



The Last Word

Physicist and bioengineer Mike Murphy argues that practitioners need to take more care to ensure they are using the correct laser safety glasses appropriately

I have identified a worrying trend in UK laser clinics. As a certified laser protection adviser (LPA), it is my job to check that practitioners are using class 3b and 4 lasers, used for hair removal, tattoos, pigmentation and skin rejuvenation plus intense pulse lights (IPLs) safely. Unfortunately, in roughly 90% of the cases I have seen in the two years of doing LPA assessment, where more than one laser is on-site, I have found that incorrect laser safety glasses are being used, meaning both patients and practitioners are at risk of significant ocular damage.

Current requirements

The standard is very clear on this issue – European Standard (EN) 207:2009¹ outlines the requirements for all laser safety glasses to ensure ocular protection and safety. This standard dictates that laser safety glasses should be able to withstand 100 pulses from a pulsed laser or a continuous beam for at least 10 seconds, without damage.

The two main points to note in EN 207:2009 are:

1. The wavelength range(s) and protection level(s) must be etched into the 'glass' – labels or prints are not adequate.
2. The 'CE' Mark must appear on both the glass and the frame.

In addition, The British Standards and International Standard Organisation standard 12609-2:2013² sets out the current requirements for IPL safety glasses. The safety standards for IPL glasses are quite different to those for laser glasses, with the minimum eye protection required being shade 3. If any of the above is not observed then the glasses are not legal under this requirement. It is very important to note that one set of glasses designed to protect against one type of laser may not give any protection against another laser – they are usually NOT interchangeable. As practitioners, you should label and store your glasses safely to ensure you do not mix them up for each laser you use.

The dangers

If laser and/or IPL users are not wearing the correct glasses then they risk serious injury to their eyes. Wavelengths shorter than 400 nm and longer than 1400 nm will result in surface damage, while wavelengths between these limits can potentially damage the retina – in some cases, permanently.³ I know of a dermatologist who had many years' experience with lasers. One day she started to treat a tattoo patient with a Q-switched laser. Unfortunately, she picked up the wrong safety glasses (her clinic had a number of lasers) by mistake. Human skin will normally reflect approximately 4% of incident light, plus back-scattered

light, of at least another 4%. Given that Q-switched lasers can easily generate 150 million watt pulses, potentially 12 million watts of laser energy can find its way to the operator's eyes (in reality, it would be considerably less than this due to divergence). By wearing the wrong glasses she was exposed to a severely damaging amount of laser energy resulting in a career-ending 60% loss of vision in one eye, and a 40% loss in the other. This should serve as a warning to anyone who may not be protecting their eyes appropriately. As well as the users, the companies supplying the devices must ensure that they are also supplying the correct safety equipment to comply with EU law. I must note, as of yet, nobody knows what will happen after the recent 'Brexit' vote, but all EU legislation will continue until at least the UK leaves the EU officially. If you have purchased a laser and are concerned that you may not have been supplied with the appropriate glasses, or have not received any at all, you should contact the laser company immediately and postpone treatment until you have received the necessary equipment. If you do not, you may be putting your, and your patients', health at risk.⁴

How to solve the problem

So, how can you check if your glasses are safe? The easiest way is to contact an LPA – there are two main organisations that can supply suitable candidates – the Association of Laser Safety Professionals (ALSP) and the Radiation Protection Adviser (RPA) 2000. They will be able to determine whether glasses comply with current regulations or not, very easily. Another path is to establish an on-site Laser Safety Officer (LSO). In my opinion, this should be a mandatory position in every laser clinic in the UK (with class 3b and/or 4 lasers). Suitable LSO candidates can be trained by an LPA and should be able to ensure safe practice on a daily basis with all the clinic's lasers and IPLs.

Conclusion

Ultimately, it is the clinic owner's responsibility to ensure the safety of their staff as well as patients. Since the CQC stopped registering laser clinics in England and Wales in 2010, the number of laser users attending training courses has dropped and the number of insurance claims has risen.⁵ If an ocular accident was to occur and it was found that the safety glasses were incorrect or inadequate, I believe that most insurance companies in the UK would wash their hands of any claim. This leaves the owner potentially open to a lawsuit, which seems to be becoming alarmingly common in recent years. Would your business survive a claim by a partially blinded patient? The answer to this problem is quite simple – check your safety glasses and be sure that they are protecting your staff and your patients properly. Make sure that they are not damaged or cracked, and, if so, throw them in the bin! After all, we only have one set of eyes so we should do our utmost to protect them.



Mike Murphy is a physicist and bioengineer and began his career in medical lasers at Canniesburn Plastic Surgery Unit via Strathclyde University in 1986. He joined the clinical research group, which developed the Q-switched laser treatment of tattoos. Murphy has developed new laser and IPL devices and introduced them into markets around the world.

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