THE TEN ESSENTIALS OF OCULAR EXAMINATION, DIAGNOSIS AND TREATMENT

Kerry L. Ketring, DVM, DACVO
All Animal Eye Clinic
Whitehall, MI 49461

Introduction
The lecture is presented in three sections. The first part will list the equipment and supplies needed to perform a thorough ocular examination. The use of the equipment and the interpretation of the results are beyond the intent of this lecture. Diagnostic labs held at many national meetings deal with this issue. The second section will include the ophthalmic drugs which you should have in your clinic for routine dispensing. You should also be aware of additional drugs for specific diseases. This last group of drugs may be too expensive to keep on your shelf, but can be ordered from various pharmacies.

The last part of the lecture covers some tenets of basic veterinary ophthalmology. The definition of a tenet is ‘an opinion, doctrine, or principle held as being true by a person or especially by an organization’. In this case, the tenets are mine. Some I learned at my mentor’s knee back in the dark ages and some have evolved after 3 decades in private practice. Keeping these in mind will help you avoid many complications.

The practitioner who is prepared with the necessary equipment, supplies, medication, and has a working knowledge of several tenets, will be better able to diagnose and treat everyday as well as emergency ocular problems.

1. Have The Right Equipment
EXTERNAL EXAMINATION
Ophthalmic equipment and instruments to do a thorough examination are now available to the general practitioner at a reasonable price. This equipment can be purchased from Dan Scott and Associates (1-800-TONOPEN) or Welch Allyn (1-800-769-4014) in most cases.

Welch Allyn’s rechargeable handle can be used with the Finnoff ocular transilluminator, the direct ophthalmoscope, and the PanOptic ophthalmoscope (discussed below). With the transilluminator, you have a bright beam of light to evaluate pupillary light reflex and dazzle reflex. This can also be used for the initial examination of the adnexa and anterior segment. Welch Allyn has several models of head-mounted focal illuminators. The more expensive models normally have a whiter and brighter light source. The head mounted unit allows you to have free hands to examine the patient.

Magnifying loupes can be inexpensive (OptiVISOR®) or very expensive depending on the company and your personal preference. Loupes with greater than 3X magnification have a very narrow depth of field. Working distance should also be considered when purchasing loupes.

The Eidolon (Eidolon Corporation through Dan Scott and Associates) is a miniature hand-held slit lamp with a bright focal slit beam and a 5X magnification lens. This is an
excellent instrument for close examination of the cornea for foreign bodies and the lids for distichia or ectopic cilia. Aqueous flare and keratic precipitates can also be detected with this instrument.

TONOMETRY
The ability to determine intraocular pressure (I.O.P.) is necessary to diagnose, prognose, and evaluate your treatment of glaucoma. An applanation tonometer slightly larger than a fountain pen and can be used while the animal is in a sternal or standing position. It is a popular instrument with veterinary ophthalmologists due to its precision and ease of operation. The Tono-Pen Vet™ is my instrument of choice for determining intraocular pressure. I believe it has advantages over other instruments available. It fits comfortably in the hand and calculates the averages of four valid taps onto the cornea to display the mean intraocular pressure and the standard deviation on the LCD screen in seconds. The Tono-Pen AVIA™ is a newer model with an ergonomic design. It does not require calibration, has a larger digital readout, and a longer battery life. Both are available from Dan Scott and Associates (1-800-TONOPEN).

OPHTHALMOSCOPY
Direct ophthalmoscopy is the technique known by most veterinarians. Equipment for this is readily available from Welch Allyn. Indirect ophthalmoscopy of the fundus has the advantage of a larger field of view and the ability to penetrate a cloudy cornea or lens opacity. Indirect ophthalmoscopy requires special equipment but a simplified technique can be performed using the Finnoff transilluminator, the Welch Allyn rechargeable handle and hand-held lens. A 20 diopter lens (5X) and 28 diopter lens are ideal for the practitioner.

The Welch Allyn PanOptic Ophthalmoscope is a third instrument for performing ophthalmoscopy. It is used on the rechargeable handle. This is the easiest of all forms of ophthalmoscopy to perform and gives a good view of the fundus. This equipment allows a field of view that is five times that of a standard direct ophthalmoscope. The image is not everted as in indirect ophthalmoscopy and does not require the use of a hand-held lens.

2. Instruments
There are several instruments that should be kept readily available in cold sterilization for routine use in examination of the adnexa, removal of conjunctival and corneal foreign bodies, suture removal, and cytology submission of the cornea and conjunctiva. These can be purchased from any surgical supply company.

1. Kimura spatula or Iris spatula (conjunctival cytology)  2. Strabismus hooks-2
3. Bishop Harmon tissue forceps  4. Cilia forceps
5. Lacrimal cannula 23g- (Straight and curved)  6. Stitch scissors
7. Adson tissue forceps-2 (teeth and no teeth)

3. Diagnostic Drugs and Supplies
The following should be available to use as indicated for ocular examination:

5% Proparacaine hydrochloride (topical anesthetic)-Falcon
Tropicamide (mydriatic)-Bausch and Lomb
Sterile eyewash
Schirmer tear test strips (Color Bar™ Eagle Vision or Schering-Plough)
Fluorescein dye strips (Fluorets®)

4. In-house Drugs
The minimal drugs for in-office use and dispensing are as follows:

   Glaucoma-Acute
      Oral glycerin  1% pilocarpine
      20% mannitol IV
      Latanoprost  (generic Xalatan from MWI)
   Glaucoma-topical control
      Dorzolamide 2% Trusopt® - Merck (generic MWI)
   Corticosteroids-systemic
      Prednisolone-oral and injectable
   NSAIDS-oral
      Rimadyl®-Pfizer (personal preference)  Zubrin®- Schering Plough
   NSAIDS-topical
      Flurbiprofen (generic from MWI; Ocuflu® pharmacy)
   Mydriatic and cycloplegic
      1% atropine ointment
   Antibiotic-oral
      Doxycycline
      Clindamycin
      Fluoroquinolone
      Cephalexin
   Antibiotic-topical
      Tobramycin
      Triple antibiotic
      Ofloxacin (Ocuflu®, Ciloxan®,Chibroxin pharmacy & generic MWI)
   Anti-viral-oral
      Optixcare/L-Lysine Chews (AVENTIX)
   Corticosteroids-topical
      Prednisolone acetate
   Antibiotic and steroids combinations
      Neopolydex ointment and solution
   Lacrimomimetic and antiinflammatory
      Optimmune® (Schering-Plough)
   Tears solution
      Genteal gel severe (OTC)
      OptixCare (AVENTIX)
      Idrop (imed)
   Cleaning Gel
      lid ‘n lash (imed)

You should be aware of the many topical drugs that are available from pharmacies. Those drugs, their indications and sources are listed below.
5. **Breed Incidence**

The initial goal in dealing with any ophthalmic disease is to establish a diagnosis or at least a workable list of differentials. In dogs, knowledge of breed predisposed ocular diseases will allow you to make a diagnosis in 75% to 85% of the cases! Once a diagnosis is made, there are many textbooks that will give you a treatment regime. The American College of Veterinary Ophthalmologists (www.acvo.org) and the Canine Eye Registration (www.vmdb.org/kerf.html). Additionally, all of the ophthalmology textbooks and atlases have similar lists. This breed awareness is the first step in dealing with ophthalmic disease in dogs.

6. **Tenet Number One-Canine Traumatic Ulcers**

A corneal ‘scratch’ or a trauma is seldom the cause of a superficial corneal ulcer. The owners may report “The puppy scratched her”, or “He has been out in the woods”, or “I think the groomers poked him or got soap in the eye”. An epithelial ulcer will re-epithelialize at a rate of 1mm/day as the basal layer slides over the stroma. Therefore, even a large ulcer should be fluorescein negative in a week as the basal epithelium slides in from the margin. If this is not the case, then you are missing the inciting etiology. Adnexal disease (distichiasis, ectopic cilia, or entropion), KCS, or an indolent ulcer are the primary differentials. All of these also have a breed predisposition. Bacterial resistant infections are seldom the cause of superficial corneal edema.

7. **Tenet Number Two-All Cats Have Herpes**

Although a slight over-statement, working under this premise will lead to the correct diagnosis and treatment of the vast majority of superficial ulcers in cats. In fact, statistics have shown that 80% become carriers and 50% spontaneously shed virus.

There are three facts that make this such a common cause of ocular disease in cats of any age. First, the high incidence in cat populations; second, treatment does not
eliminate the virus from the cat; and third, stress from any number of causes results in relapse or recrudescence of a latent infection.

Corneal ulcer in a cat? Think herpes!

8. Tenet Number Three- Drug Reaction
Be aware of adverse reaction to ophthalmic drugs. Oral drugs such as EtoGesic®, sulfonamides, and antihistamines can cause a reduction in the STT. Cats and to a lesser degree, dogs, can have a reaction to Terramycin® and neomycin. This is manifested by blepharospasms, conjunctivitis, and blepharitis (lid depigmentation and swelling). All the available antiviral drugs have the potential to cause severe reaction in cats as well.

Atropine topically can cause severe blepharoconjunctivitis in the treated eye. Topical application can have systemic effects. Decreased tear production in both eyes as a result of topical treatment is not uncommon. This is especially true in dogs with borderline basal tear production. One drop of 1% atropine delivers .5mg! I use 1% atropine ointment no more than once daily applied in the lateral inferior cul-de-sac (reduces hypersalivation immediately following treatment).

In dealing with glaucoma, three drugs can have adverse effects. Topical pilocarpine causes a severe reaction which can resemble an acute uveitis in 90% of the cases. Topical dorzolamide (Trusopt®) has been found to cause blepharoconjunctivitis with chronic use. Oral methazolamide can cause metabolic acidosis resulting in excessive panting and vomiting. It can also cause potassium loss which can lead in weakness, lethargy, and in some cases, mental confusion.

The use of lacrimomimetics, i.e. cyclosporine and tacrolimus, can cause blepharoconjunctivitis.

9. Tenet Number Four-Allergies and the Canine Eye
The eye is not a primary target organ for inhalant, food, or contact allergies in animals as it may be in people. Allergies involving the skin may also involve the lids and secondarily involve the conjunctiva. But dogs do not have allergies that result in only itchy, red, and runny eyes. The majority of these cases actually have borderline KCS (STT of 10-12mm/min). The diagnosis of ‘dust allergies’ are caused by low humidity in the house or the dog lying in front of an air vent and exacerbating a borderline keratoconjunctivitis sicca. ‘Grass allergies’ are usually the result of the dog being outside and just getting additional external irritation. Any topical medication will add lubrication and resolve the problem temporarily. The owner of an older dog such as a 10 year old Shih Tzu with severe ulcerative keratitis will typically report, “She has had allergies for years and my veterinarian would treat it for awhile and it gets better”. Both the breed and the age have resulted in a progressive disease associated with KCS in this and many other individuals. Allergies played no part in these scenarios.

10. Tenet Number Five-Antibiotic Use and Misuse
Veterinarians have a tendency to dispense antibiotics for every ophthalmic disease they see! In many cases, they are of no value for the condition and in some cases, they may
actually be contraindicated. The following are cases I have seen where this misuse occurred.

SUPERFICIAL ULCERS
Oral or topical antibiotics are not indicated and may be contraindicated in cats with superficial ulcers (herpes!).
Topical and oral antibiotics have no affect on indolent ulcers

ANTERIOR UVEITIS
Oral and topical antibiotics are not indicated in dogs or cats with anterior uveitis unless a specific disease is suspected such as *Bartonella* or a tick-borne disease.
In this case, a specific oral antibiotic may be indicated; however topical antibiotics are of no value.

ADNEXAL DISEASE
Oral antibiotics may be indicated for adnexal disease if a secondary infection plays a part such as a staphylococcus blepharitis. They are not indicated in entropion.

DEEP STROMAL ULCERS
Oral and topical antibiotic may be indicated in deep stromal ulcerations or keratomalacia.

GLAUCOMA
Neither oral nor topical antibiotics are indicated unless the glaucoma is secondary to a proven infection.