

BACK TO SCHOOL

THE NEW MASTERS IN REFRACTIVE SURGERY

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Spare a thought for your operating microscope...

During eye surgery, neither the patient nor the surgeon thinks much about the operating microscope, except as a mere accessory to the procedure. Recently, however, I had the opportunity to do research on the potential dangers of operating microscopes for an assignment for my Masters. The results are worth thinking about for all professionals working in eye care, as well as for patients considering any eye surgery.

Operating microscopes have become an essential tool in the treatment of ocular disease. It is well documented, however, that there are risks to the patient's eyes from the microscope's illumination system. A number of reports have described cases of retinal damage caused by these microscopes.

The problem is that during surgery, a patient has the operating microscope positioned directly above his fully dilated eye, with his retina typically exposed to the microscope light for relatively long periods of surgery.

However, to provide a caveat, damage to the cornea and crystalline lens from operating microscope illumination is always minimised because most of the ultraviolet and infrared wavelengths in the illumination light are filtered. The human eye's exposure limit for these structures is actually quite high, but it

is still valuable to think about potential damage. The main concern is potential damage to the retina.

There are many variables that are difficult to quantify, and each patient is different, so determining the irradiance in any particular situation is difficult. It is possible, though, to create useful 'worst-case' values that help us determine the risk of retinal toxicity. These are:

- A) The operating microscope illumination is at maximum setting.
- B) The pupil is fully dilated.
- C) There is no movement or interruption of the illumination by eye movement or other factors.

At Eye Institute we take precautions to protect our patients. We use a modern microscope, which has appropriate filters to eliminate harmful ultraviolet radiation. The microscope has advanced optics and this reduces the need for high illumination to achieve good visualisation. When operating we always use the lowest illumination possible and offset the axis so that the macular is protected. When possible the pupil is covered to protect the retina. Most surgeries are very short lasting only 10 to 15 min, this also limits the risk.

Despite the theoretical risks with the above steps the real risk is extremely low. Reported cases of retinal toxicity are now extremely rare. ①