Trinkets of fact or fiction

BY NISHANT AGGARWAL

Trinkets of adult wisdom are often delivered to children alongside warnings of catastrophic outcomes. In this article we present five 'facts' about eye health and vision and ask the question: to what extent are these ideas backed up by literature?

Eat more carrots

During wartime, the UK Ministry of Food released propaganda suggesting that British pilots had excellent vision due to their excessive carrot consumption. This campaign aimed to encourage Britons to eat more locally-sourced carrots but also may have had an undercover military aim – to convince Germans that pilots were reliant on carrots instead of their newly adopted radar technology to aid their nighttime vision. Although the intentions of this campaign are debated, the outcome remains that carrots are popularly believed to improve eyesight. But is this true?

Carrots are rich in β-Carotene, a precursor to vitamin A. Vitamin A-based products or retinoids, in association with rods and cones, are essential for vision. Retinoids absorb light, undergo photoisomerisation, subsequently initiating the neuronal response [1]. In turn, night blindness is caused by vitamin A deficiency, and can be prevented via vitamin A supplementation [2]. It is important to note that problems arise from very low levels of vitamin A, and the risk of this deficiency becomes apparent only in resource-poor regions [3]. In addition, the relationship between vitamin A and improved vision does not appear to be dose dependent. Furthermore, previous research studied vitamin A or β-Carotene supplementation rather than testing the ingestion of carrots.

Thus, based on the evidence, there exists no compelling argument that eating more carrots will improve your nighttime vision. However, the Age-Related Eye Disease Study (AREDS) trial revealed that the antioxidant properties of β-Carotene may help slow down age-related macular degeneration [4]. Perhaps an argument along this line of thought may stake a more compelling claim as to why we should eat more carrots.

Don't rub your eyes

The evidence-base for this point is more clear-cut. Eye rubbing is known to associate significantly with keratoconus. Eye rubbing, due to the elastic nature of the cornea, has been found to reduce keratocyte density. Fluctuations in intraocular pressure, changes in temperature, and proliferation of inflammatory cytokines due to eye rubbing are also thought to have a role in this association [5,6]. Eye rubbing is often due to bothersome feelings of either dryness or itching. Atopy and allergy, key determinants of chronic eye rubbing [7] should be managed appropriately to reduce symptom burden and reduce the risk of keratoconus. Additionally, eye touching is a recognised risk factor for transmitting infections, especially infective conjunctivitis [8].

Don't read in dim light

After reviewing the literature, I was unable to specifically identify any studies investigating whether dim light has any long-term sight implications. The general ophthalmology consensus appears to be that dim-light reading induces eye strain but does not lead to any long-term visual deficit [9]. However, the association of near-work activities and myopia is well documented [10,11]. Thus, reading alone, in dim light or not, may be bad for long-term vision. Oftentimes conventional wisdoms have some basis; in this case dim light has been labelled the offender whereas the evidence points to reading as the culprit! If reading in the dark gives you a headache or eye strain, buy a bedside lamp. However, to reduce chances of myopia the evidence suggests it may be a good idea to drop the book and go for a walk. Perhaps instead of reading, maybe we should stick on the TV…

Stop looking at your screen

If screen time is bad for your eyes, is it due to the screen or the close range at which we tend to use them? For the latter, the same evidence relating near-work activities and myopia applies to screen time, especially for children.

Digital eye strain (DES) includes transient symptoms including headaches, blurred vision, and dry eyes. Increased accommodative stress and the reduced blinking rate when using screens are thought to be the main contributors to this syndrome [12]. Blue light has also been considered as a determinant of DES, however the evidence for this is currently weak [12,13].

Theoretical evidence for the retinal damage of blue light has been demonstrated in animal studies [14,15]. New LEDs are known to emit significantly more blue light than their incandescent predecessors, increasing the concern for damage by blue light. However, research indicates that even under long-term viewing conditions, the exposure to optical radiation from screens is well below safe levels [16]. Although blue light is widely considered to present a very low risk acutely, the cumulative effects of blue light are not fully understood [14].

Train your eyes!

Previously, alternative 'eye exercises' or vision therapy have been recommended for those with learning difficulties (LDs) and visual defects, despite these techniques having no evidence-base [17]. Examples of such interventions include doing letter puzzles and wearing eye patches or tinted glasses whilst reading. Moreover, children with LDs have no difference in visual performance than children without LDs [17]. Thus, methods of alternative eye training are misdirected for two reasons: no evidence shows they correct subtle visual defects and no evidence shows any improvement in learning difficulty outcomes. However, there is an evidence base for eye exercises in the exceptional case of convergence insufficiency, wherein near-point exercises and prism-convergence exercises are the mainstay treatment [18].

Conclusion

Most evidence around long-term visual loss is based on prevalence studies, in which distinguishing causality from correlation can be difficult. This is especially the case for some of our Top Five facts or fiction. Many of the risk factors discussed are either very difficult to measure or incredibly difficult to control, especially over long periods. Navigating the murky waters between fact and fiction reiterates the importance of a sound theoretical understanding of anatomy, physiology and optics when debating contentious topics.

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