

## Introduction

Are direct and indirect ophthalmoscopes perhaps on their way out of optometric and ophthalmic practice? Today, in both optometry and ophthalmology, modern and increasingly sophisticated instruments such as, for example, non-mydratic digital cameras are becoming much more commonly used. This is also becoming true not only in university programmes in optometry and ophthalmology but also more widely in clinical practice. These instruments have many advantages over the simpler ophthalmoscopic methodologies such as the ability to significantly increase image size on high-definition monitors and also to easily obtain stereo-photographs of parts of the eye such as the optic nerve head, fovea and macular regions. Some digital instruments such as scanning laser ophthalmoscopes can photograph almost the whole retina and thus even holes or tears in the retinal periphery can be rapidly located with minimal discomfort for the patient. Such imaging devices are also becoming widely used in telemedicine and are helping to improve accessibility to eye care in both developed and less well developed parts of the world. There are also very sophisticated scanning laser ophthalmoscopes that use adaptive optics to visualize very fine or minute detail within the retina such as the photoreceptors. Although still experimental and mainly confined to a limited number of eye and vision research laboratories, a more specifically commercial version of such instruments for routine clinical ophthalmic practice is probably not too very far off.

Digital images, whether of a single or multiple image nature, can be manipulated electronically or digitally to more easily examine different parts of the retina and newer methods of ocular evaluation and quantification that are not so well known in optometry can be easily utilized in clinical settings. Such

methods greatly assist in improved diagnosis and treatment of many eye disorders such as optic disc drusen, papilloedema, maculopathy and others. Although this type of technology is still quite expensive in comparison with ordinary ophthalmoscopes one can anticipate that with time the costs will become comparable and already simple mobile or portable fundus cameras are available.

Having a more permanent record of the ophthalmoscopic examination of the patient through the use of digital methods is also likely to have important implications for more effective monitoring of patients and also medico-legal protection of both patients and practitioners is also likely to be markedly enhanced. The special advantages that such instruments have in teaching situations is obvious and, for instance, multiple students can be more easily exposed to the same clinical problem without each having to individually and in sequence perform direct and/ or indirect ophthalmoscopy on the patient concerned. Today even digital versions of indirect ophthalmoscopes are available that can be directly linked to external monitors and they greatly enhance clinical instruction of students learning the procedure. Rather than struggling, as in the past, to teach via tiny teaching or learning mirrors attached to an indirect ophthalmoscope one can now send the relevant video and digital images to a computer or monitor and enlarge single images or video clips so that several students can in real-time simultaneously observe the details of the central or peripheral retinal examination being performed. Add to this the revolution in digital biomicroscopy and similar methods of enhanced visualization also can be applied to investigation of the more anterior parts of the eye and also to methods such as gonioscopy. And, then there are modern methods of corneal topography, wavefront aberrometry and ocular coherence tomography that allow for a much more extensive and

sophisticated examination of the patients than that available even as little as 10 years ago. All in all these advances in technology represent a very exciting time in eye and vision examination and, no doubt, even more amazing technology is probably on the way that one might not even be able to properly imagine today!

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