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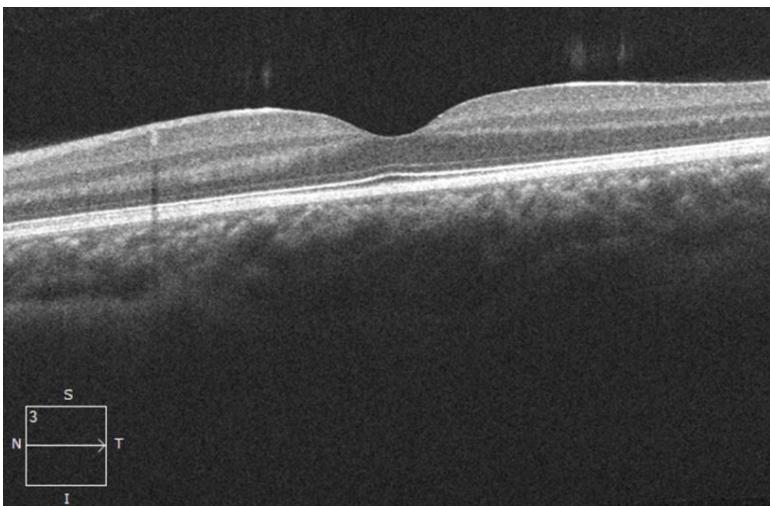
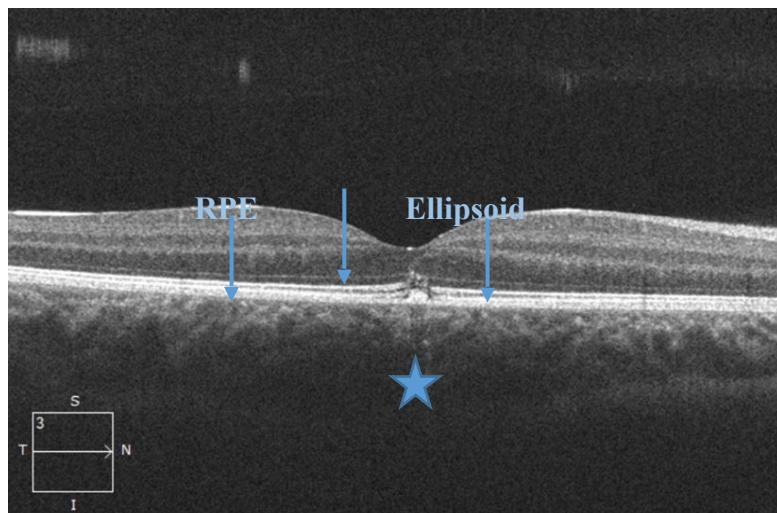
Century City

(877) 3-RETINA

Case of the Month – November 2018

Presented by David Lazar, MD

An 11 year-old patient presented with a blurred central vision in the right eye after playing with his green laser pointer. The patient states the laser hit his right eye when he pointed it at the bathroom mirror. It is unknown where the patient got the laser pen and how long the eye was exposed. Vision in the right and left eyes were 20/20 OU. Anterior segment examination was unremarkable OU. Posterior segment optical coherence tomography of the right eye is seen below:



OCT Macula OD (Top): Right eye (Star) shows disruption of the external limiting membrane (ELM) with hyperreflective thickening extending from the ELM to the RPE. There is adjacent disruption of the ellipsoid zone.

OCT Macula OS (Bottom): Left eye shows a normal foveal contour and retinal structures.

Differential diagnosis: Laser injury to the retina, idiopathic CNV, solar retinopathy, central serous chorioretinopathy, pattern dystrophy of the RPE, and remote blunt ocular trauma

Discussion:

Inadvertent retina injury from laser pens is unfortunate but a well-documented event in the ophthalmic literature. The mechanism of injury is usually caused by direct visualization of the laser beam or staring at the beam reflected off of a mirror. The laser itself can cause mechanical, photochemical, or thermal injury. Theoretically, laser pointers sold in the United States should be minimally dangerous due to strict regulation by The American National Standards Institute. It has mandated that laser pointers have a maximum power of 5mW. The US Food and Drug Administration states that this class of laser can be “momentarily hazardous when directly viewed directly at the beam with an unaided eye”. However, it is very easy to buy higher power laser pointers online through retailers outside of the United States. Also, “handheld” lasers look identical to laser pointers and can have power ranges up to 500mW. These handheld lasers are regulated at a different class than laser pointers and can therefore be much more powerful.

Laser pointers of different colors cause injury in different locations in the retina due to their unique wavelengths. Green lasers result in damage to the retinal pigment epithelium (RPE) because green wavelengths are absorbed by melanin in these cells. Red lasers may cause similar RPE changes but require longer durations of direct exposure to cause tissue damage. Blue wavelength is easily absorbed by foveal xanthophyll and focuses more anteriorly in the retina due to its shorter wavelength. Optical coherence tomography in eyes with laser damage shows outer retinal damage, with hyperreflective bands extending from the photoreceptors. RPE loss and focal atrophy may develop overtime with resulting choroidal neovascularization formation. There is no study that has been used to determine treatment options for laser related injuries to the retina. However, secondary choroidal neovascularization can be treated successfully with intravitreal anti-VEGF agents.

Take Home Points

- Lasers can cause different injuries to the retina depending on specific wavelength and power.
- The damage from laser injuries may be permanent and can cause secondary choroidal neovascularization formation
- Although they may look identical, laser pointers are different from handheld lasers and have a different maximum energy. Laser power greater than 5mW can be extremely dangerous to the retina.



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