Improving the teaching of fundoscopy in veterinary medicine

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Learning how to examine the fundus of veterinary patients consistently and well is undeniably difficult, and teaching aids are important to avoid the demotivation of students. However, the rewards of mastering the technique are equally undeniable. Fundic abnormalities may be present in cases where there is only a narrow window of opportunity for recognition and treatment of conditions that threaten vision (eg, optic neuritis) or even life itself (eg, severe systemic hypertension). Fundoscopy also frequently enables us to distinguish potentially reversible from irreversible pathology, thereby guiding clinical decision making with clients.

The teaching of fundoscopy has taken many routes over the years, and a variety of methods enabling the tutor and student to see the same thing at the same time have been employed. Early methods included the use of teaching prisms on the headpiece of binocular indirect ophthalmoscopes, resulting in the clinical tutor and students swaying gently in unison as the viewing angle was changed.

Improvements in the digital age have been impressive, with video camera attachments to indirect ophthalmoscopy headsets and a variety of digital fundus cameras becoming available, albeit at considerable cost. While these have undeniably increased the understanding students have of fundoscopic anatomy, as well as providing superlative images for clinical records in referral practice, they are not realistically affordable for general practice and can be time consuming to use when patient compliance is poor.

In more recent years, a variety of lightweight handheld fundus cameras aimed at the veterinary market have been produced, designed with simplicity of use in mind. Those that permit video recording and simultaneous viewing on a laptop facilitate student interaction, and one such camera – the epiCam V – is in regular use at the Royal (Dick) School of Veterinary Studies in Edinburgh. Handheld fundus cameras allow non-specialist staff to acquire high-quality images after minimal training and without requiring patient mydriasis. However, despite being competitively priced, these cameras are likely to remain on the wish-list for many practices.

What probably all general practices have, and what most veterinary surgeons use, is a direct ophthalmoscope. While the direct ophthalmoscope is an extremely versatile instrument, it suffers the major limitation of providing only a very restricted field of view. The PanOptic ophthalmoscope (Welch Allyn) was developed to overcome this limitation by providing a wider field of view.

The major advantage of direct ophthalmoscopy is the degree of magnification it provides, and it remains a skill worth acquiring for that reason. However, students expecting direct ophthalmoscopy to provide a field of view resembling that of images in textbooks are almost inevitably disappointed, finding it hard to navigate their way successfully around the fundus. It is also not possible for student and tutor to view the fundus simultaneously, rendering minimal interaction in practice.

WHAT YOU NEED TO KNOW

- Smartphones can provide high-quality video recordings and photographs of the fundus. Detailed instruction on how best to perform the technique for recording images of the fundus, and other ocular structures, is available at www.theeyephone.com
- The use of smartphones during ophthalmic examination allows images to be discussed with veterinary students to improve their understanding and build their confidence in the technique. The ability to share images with clients during consultations can also aid the decision-making process.
- Images stored in patient files are invaluable for monitoring case progression. However, taking a photograph of the whole patient and their case file or passport before ocular photography will avoid potential misidentification when the images are downloaded from the smartphone.
- The ability to share high-quality images with ophthalmologists in referral practice is extremely helpful when assistance with case management is sought.

RESEARCH COMMENT
student questions such as ‘is that the optic disc on the left?’ completely unanswerable.

At the Royal (Dick) School of Veterinary Studies, model teaching eyes with words and numbers along the path of retinal vessels – the latter converging on an optic disc – have been used to replace standard glass issue in stuffed toy dogs. These have proved popular in teaching close direct ophthalmoscopy as they impress upon students the need to direct the light through the pupil from multiple angles at close range in a stable position by securing the top of the handle between a single finger and thumb, freeing other fingers of the same hand to remain in contact with the patient (the intermandibular groove of small animals or the facial bones of large animals). However, what this method cannot reproduce is the challenge created by patient movement, whether it is a change in the position of gaze or of the entire animal.

Indirect ophthalmoscopy can also be taught using the same toys, allowing students to compare the field of view and magnification provided by the two different techniques. Indirect ophthalmoscopy is the technique of choice for most ophthalmologists when examining the fundus, as the field of view is unsurpassed, but it is much less commonly used in general practice. Binocular headsets provide a stereoscopic view, enabling elevation or depression of the optic nerve head and fundic lesions to be readily assessed. While these headsets are likely to be cost-prohibitive for non-specialist use, hand-held condensing lens and a focal light source held at the temple provide a cheap and satisfactory alternative.

The use of smartphones in combination with a handheld condensing lens to further increase the field of view has also been described in the literature. Indeed, the use of the smartphone for fundoscopy, and ophthalmic photography more generally, has become increasingly widespread in recent years. This is thanks, in no small part, to the role played by Tim Knott in widely sharing his enthusiasm for this technique. His...
The greater understanding of fundoscopic anatomy provided by the larger field of view of the smartphone proved useful when direct ophthalmoscopy was subsequently performed. Their technique required neither sedation nor mydriasis and was well tolerated by the teaching horses, which is an important ethical consideration. As new student intakes in many UK veterinary schools are in excess of 120 per year, it is important that ophthalmology is taught in a way that considers animal welfare.

The work of Shipman and colleagues is not only helpful to those involved in teaching ocular examination to undergraduates and qualified practitioners but can also be helpful in introducing the technique to veterinary surgeons who may have been unaware of the potential use of the smartphone for visualising the fundus and recording images.

Photographic images obtained using this technique can be downloaded to patients’ electronic medical records, providing a valuable means of monitoring disease progression. The provision of good-quality images from a smartphone can also greatly assist case discussion with colleagues and facilitate virtual consultations with referral patients. Given the restrictions imposed by the current Covid-19 pandemic, this ability to use a telemedicine approach for referrals has never been more important.

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doi: 10.1136/vr.m1921

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