

# What Causes Eye Floaters and Are They Dangerous?

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## STORY AT-A-GLANCE

- › Floaters are small black dots, squiggly lines or cobwebs inside your eyes that float across your vision. They are a nuisance, but when they appear quickly in combination with flashes – light flashes like lightning or a camera flash – it requires immediate medical attention
- › The tiny specks move as your eye moves, so as you look at them, they seem to float away. They are more obvious when looking at a light background and develop when the vitreous fluid in the back of the eye loosens from the retina, causing collagen strands to stick together and casting a shadow over the retina
- › Nearsighted people have a higher risk of developing floaters, and excessive screen time can increase the risk of nearsightedness. Eye fatigue can be alleviated following the 20-20-20 rule – after 20 minutes of screen time, look away for 20 seconds at something 20 feet away
- › Lutein can help prevent nearsightedness and melatonin helps protect eye health, including playing a role in preventing glaucoma and cataracts. Other nutrients important to eye health include water, vitamins A, C, E, lutein, zeaxanthin and omega-3

From time to time, most people notice small black dots or squiggly lines in their eyes that float across their vision. In a study<sup>1</sup> of 603 people, 76% reported that they see floaters and 33% said it caused a noticeable impairment in their vision.

For some people, floaters can also appear like little cobwebs that come and go across their visual field. While most of the time floaters are only a nuisance, sometimes they

can be a sign of a more serious eye condition.

These little specks in your visual field move as your eye moves. This means when you attempt to look directly at them, they seem to float away. As your eyes stop moving, they may float back into vision again. Nearly everyone will see floaters as they age, but some people have a higher risk of floaters.<sup>2</sup> This includes people who are typically over the age of 50, nearsighted, have diabetes or have had surgery to correct cataracts.

Floaters are most obvious to a person when they are looking at a bright white object. This might include light-colored walls, the snow or a computer screen. The floaters appear as black flecks that may initially look like flies or spiders moving at the very edge of their peripheral vision.

## **How Do Eye Floaters Form?**

The eye has two chambers that are commonly referred to as the front and the back of the eye. At the front of the eye is the cornea, which is the dome-shaped portion. Behind the cornea is a chamber filled with fluid called aqueous humor. The definition of “humor” is “bodily fluid.” The body continually produces aqueous humor that maintains pressure in the eye. This happens when the same amount of fluid is leaving the eye as is being produced.

The back of the eye is located between the lens and the retina. This is called the vitreous cavity and it is filled with vitreous humor. Vitreous humor is a gel-like substance that is more viscous than aqueous humor but continues to allow light penetration. With age, vitreous humor thins and may loosen from the retina. Floaters form when tiny collagen strands of vitreous stick together and cast a shadow over the retina. It is the shadow you see as a floater.

The vitreous humor may detach from the retina, called posterior vitreous detachment. In this case, a person experiences acute flashes and floaters, which require immediate medical attention. Flashes may look like a camera flashing or lightning.

On their own, floaters are common and do not typically need to be treated. However, when floaters and flashes appear together, it is a serious condition. Vitreous humor makes up approximately 80% of the volume of the eye and helps maintain the shape of the eye. Dr. Sarah Brewer told Mirror:<sup>3</sup>

*“Healthy vitreous humor is a uniformly transparent gel, but aging, lifestyle factors and environmental stressors such as UV light can trigger oxidative stress and protein glycation, which cause collagen to clump together and the vitreous humor to degenerate. Although not necessarily harmful, eye floaters can cause discomfort, distraction and frustration on a daily basis.”*

## **Screen Time Alters the Structure of the Eyeball**

Myopia (nearsightedness) affects 41.6% of Americans<sup>4</sup> and by 2050, experts estimate it will affect half the global population. Nearsightedness describes a vision problem in which close objects are clear but distant objects are blurry. The condition is thought to be triggered by refractive errors in the eye.

This means as the light is bent when it passes through the cornea and lens to the retina, there is an error in the bending. Refraction errors can occur when there's a change in the shape of the eye, such as the length of the eyeball or the shape of the cornea. CBC News<sup>5</sup> reports researchers have linked hours of use on the computer or smartphone to progressive, irreversible eye conditions, such as myopia and dry eye disease.

Staring at screens can change the structure of the eyeball, and while there is a genetic component to nearsightedness, studies have shown those with excessive screen time had a faster progression of vision errors. Although the data are mixed,<sup>6</sup> others believe the link in children and young adults is consistent.<sup>7</sup> Rupert Bourne, professor of ophthalmology in the Vision and Eye Research Institute at Anglia Ruskin University (ARU), said:

*“Our study is the most comprehensive yet on this issue and shows a potential link between screen time and myopia in young people. This research comes at a*

*time when our children have been spending more time than ever looking at screens for long periods, due to school closures, and it is clear that urgent research is needed to further understand how exposure to digital devices can affect our eyes and vision."*

Nearsightedness places you at an increased risk for developing floaters and screen time increases your risk for nearsightedness. Long hours in front of a computer screen can also increase your risk of eye fatigue. Some ophthalmologists also believe that eye fatigue can contribute to developing floaters.<sup>8</sup>

Unfortunately, the evidence doesn't pinpoint exactly how many hours are too many when it comes to screen time. Dr. Vivian Hill,<sup>9</sup> pediatric ophthalmologist and surgeon in Calgary, Canada, suggests that rather than fixating on a specific number of hours, be aware of how your eyes feel while you're watching TV, working on your computer or browsing the net on your phone.

If your eyes feel dry, tense or tired, take more frequent breaks and be conscious of your need to blink more often. "Whenever we're staring at a screen, our blink rate goes down to about 10% of normal. So that means we're blinking once instead of 10 times," she said.

## **Lutein Protects Against Nearsightedness and More**

Lutein is a nutrient important to eye health and it helps protect against the development of nearsightedness. A 2020 study<sup>10</sup> found participants with the highest lutein concentrations had a 40% reduced risk of developing nearsightedness. An earlier study<sup>11</sup> also found people with the highest plasma lutein concentrations had a significantly lower risk of myopia.

Lutein is important to help prevent age-related macular degeneration, cataracts and other eye diseases.<sup>12</sup> Lutein is efficient at filtering blue light, which is the type emitted from computers, tablets, cell phones and led lights. Blue light induces oxidative stress in the eyes, which increases your risk of macular degeneration. Your body cannot make

lutein, so you must consume it in your diet. The following foods are rich sources of lutein.<sup>13,14,15</sup>

Dark leafy greens	Summer squash	Pumpkin
Carrots	Broccoli	Egg yolks
Avocados	Brussels sprouts	Pistachios

Lutein is a carotenoid and of all the known carotenoids, only lutein and zeaxanthin can cross the blood-retina barrier. Lutein may help prevent age-related macular degeneration (AMD), which is now the leading cause of blindness in Americans aged 65 and older.<sup>16</sup>

Studies have shown those with the highest levels of lutein and zeaxanthin had a lower incidence of neovascular AMD,<sup>17</sup> a lower risk of development or progression of diabetic retinopathy and lower risk of cataracts and glaucoma.<sup>18</sup>

Lutein also plays a role in brain health. In one trial,<sup>19</sup> supplementation with lutein and zeaxanthin boosted cognitive function and in older adults,<sup>20</sup> it improved cognitive function and provided a boost in complex attention and cognitive flexibility domains when compared to those taking a placebo.

In another example,<sup>21</sup> among 60 adults between the ages of 25 and 45, those with higher levels of lutein in middle age had more youthful neural responses than those with lower levels. The researchers suggested eating more lutein-rich foods could therefore benefit your brain in middle age.<sup>22</sup>

## **Melatonin Plays a Role in Eye Health and Vision Protection**

Melatonin is another nutrient that scientists recently discovered is useful for far more than a good night's sleep. A team of scientists<sup>23</sup> analyzed the effects that melatonin supplements had on patients with glaucoma.

Glaucoma is one of the leading causes of blindness. It affects more than 3 million Americans and roughly 90 million people throughout the world.<sup>24</sup> It has been suggested that glaucoma is a neurodegenerative disease<sup>25</sup> and that damage to retinal ganglion cells affects not only vision but also the circadian rhythm and sleep.

People with glaucoma may have a disrupted circadian rhythm compared to their peers and neuroprotective strategies that prevent damage to retinal ganglion cells could help with both disrupted sleep and glaucoma. The participants in the study took a melatonin supplement daily at 10:30 p.m. for 90 days. The researchers recorded several benefits, including:<sup>26</sup>

- Increased stability of systemic circadian rhythm
- Decreased intraocular pressure
- Improve the function of retinal ganglion cells in participants with advanced glaucoma
- Improvements in sleep and mood, particularly in participants who had advanced glaucoma

Although melatonin is often described as a pineal hormone, much of it is produced inside your mitochondria when you get proper sun exposure, which is involved in melatonin production.<sup>27</sup> Melatonin receptors also exist in several areas of the eyes, including the cornea, retina, and lens, suggesting that melatonin also acts on these tissues.

Melatonin appears to affect vision health. For example, cataracts are associated with oxidative stress and researchers have suggested that melatonin counteracts oxidative damage in the lens and may be a “potential therapeutic agent for cataract prevention/management.”<sup>28</sup>

Alongside lutein, melatonin may also prevent neurovascular AMD by inhibiting endothelial progenitor cell angiogenesis in neovascular AMD.<sup>29</sup> Melatonin may also play a role in the mitochondrial component of AMD. Researchers explain:<sup>30</sup>

*“The effect of melatonin on mitochondrial function results in the reduction of oxidative stress, inflammation and apoptosis in the retina; these findings demonstrate that melatonin has the potential to prevent and treat AMD.”*

You can optimize your melatonin production by getting enough bright sunlight during the day as this helps to set your circadian clock. Aim for at least 15 minutes in the morning to help regulate production. This helps drop melatonin to daytime levels, so you feel awake during the day and sleep better at night.

Ideally, sunlight on your bare skin will help the near-infrared light from the sun activate your mitochondria to produce melatonin. As evening approaches and the sun sets, try to avoid artificial lighting. Blue light from electronic screens and LED lights inhibits the production of melatonin. Try using incandescent light bulbs, candles or salt lamps.

## **More Steps That May Help Prevent Floaters**

In addition to optimizing your melatonin production and eating foods high in lutein, there are several more steps you can take that may help prevent floaters from developing:<sup>31,32,33</sup>

- **Hydration** – Chronic dehydration can cause the vitreous humor to lose volume and the vitreous cavity to lose shape. This contributes to the formation of floaters. Hydration also helps the body to flush out toxins and debris, which is another factor in the development of floaters.
- **Rest and sleep** – Getting from seven to eight hours of sleep each night helps your body to get rid of toxins and debris and promotes melatonin use as it is released at night to help you sleep. Also, take care to rest your eyes while working on a computer or your smartphone.

You can reduce eye fatigue by incorporating the 20-20-20 rule. This means for every 20 minutes you are looking at a screen, you spend 20 seconds looking at something else that’s 20 feet away.

- **Reduce stress** – By managing your stress level you can help promote good eye health. Find stress-reducing activities you can incorporate into your day. For example, consider exercise, stretching, yoga, walking, meditation or deep breathing. **Emotional Freedom Techniques** (EFT) is another activity that helps reduce stress by addressing emotional barriers.
- **Balanced diet** – Consuming a balanced diet can help ensure you aren't deficient in vitamins and micronutrients essential for good eye health. These include vitamin C, lutein and omega-3 fatty acids. It's best to get your nutrients from your diet, but when you don't eat enough fruit or vegetables, you may want to consider supplementation.
  - **Vitamin C** – Adequate amounts of vitamins C and E help prevent cataracts.<sup>34</sup> When you have optimal amounts of both, they protect the other from being oxidized. While citrus fruits are classic choices, they are also high in fructose. Other fruits and vegetables lower in sugar and rich in vitamin C are broccoli, kiwi, kale, tomatoes and bell pepper.<sup>35</sup>
  - **Vitamin E** – Vitamin E is an antioxidant that helps protect the body against free radical damage and deficiency can lead to retinopathy.<sup>36</sup> Food sources high in vitamin E include avocado, beets, collard greens, spinach, peanuts, red bell pepper, mangoes and asparagus.
  - **Lutein and zeaxanthin** – These are the carotenoid pigments responsible for the yellow and orange color in cantaloupe, corn, carrots, wild-caught Alaskan salmon and pasture raised organic eggs.
  - **Vitamin A** – Vitamin A helps promote eye health and the main nutrient – beta-carotene – is a precursor to vitamin A.<sup>37</sup> Foods that are high in vitamin A include tomatoes, red bell pepper, mango, cantaloupe, beef liver and pasture raised organic milk and eggs.
  - **Omega-3** – Two of the main long-chain fatty acids in **omega-3 fatty acids** that are found abundantly in fatty fish are EPA (eicosapentaenoic acid) and DHA



(docosahexaenoic acid). DHA may help preserve your vision and promote eye health. The type of fish you choose matters since not all fish have omega-3 fats.

Farmed fish, especially farmed salmon, is best avoided altogether due to the exaggerated potential for contamination. Alaska does not permit aquaculture, so all Alaskan fish are wild-caught. They also have some of the cleanest water and some of the best maintained and most sustainable fisheries.

To verify authenticity, look for the state of Alaska's "Wild Alaska Pure" logo. This is one of the more reliable ones, and it's a particularly good sign to look for if you're buying canned Alaskan salmon, which is less expensive than salmon steaks. Other fish high in omega-3 fats include herring, mackerel and anchovies.

If you don't eat fish, consider an omega-3 supplement. Krill oil is a better option than fish oil since it is sustainable, and the omega-3 is more bioavailable than in fish oil. Importantly, your brain cannot readily absorb DHA unless it's bound to phosphatidylcholine, and while krill oil contains phosphatidylcholine naturally, fish oil does not.

## Sources and References

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