

NYC VMA: January, 2014

“A picture is worth a thousand words: practical uses of photography in veterinary ophthalmology”

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OVERVIEW:

In today's digital technological age, it is easy to photo-document a myriad of pathologies affecting the veterinary patient. Appropriate, yet simple, macro-photographic techniques can be a useful way to convey what the practitioner is observing to the referral ophthalmologist. This lecture will provide easy tips for ophthalmic photography with the goal of improving communication between you and your veterinary ophthalmologist, thus ensuring a better consultation experience. Special emphasis will be placed on practical applications for the SMARTPHONE.

GENERAL PRINCIPLES:

The general practitioner is commonly presented with a variety of ocular abnormalities where consultation with a local ophthalmologist is useful. Ophthalmic photography is the art of photographing ocular diseases for medical purposes. There are many different ways to photograph specific ophthalmic diseases. The purpose of this lecture will be to provide the attendee with practical ways to improve the quality of the consultation with his/her regional veterinary ophthalmologist through the use of photography. Whether you have extensive experience in photography or feel more comfortable with a simple “point and shoot” camera, this lecture will cover some basic principles that aim to improve your skill-set in capturing ocular images. A photograph does not replace the need for a complete ophthalmic examination and/or referral to a veterinary ophthalmologist. However, a consultation that includes appropriate photodocumentation will likely markedly improve the ways in which a veterinary ophthalmologist can best help you provide optimal service to your patients.

As ophthalmologists, ophthalmic photography represents “our data”. We photograph for many different reasons, including documentation of our clinical cases and for publication purposes. Ophthalmic photography is a subset of photography that uses specialized cameras to photograph almost all structures of our patients' eyes. Photographs document and diagnose disease conditions and are used widely in vision

science research. Ophthalmic photography uses specialized equipment to illuminate and image specific structures in the eye.

HISTORICAL PERSPECTIVE

For as long as there have been patients losing their vision, there have been medical personnel trying to prevent that from happening. Because the eye is designed to look out onto the world, it follows that we can also see into the eye. Early ophthalmologists figured out how to examine the eye, the retina specifically, and would often make a drawing of what they saw for future reference. Some of these retinal drawings were spectacularly detailed, works of art in their own right. But they were time-consuming to produce. Obviously, a demand arose for a faster and less subjective way to record the progression of an ophthalmic condition.

EXAMPLES OF TYPES OF OPHTHAMIC PHOTOGRAPHY

- Extra-ocular photography
 - Various digital cameras with macro-lenses are suitable to adequately capture diseases affecting the eyelids, cornea, and lens. More specialized slit-lamp cameras are also available.
- Fundus photography
 - Retinal cameras are unique instruments because the light source comes through the same lens that takes the photograph (no other camera works this way). Retinal cameras, therefore, are not used for any other kind of photography.
 - Stereo fundus photography requires two photographs, slightly offset left to right, and a special viewing device to fuse the two images into one, giving the viewer a three-dimensional image of the retinal structures. To the trained eye, stereo fundus photography reveals information about the condition of the retina that cannot be seen in single images.
 - Fluorescein Angiography - a type of fundus photography in which a fluorescent, mineral-based dye, (e.g. fluorescein sodium), is systemically injected and a series of photographs is captured as the dye moves through the blood vessels in the eye. A fluorescein angiogram is a valuable tool for assessing blood flow in the eye but requires specialized

equipment and for the patient to be under heavy sedation or general anesthesia in most cases.

- Optical Coherence Tomography (OCT)
 - OCT is a newer technology that is widely used in physician ophthalmology and is currently largely used in a research setting in veterinary ophthalmology. Using low-powered lasers, the OCT provides a cross-section of the retina.
- Slit Lamp Photography
 - A slit lamp bio-microscope is the primary examination instrument for the front of the eye (eyelids, conjunctiva, cornea, iris, and lens). A slit lamp camera is a slit lamp equipped with a camera and a flash light source. Slit lamp photography is done to document disease-related changes to these structures and specifically, images may be captured in the “parallelepiped” which helps to localize a lesion to a specific area within the anterior segment (i.e. deep corneal stroma or anterior lens capsule).
- Miscellaneous imaging methods
 - Scanning-laser ophthalmoscopes of the optic nerve head
 - Corneal topography
 - Photomicrographs of the corneal endothelial cell layer
 - Video imaging of eyes gazing in different directions
 - Surgical photography
 - Portrait, publicity, and studio photography

QUALITIES FOR AN EXCELLENT OPHTHALMIC PHOTOGRAPHER

- Good hand-eye coordination to master the fine controls of ophthalmic photography instruments
- A photographer's "eye" that appreciates what makes a good photograph: good composition, proper exposure and a hard-to-define aesthetic that pleases the artist in all of us without straying from the essential mission, which is to present medical findings in a clear manner

- The aptitude and willingness to learn basic eye anatomy
- A cool head and grace under pressure, flavored with a sense of humor
- A curious mind coupled with good communication skills
- Good computer skills

OPHTHALMIC PHOTOGRAPHY AND THE MACRO-PHOTOGRAPHER

Many ocular imaging instruments are made especially to photograph the eye, and do not overlap with “traditional” macro-photography equipment we may be familiar with. However, in ophthalmic photography, the “lesion of interest” is small. Therefore, many of the same challenges that are present in macro-photography are present in ocular photography: low depth of field, a very small focusing range, and a small working distance to the subject.

You do not need to be a professional photography to capture many of the commonly encountered eyelid and corneal diseases that affect your patients. Certain principles will apply (see below). Certainly, the level of interest, the quality of instrumentation, and patient compliance will all affect a veterinarian’s ability to capture the lesion of interest. Finally, it is reasonable to expect that a veterinary ophthalmologist may elect to charge a fee for an ophthalmic consultation that includes photographic images.

SUMMARY/KEY POINTS:

- If you are not an “expert”, remember the “KISS” principle
- Use the macro-setting on your simple, point and shoot camera
- Focus in on the head and the eye
- Use the highest resolution setting possible
- Take multiple views
- It is reasonable to expect a “fee for service” for this type of consultation from a veterinary ophthalmologist

REFERENCES

<http://www.opsweb.org/>

<http://www.opthalmicphotography.info/>

<http://www.digital-photography-school.com/macro-photography-tips-for-compact-digital-camera-users>

<http://www.macrophotography.com/>

<http://www.bmpt1.com/>

RECOMMENDED REFERENCE FOR SMARTPHONE USERS

<http://www.theeyephone.co.uk/>