10.3233/BPL-180073.

Livingston, E.M., Siegel, L.S., & Ribary, U. (2018). Developmental dyslexia: Emotional impact and consequences. Australian Journal of Learning Disabilities, 23(2). 107-135.

Moreau, D. (2022, April). How malleable are cognitive abilities? A critical perspective on popular brief interventions. American Psychologist, 77(3), 409-423.

NIH-Funded study finds dyslexia not tied to IQ. (2011). https://www.nih.gov/news-events/news-releases/nih-funded-study-finds-dyslexia-not-tied-iq

Raghuram, A., Gowrisankaran, S., Swanson, E., Zurakowski, D., Hunter, D.G., & Waber, D.P. (2018). Frequency of visual deficits in children with developmental dyslexia. JAMA Ophthalmology. 136(10), 1089-1095.

Robinette, L.M., Hatsu, I.E., Johnstone, J.M., Tost, G., Bruton, A.M., Leung, B.M.Y., Odei, J.B., Orchard, T., Gracious, B.L., & Arnold, L.E. (2022). Fruit and vegetable intake is inversely associated with severity of inattention in a pediatric population with ADHD symptoms: the MADDY Study. Nutritional Neuroscience. https://doi.org/10.1080/1028415X.2022.2071805

Rucker, J.C., & Phillips, P.H. (2018). Efferent vision therapy. Journal of Neuro-Ophthalmology, 38(2), 230-236.

Talukdar, T., Zamroziewicz, M.K., & Zwilling, C.E. (2019). Nutrient biomarkers shape individual differences in functional brain connectivity: Evidence from omega-3 PUFAs. Human Brain Mapping, 40, 1887-1897.

Zelcer, M., & Goldman, R.D. (2015). Omega-3 and dyslexia: Uncertain connection. Child Health Update. Canadian Family Physician, 61.

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