Laser pointers: an optometrist’s perspective

Lasers used to be confined to the movies. Following *Star Wars* no space movie would be complete without a laser and then, in the 80s, came laser pens. Handheld pointers gave lecturers the magical power to point across a room, illuminating even the dullest of subjects. Over the last ten years, lasers have become both cheaper and much more powerful - from popping balloons to lighting matches, you may be forgiven for thinking they are nothing more than a cheap harmless novelty.

Recently the *British Journal of Ophthalmology* estimated that around 150 children had suffered injuries to the back of their eyes due to lasers. With over half a million low cost laser pointers now in circulation in a variety of powers, optometrists should be aware of the harm that may result to in particular to children. Originally, classroom lasers had a power of 1mW; now, due to advances in manufacturing and mislabelling, lasers are typically up to 300mW strong, with low cost laser pointers available up to 1000mW, and those marketed for pointing at stars up to 6000mW. All these higher-powered lasers are capable of producing heat that can burn and cause serious damage to the back of the eye in seconds. Curious young children have been reported to have accidentally pointed lasers at their friends or stare into the beam, resulting in eye damage.

There have been a number of news reports over the last year highlighting the targeting of pilots for attack by lasers. According to the CAA, there was a peak in 2011 with 1912 reported incidents in the UK, and now there are on average around 1400 attacks each year. It is hoped that a number of high profile convictions and custodial sentences will act as a deterrent and we will see a continued reduction of pilot targeted laser attacks. The recent BMO editorial by Prof John Marshall stated that even with the increasing prevalence of high powered lasers, empirical research can demonstrate that permanent retinal scarring is not possible beyond a distance further than a couple of metres and, therefore, pilots are currently still at a low risk of permanent visual harm.

The primary visual risk to pilots is flash glare, disorientation, temporary blind spots and after images, which all have the potential to cause a serious accident. However, pilots have, for many years, been well briefed on a protocol to minimise the potential risk of attack. In recent conversations with pilots, it has been suggested that the reassurance of knowing that flash blindness is temporary and risk of permanent retinal harm low, results in an increased ability to manage an in-air laser attack according to CAA protocol, minimising the risk of an air accident, as fears and anxiety about potential visual loss can be disregarded. The CAA has a self-assessment aid for pilots called the aviation laser exposure self-assessment (ALESA) with a simple flow diagram to aid deciding when to seek an assessment with an optometrist or ophthalmologist.

Note: An OpenAthens password is required to access *British Journal of Ophthalmology* article, which the College library can provide for members.
Optometrists may be presented with patients who are concerned following exposure to a laser pointer. Here are some tips for the eye examination:

**CONSULTING ROOM TOP TIPS FOR EXAMINATION**

**Amsler and visual acuity**

Use the Amsler chart to assess central field and visual acuity to assess macula function.

**Laser history**

Record the estimated distance at which the laser pen was held; within a couple of metres is the highest risk.

- The colour and approximate power of the laser
- The approximate length of exposure
- The context of exposure - accidental or malicious

**Fundus photography**

Compare with previous retinal images to look for change.

**Refer to a medical retina specialist**

If there is amsler scotoma or a reduced visual acuity refer to a specialist. If you have access to an OCT or FAF it may be useful to include the results with the referral. Of the reported incidents, those staring into the beam at close proximity, often children playing, are at most risk.

**Reassure pilots**

Knowing that flash blindness is temporary and risk of permanent retinal harm thought to be low, is reassuring and may result in an increased ability to manage an in-air laser attack according to the CAA laser attack protocol, minimising the risk of an air accident.

**Educate parents**

Proactively warn parents of the dangers of laser pointers and potential consequences of their misuse. Refer them to our advice on our patient website [Look after your eyes](#).