Ocular nutrition for a digital generation

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Emily Warrender June 13, 2025

Figure 1: Ocular nutrients, including carotenoids, healthy fats, antioxidant vitamins and minerals can be found in leafy greens, bell peppers, citrus, nuts, and wild salmon.

Effective nutritional solutions to support healthy vision in children affected by Computer Vision Syndrome (CVS). Discover how healthcare professionals and policymakers can promote eye health and reduce the impact of screen time on kids

The increasing prevalence of Computer Vision Syndrome (CVS)

Children are immersed in hours of digital screen time daily through social media, gaming, and education. Optometrist and independent researcher Dr Milton Hom reflects, “I think most practising eye doctors would agree that digital device overuse in kids is not good.” More than half of school- aged children experience symptoms of Computer Vision Syndrome (CVS) [1]. Symptoms include eye strain, blurred vision, dry eyes, headaches, and neck or shoulder pain, often resulting from extended exposure to computers, tablets, e-readers, and smartphones [2].

A study of secondary school students showed that just two hours of daily screen time triggered symptoms of CVS [3]. While the American Academy of Pediatrics suggests limiting screen time to two hours daily, adolescents and teenagers exceed this limit by around three to four times [4, 5, 6, 7].

Dr Hom observes, “The resulting myopic progression, dry eyes, and discomfort are more common than you think,” raising broader concerns about the impact on sleep, learning, and mental health.

Managing CVS involves regular eye exams and educating patients and parents on prevention and care. Healthy habits like taking screen breaks and outdoor activity can reduce symptoms. Ergonomic screen practices minimize eye strain and promote long-term eye health. Corrective lenses or anti-reflective coatings may also be recommended [2].

The role of nutrition in managing CVS

Maintaining ocular health through nutrition, including vitamins, antioxidants, and essential minerals, is specifically beneficial for the eyes [5]. Dr Jeffry D. Gerson, O.D. highlights the critical role of ocular nutrition in supporting pediatric ocular health, stating, “As an optometrist who prioritizes ocular nutrition, and a parent of a teenager, I believe it’s crucial to focus on strategies that include dietary interventions that protect and improve visual health in younger patients.”

Children’s visual development is affected by the shift to processed foods high in sugar and unhealthy fats but low in nutrients. Nutritional deficiencies are linked to conditions like myopia, dry eye syndrome, and optic neuropathy [8, 9, 10, 11]. In contrast, nutrient-rich diets including vitamin A, omega-3s, vitamin C, zinc, lutein, zeaxanthin, and astaxanthin help support the retina, maintain the optic nerve, and enhance antioxidant capacity (Figure 1) [12].

AstaReal® Astaxanthin to bridge nutritional gap

A recent study on AstaReal® Astaxanthin, an antioxidant carotenoid shown to reduce CVS symptoms in adults, reveals it can also help with eye strain in school- aged children [13]. Unlike beta-carotene and lutein, which are easily obtained from fruits and vegetables, astaxanthin is harder to get through diet. To consume the recommended 4mg daily dose,

which has been shown to reduce CVS symptoms in children, 85lbs of wild sockeye salmon are needed annually. By comparison, the average American eats only 2lbs of salmon per year, highlighting a significant dietary gap [13, 14, 15].

Astaxanthin from *Haematococcus pluvialis,* a freshwater microalga, offers an effective, vegetarian solution to bridge this gap. Astaxanthin is naturally produced by these algae to combat the oxidative stress from sunlight exposure. Supplementation with algal astaxanthin offers ocular benefits by quenching free radicals, supporting mitochondrial health, and enhancing both resilience to eye strain and visual performance during digital device use.

A study on children aged 10-14 supplementing with 4mg/day of AstaReal® Astaxanthin showed reduced CVS symptoms. After 12 weeks, chronic symptoms dropped by 20%, and acute symptoms triggered by 60 minutes of gaming decreased by 57% compared to placebo. Stereovision, an objective measure of visual function, improved by 12% in the astaxanthin group. Tear production also improved significantly at six and 12 weeks compared to baseline, with no changes in the placebo group (Figure 2) [13].

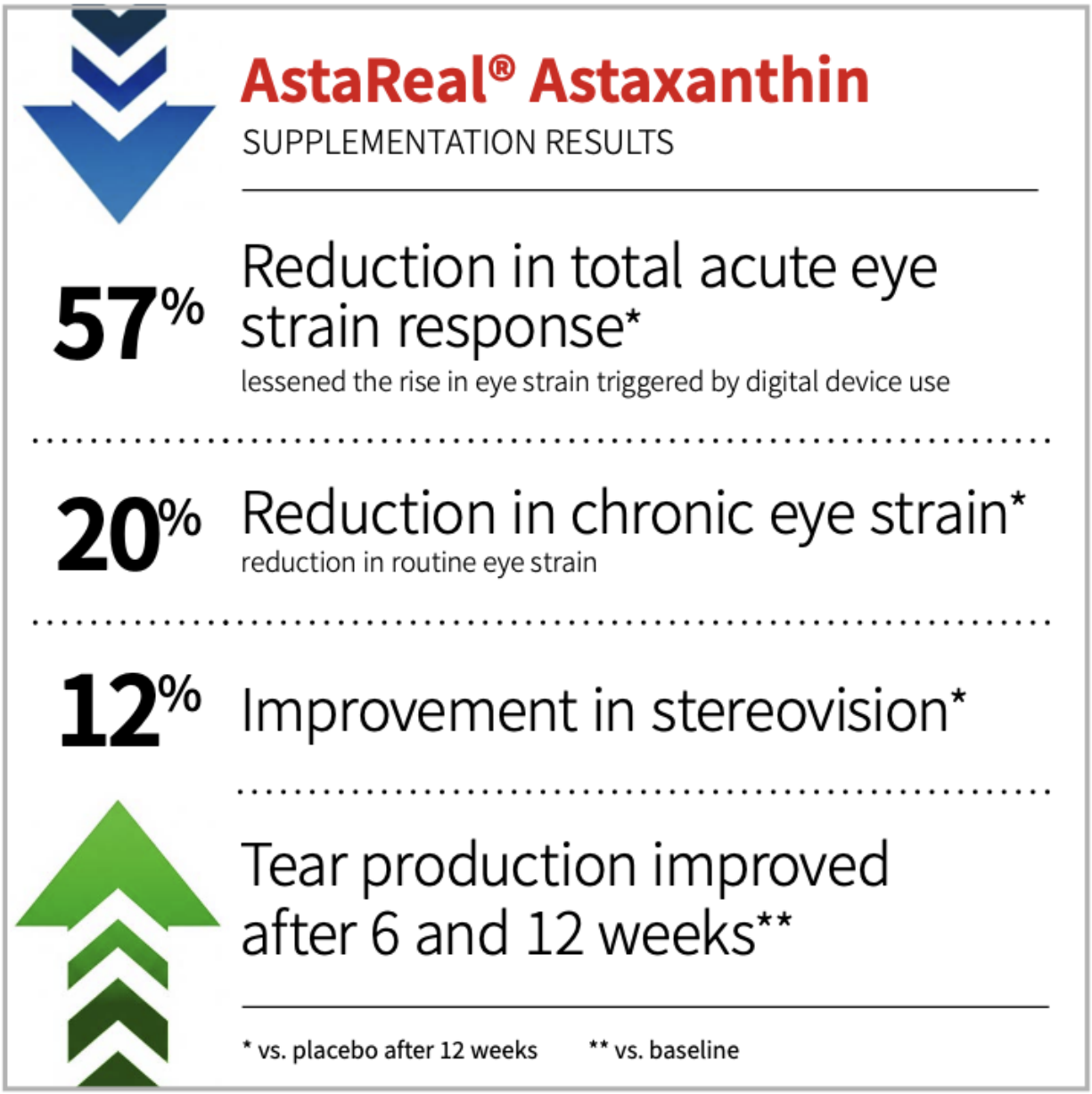

Figure 2: Key findings from astaxanthin (AstaReal®) intervention study on CVS in children.

The increasing importance of ocular nutrition

As our understanding of CVS's impacts on children evolves, so will the solutions from healthcare providers and policymakers. Tools like the FDA's Reference Daily Intakes (RDIs) raise awareness and guide choices for ocular nutrition. It's been suggested that the evidence for lutein's role in eye health is strong enough to establish an RDI value [17]. RDIs for ocular nutrients cover only vitamins A, C, and zinc, excluding omega-3s, lutein, zeaxanthin, and astaxanthin.

Global regulations reflect astaxanthin's versatility and safety. In the US, algal astaxanthin is approved for continuous supplementation at 12mg/day. Canada and Brazil approve claims related to eye strain and antioxidant support at 6mg/ day. The EU approves astaxanthin as a food supplement at 8mg/day for adults, 2.3 mg/day for children aged 3+, and 5.7mg/day for adolescents. India allows 2-12mg/day, Australia 6mg, and China 12mg. Japan has no daily limit, allowing claims for skin and eye health.

With the rise of CVS in children, reducing screen time and improving ergonomics are important. Key nutrients like vitamin A, omega-3s, lutein, and astaxanthin also support eye health. Astaxanthin, already known for easing CVS symptoms in adults, is now shown to help children too. Prioritizing these nutrients and clear dietary guidelines are essential to protect vision in today's digital age.

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