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PAPER ABSTRACTS

Surgical repair of pseudopterygium-like symblepharon in a cat
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Purpose: To describe successful surgical treatment of symblepharon in a cat that presented with pseudopterygium-like conjunctival and third eyelid incarceration without corneal adhesions. Methods: A 1-year-old spayed female domestic shorthair cat presented with symblepharon affecting conjunctival and third eyelid tissues that resulted in a nonadherent circumferential veil of amniotic conjunctival tissue over healthy, unaffected cornea. The appearance morphologically resembled pseudopterygium. Surgical repair utilizing a technique described in rabbits for the treatment of aberrant conjunctival structure and overgrowth (pseudopterygium) was performed dorsally and ventrally to reflect the conjunctiva back into the fornix, while the third eyelid was partially transected to clear the ventromedial visual axis. Results: Surgical invagination of the conjunctival tissues and transpalpebral fixation reformed the fornices and effectively cleared corneal obstruction dorsally and ventrally. The third eyelid required partial resection to clear corneal obstruction unilaterally. The patient benefited overall from surgery; the cat had no recurrence of symblepharon or adverse effects from partial third eyelid excision in the subsequent 8 months. Conclusion: This surgical technique, originally reported to benefit rabbits with pseudopterygium, offered utility in a cat afflicted with pseudopterygium-like symblepharon and could be considered in similar cases to improve vision and comfort. None.

Comparison of bacterial culture results collected via direct corneal wound sampling versus conjunctival fornix in canine eyes with presumed infected ulcerative keratitis
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Purpose: To compare aerobic bacterial culture results in eyes with presumed infected corneal ulcers between direct wound sampling and samples obtained from the lower conjunctival fornix. Methods: Fourteen sampling points were collected by direct sampling collected in 1 eye and fornix sampling in the contralateral eye. Comparison of organisms isolated from the two collection sites of the same eye revealed an exact correlation in 41/45 eyes (91%) and discordance in 4/45 eyes (29%). Conclusion: Sampling from the conjunctival fornix may be a suitable alternative to direct wound sampling in eyes with compromised corneal structural integrity. None.

Yucatan minipig choroidal neovascularization: a laser-induced model of human neurovascular age-related macular degeneration
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Purpose: Historically, large animal models of neurovascular age-related macular degeneration (AMD) have been unreliable. Only 1/10 of laser-induced choroidal neovascularization (CNV) lesions in non-human primates (NHP) are considered clinically relevant and only up to 40% of lesions ideal, exhibiting Grade IV leakage on fluorescein angiography (FA). This inefficiency translates to nonapplicable studies in the realm of AMD. Previous studies have reported extensive retinal damage and minimal choroidal involvement when neovascularization was confined to the macula P Values of 0.05 were considered significant. Angiograms were recorded with the Spectralis (Heidelberg Engineering). Three groups of beagles were euthanized: (1) control; (2) laser-induced CNV; and (3) non-mutant controls (0.5–6.6 years; n = 5). Routine ophthalmic examinations and fundus imaging by spectral domain optical coherence tomography (SD-OCT; Spectralis®) were performed. Results: Of 29 eyes examined, 23 dogs showed wedge-shaped areas of delayed perfusion and 1/15 also showed delayed superior retinal venule filling. Group 1: 10/23 dogs had a combination of wedge-shaped areas of delayed perfusion and filling, peripapillary and ONH hyperfluorescence. Only 3/15 dogs control showed wedge-shaped areas of delayed choroidal filling. The abnormalities were more distinct with FA than ICGA. Observation revealed wedge-shaped retinal thinning in the area of delayed perfusion in 2/23 dogs in Group 2. Hyperfluorescence in and around the ONH was associated with severe thinning of the nerve fiber layer in advanced disease. Conclusions: Wedge-shaped retinal defects are seen in dogs with advanced glaucoma. Our study showed that delayed vascular perfusion in choroidal watershed zones is likely responsible for these defects. Supported by Michigan State University startup funds and Edward Sheppard and family. None.

A survey of orbital disease associated with exophthalmos in ferrets (Mustela putorius furo)
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Purpose: To survey and organize the known causes of orbital disease manifesting as exophthalmos in ferrets (Mustela putorius furo). Methods: An extensive literature review was conducted along with a thorough analysis of the COPLow database in search of ferret orbital disease following management of a case at the Iowa State University Veterinary Medical Center (ISU LVMC). A qualifier for inclusion into this study was that the patient’s disease had to be observed and recorded at the time of presentation. Results: Out of the 17 recorded ferret cases in the COPLow database, 7 (41.1%) represented orbital disease. A retrospective review revealed 16 cases of recorded documented case of disease in ferrets. Including the single case seen at the ISU LVMC that prompted this survey, in total 16 cases of ferret orbital disease were identified. Of these 16 cases, 4 (25%) were caused by a zygomatic salivary mucocele; 7 (41.7%) were confirmed as orbital lymphoma, and 5 (31.2%) were diagnosed as orbital adenocarcinoma. The average age of diagnosis for the ferrets with orbital disease was 4.3 years. The average duration of the cases was 6.3 years for the lymphoma cases and 4.3 years for the adenocarcinoma cases. Conclusions: The purpose of this survey is to provide veterinarians with an updated resource of information regarding causes of exophthalmos in pet ferrets. This is the first reported study that...
Risk factors associated with postoperative orbital infections in 182 horses undergoing enucleation
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Purpose: To determine the association between horse’s age, primary pars intermedia dysfunction (PPID), systemic antibiotic use, anesthetic protocol (general anesthesia vs. standing sedation), and duration of hospitalization on the development of postoperative orbital infections. Methods: Retrospective study of medical records from horses undergoing enucleation at Fairfield Equine Associates, Miller and Associates, University of California-Davis, and Geneve Valley Equine clinic from 2000-2017. Fisher’s exact test was used to evaluate the association between age, PPID status, systemic antibiotic use, anesthetic surgical location (general anesthesia or standing sedation (n = 7 stable setting; n = 119 hospitalized setting). The length of stay for hospitalized horses was a mean of 3 days (range 0-25 days). Orbital infections occurred in 8/182 enucleations (4%). Increased risk of orbital infection was associated with PPID (p = 0.009), but not age, specific antibiotic use or duration, duration of hospitalization, anesthetic protocol, or surgical location. Conclusions: Horses with PPID may be at increased risk for orbital infection following enucleation. Therefore, antimicrobial therapy, diligent asepsis including intraoperative wound ligation, and postoperative wound care may be more important in these patients. Assessment and management of their endocrine status should be considered in the management of older horses undergoing enucleation. 

Bandage contact lens retention time in dogs
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Purpose: To assess and compare retention rate, time of case, application and patient tolerance of various bandage contact lens types from four different manufacturers. Methods: Five different contact lens types from 2 veterinary contact lens brands (All-on-Vision D1 and D4, and Hydron HRT 78, AL-1 B-HRT 78, and Hydroclear) were evaluated in 4 dogs. The dog’s toler- ance of the lenses and their retention time for up to 14 days were recorded. Statistical analysis was performed with a linear mixed model performed. Results: The veterinary-specific lenses had an average retention time of 0.43 days. However, the human lenses did not differ significantly from 0.43 days. All lenses were well tolerated except for the human lenses. Conclusions: Bandage contact lenses are important for treatment of corneal diseases. Further research is needed to evaluate the retention time of these lenses in a larger population of dogs.

Tear lacritin concentrations in canine keratoconjunctivitis sicca
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Purpose: To determine if tear lacritin concentration is decreased in canine eyes affected by keratoconjunctivitis sicca (KCS). Methods: 58 client-owned dogs were enrolled in the study [48 KCS (KCS+)] and 44 eyes underwent an ophthalmic exam, including Schirmer Tear Testing (STT), anterior segment assessment, and tear sample collection. Tarsal samples were evaluated for their total protein concentrations via bicin-choninic acid assay and lacritin concentrations via enzyme-linked immunosorbent assay. Results: Median total protein of canine tears was significantly increased in KCS-affected eyes compared to normal eyes. When measured as a fraction of total protein, tear lacritin levels were significantly decreased in KCS-affected eyes compared to normal eyes. When measured as a proportion of collected tear volume, tear lacritin concentrations were not significantly different between KCS-affected eyes and normal eyes. Conclusions: Lacritin is a tear protein and its concentration is decreased in KCS-affected eyes compared to normal eyes. Further research is needed to determine the role of lacritin in tear physiology.

Evidence of mechanocompensation in the aqueous outflow pathway of non-human primates with experimental glaucoma
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Purpose: This ex vivo study provides biomechanical and ultrastructural changes in unaltered trabecular meshwork (TM) from non-human primates (NHPI) with experimental glaucoma (ExG). Methods: Globes were obtained from n = 16 adult Macaca fascicularis with unilateral

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Effect of 0.5% proparacaine on culture results from dogs, cats, and horses with ulcerative keratitis

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Purpose: To investigate effects of topically applied proparacaine on culture results, and to compare cytologic and culture results in patients with ulcerative keratitis. Methods: Corneal scrapings were collected from 13 dogs, 19 horses, and 12 cats with ulcerative keratitis. Samples for bacterial (dogs, cats, horses) and fungal (horses) culture were collected prior to and following application of 0.5% proparacaine or saline. Cytology samples were then collected following 24 hours of application of proparacaine (dogs, cats) or 0.5% tetracaine (horses). Frequency of culturable bacteria before and after saline/proparacaine application was compared using Fisher’s exact test. Homogeneity of culture and cytology results were assessed using the chi-square test. Frequency of cultivatable bacteria before and after saline/proparacaine application were compared using Fisher’s exact test. Frequency of cultivatable bacteria before and after saline/proparacaine application were compared using Fisher’s exact test. Results were correlated to the presence or absence of bacteria detected using culture and cytology.

Conclusion: The presence of bacteria was less frequent using culture alone than using culture and cytology. However, cytology did not provide additional information for patients with ulcerative keratitis. Both methods should be done to maximize organism detection in patients with ulcerative keratitis. Funding by the Center for Companion Animal Health, 154-1417. Supported by the University of California, Davis, CA.

The effect of topical latanoprost on aqueous humor flow in normal dogs

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Purpose: To evaluate the effect of topical latanoprost 0.005% (Akorn, Lake Forest, IL) on aqueous humor flow rate (AHRF) and intraocular pressure (IOP) in normal dogs. Methods: Following a 5-day acclimation period, twelve beagles were randomly assigned to 2 groups. On day 5 of the study, AHRF and IOP were measured in the dorsolateral and ventral canaliculi (Gonioscope, Titecan, Inc., Chicago, IL). On days 5 to 10, one drop of either 0.005% latanoprost or artificial tear solution (Alcon, Lake Forest, IL) was applied to the 2 lateral canaliculi. AHRF and IOP were measured in the dorsolateral and ventral canaliculi on days 5 to 8. No statistically significant differences were seen in AHRF or IOP in the test and control groups (P = 0.101). In the treatment group, there was a significant decrease in IOP (P < 0.001). In the control group, the mean ± SEM AHRFs on days 4 and 10 were 3.26 ± 0.30 μl/min and 3.21 ± 0.47 μl/min, respectively. In the treatment group, the mean ± SEM AHRFs on days 4 and 10 were 3.09 ± 0.31 μl/min and 3.33 ± 0.45 μl/min, respectively. Conclusions: Topical 0.005% latanoprost decreases IOP but does not alter the AHRF in normal dogs. Supported by KSF DCS Mark Derrick C anon Research Fund. None.

Feline acute corneal hydrops associated with descemet’s membrane rupture: 65 cases

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Purpose: The etiology and pathogenesis of feline corneal hydrops/acute bullous keratopathy (FCH/ABK) remains to be investigated. The purpose of this investigation was to determine clinical and histopathologic findings in 65 cases of FCH/ABK and identify risk factors for the development of FCH/ABK. Forty-six cases diagnosed with FCH/ABK were identified in the archives of the Comparative Ocular Pathology Laboratory of Wisconsin. Signalement, history, ophthalmic: examination findings, and gross and histopathological lesions were reviewed and summarized. The relative risk (RR) of Descemet’s membrane rupture in the development of FCH/ABK was calculated. Results: 65 glands from 63 cats diagnosed with FCH/ABK were identified. FCH/ABK was bilateral in 56/63 cats. Descemet’s membrane rupture was a significant risk factor in the development of FCH/ABK (RR=5.8, 95% CI [3.98–9.19]; P<0.0001). Additional risk factors included bilateral FCH/ABK with FCH/ABK included glaucoma (17/66) feline diffuse iris melanoma (13/66), lymphoplasmacytic keratoconjunctivitis (29/66), and herpesvirus-8 (16/66). Corneal hydrops/corneal edema in FCH/ABK is likely a multifactorial process. These findings sug¬gest a causal relationship between Descemet’s membrane rupture and FCH/ABK. Except in the case of the Hauss’s striae, no cause for Descemet’s membrane rupture was identified. These findings identify and report the use of procedures that tamponade Descemet’s membrane in the treatment of FCH/ABK.

A modified Ahmed glaucoma implant for shunting aqueous humor to the ocular surface in a dog with phacoemulsification case report and proof of concept

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Purpose: Traditional Ahmed gonio-implant surgeries in dogs are associated with challenges inherent to both maintenance of a patent valve and bleb management. A modification of the standard Ahmed valve has been successfully used to shunt aqueous humor to the ocular sur¬face in a subset of high-risk human patients undergoing multiple corneal and fibrilatric procedures. A 9-year-old female spayed Chihuahua-mix with bilateral refractory glaucoma post-phacoemulsification had this concept adapted to be used on the remaining eye after unilaterally successfully bleb failure upon standard Ahmed-valve implantation in the contralateral eye. Methods: A silastic tube (0.76 mm inner diameter, 1.65 mm outer diameter Dow Corning Corp. Midland, MI) was secured with a simple interrupted 8-0 nylon suture on the anterior-lateral surface of an 8/1 pediatric Ahmed gonio-implant (New World Medical, Rancho Cucamonga, CA). Following standard placement of the glaucoma drainage device, further sub-conjunctival dissection allowed the extension tube to be placed and trimmed, exiting through the conjunctiva near the lateral at the level of the 4 o’clock position (OS). The tube was then laser sutured to the globe using several 10-0 nylon interrupted sutures. A single sample interrupted 9-0 nylon sutures to restrict tube movement. In addition to standard post-opera¬tive medications, topically administered glaucoma surgery (0.5% timolol) was prescribed long-term. Results: The intraocular pressure (IOP) remained <15 mmHg until the 2-weeks and 6-weeks after surgery in which clogging of the tube in the anterior chamber was identified. The IOP was 25–28 mmHg. On both occasions, anterior chamber cannulation of the glaucoma device was performed under general anesthesia with a 27G needle through the conjunctiva, the gonio-implant was removed, and fluid was immediately seen out of the tube over the conjunctiva, characterizing release of the blockage. After each intervention, intracanalicular tissue plasminogen activator (25ug) and moxifloxacin (0.5%) were injected intracamerally. The eye has remained comfortable, normotensive and visual, with IOP < 15 mmHg by the time the abstract was written (14 months post-operatively). No signs of eyelid discomfort are present at the level of the extension tube. Conclusions: The state of normotension and the lack of bleb formation more than a year after surgery is proof-of-concept that the aqueous humor can be successfully shunted to the ocular surface in dogs. Further studies will aim to determine laser ablation rates and the impact of different size/tube materials along with the advantages of using a micro-pore filter inside the extension tube. None.

Phacoemulsification of a subluxated microphakic lens in the presence of vitreous prolapse with use of Iris Hooks and a capsule tension segment following triamcinolone-assisted anterior vitrectomy via pars plana – case report

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Purpose: Vitreous staining, capsule stabilization techniques and anterior vitrectomy via pars plana have gained considerable interest in recent years in human ophthalmology. The pur¬pose of this abstract is to describe a peri-operative capsule sparing lens stabilization system with an iris hook and a capsule tension segment (CTS) in the removal of a severely subluxated microphakic lens that was accompanied by vitreous prolapse. Methods: From the pars plana approach to the prolapsed anterior vitreous was chosen using a suture-less transconjunctival 23G trocar (Alcon Laboratories, Fort Worth, TX) inserted 3 mm from the limbus. The CTS was a 15 mm × 2 mm × 1.6 mm piece of a triamcinolone (Trime¬cin®) preserved free triamcinolone acetonide injectable suspension, Alcon Laboratories, Fort Worth, TX) and subsequently removed via the pars-plana trocar and using a 2-handed technique it was cut at 2 mm per minute with a 35 mm × 1 mm × 1.6 mm SARDS (Microsurgical Technology, Redmond, WA) to allow a continuous curvilinear capsulotomy by means of a radio-frequency capsulotomy (Alcon, Oertli Instruments, Switzerland). Iris hooks (Microsurgical Technology, Redmond, WA) were used to secure the capsular bag in position for placement of the CTS (FCI Ophthalmics, Pembroke, MA) and subsequently one of which was used to stabilize the CTS, which in turn stabilized the area of zonular loss for the procedure. Surgery was performed using the Alcon Infiniti™ Vision System (Alcon Laboratories, Fort Worth, TX). Energy was delivered strictly in Intelligent-Phaco (IP) Ozi™ torsional mode. After phacoemulsification was completed, the CTS/iris hook system was removed. The main clear corneal incision was closed with 9.0 monofilament vicryl. The side-port incisions were closed using sutured hydraulic. Stained vitreous immediately adjacent to the posterior capsule (microphakic crescent was removed with the use of 2.5 mm paracentesis) Capsulotomy – Capsular: Success: Capsular stabilization was successful, lens removal and anterior vitrectomy was uneventful. No complications such as retinal detachment, recurrence of vitreous presentation or glaucoma was noticed during the whole procedure. Results: Capsular: Success: Capsular stabilization was successful, lens removal and anterior vitrectomy was uneventful. No complications such as retinal detachment, recurrence of vitreous presentation or glaucoma was noticed during the whole procedure. Conclusions: This was the first report of the successful use of an iris hook/CCTS system for peri-operative stabilization of a subluxated lens during phacoemulsification in a dog. None.

Cancer incidence in dogs with clinical presentation of sudden acquired retinal degeneration syndrome – SARDS

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Purpose: To develop diagnostic parameters for differentiation of cancer-associated retinopa¬thy (CAR) and SARDS in canine population. Methods: Initial diagnosis of SARDS (n = 10), including bilateral retinal detachment and/or immune-mediated retinitis-cancer associated retinopathy (IMR-CAR, n = 7) was
When should we measure the schirmer tear test?

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Purpose: Although the Schirmer tear test (STT) effectively evaluates aqueous lacrimal gland function, the test endpoint may influence the interpretation of the test result. The test endpoint was set as the appearance of the fluorescein-stained cornea. However, performance of fluorescein staining before the STT result was published may affect the Schirmer tear test (STT) result. This study aimed to examine the effect of eye closure on the Schirmer tear test (STT) results on the STT test result has not been reported in dogs. Methods: Dogs presented to Triangle Animal Eye Clinic were divided into 3 groups based upon STT result: Group 1: CTT ≤ 5 mm/min, Group 2: 5–10 mm/min, Group 3: > 10 mm/min. Each group was further subdivided by a 6-month interval. Results: STT-1 measurement, followed by application of 0.5 μl of fluorescein into the inferior palpebral conjunctival fornix. Following 10 min to permit tear turnover, a second STT-2 measurement was recorded. Results: Of 427 dogs (11 males, 22 females) with a mean ± SD age of 7.7 ± 3.9 years were included in this study, 243 were border collies. Pre-STT fluorescein staining before STT was performed in 13 dogs (11 males, 22 females) with a mean ± SD age of 7.7 ± 4.0 years were included in this study. For all groups, mean ± SD post-fluorescein CTT was 3.3 ± 1.9, 7.2 ± 4.9, and 19.4 ± 7.8 min. We found no significant difference between the pre- and post-fluorescein STT results within each group (P = 0.038, 0.547, 0.43, respectively, paired t-test). Assessments of corneal fluorescein staining patterns were adequate in all eyes. Conclusions: Application of 0.5 μl fluorescein 10 min previously did not change the STT result in dogs.

The effect of subconjunctival bupivacaine, lidocaine, and mepivacaine on corneal sensitivity in healthy horses

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Purpose: To compare the efficacy and duration of effect of three local anesthetics on corneal sensitivity when administered subconjunctivally in horses. Methods: Eight healthy horses were randomly assigned to receive, in a crossover controlled study, with two washout periods between trials. The subconjunctival space of the randomly selected eye was injected with 0.2 ml of bupivacaine (0.5%), lidocaine (2%), mepivacaine (2%), or saline. All horses received topical medication once in the contralateral eye. The corneal sensitivity was evaluated with the Cochet-Bonnet aesthesiometer. Results: The corneal touch threshold (CTT) was measured in both eyes with a Cochet-Bonnet aesthesiometer. At least one of the study anesthetics produced a decrease in corneal sensitivity in one of the 8 horses. Conclusions: Subconjunctival administration of lidocaine, bupivacaine, and mepivacaine effectively reduced corneal sensitivity in horses and can be considered a beneficial agent for equine corneal procedures. Supported by MSU-ORHS Office Clinical Research Grant. None.
both). In both canine and equine samples, concentrations of tetracyclines ≤0.5% EDTA ≥0.1% and N-acetylcysteine ≥0.5% were more efficacious than control (P < 0.0027 for canine compounds; P < 0.0001 for equine compounds) in preventing corneal weight loss. 0.5% tetracycline and 1% EDTA were as or more efficacious alone than when in combination with another compound. Conclusions: Concentrations of tetracyclines ≥0.5%, EDTA ≥0.1%, and N-acetylcysteine ≥0.5% were efficacious in preventing corneal weight loss in an in vitro model as compared to the positive control. The concentrations were more efficacious than placebo treatments which were less efficacious than homologous serum. Tetracycline 0.5% and EDTA 1% were equally as efficacious alone as when in combination with another compound.

Targeting gene expression to the canine aqueous humor outflow pathways via intravitreal vector administration

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Purpose: A main goal of our research efforts is the long-term control of intraocular pressure by adeno-associated virus (AAV) mediated gene therapy in dogs with open-angle glaucoma. In this study we compared green fluorescent protein (GFP) expression levels along the canine aqueous humor (AH) outflow pathways following intravitreal (IVT) vs. intracocular (IC) vector administration. Methods: AAV2-GFP (either self-complementary with B6-Pi promoter, or single stranded with Y44F cap snipping and mCMV promoter) was injected in 12 eyes of 6 young adult wild-type dogs either IC (n = 8 eyes) or IVT (n = 4 eyes). Total number of vector genomes (vg) injected were 2.78×10^12–2.56×10^13 vg for IC or 2.11×10^12–2.78×10^12 vg (IVT). GFP expression was visualized and quantified (ImageJ) histologically at 5 weeks by epifluorescence microscopy. Results: Histologic examination showed that IC delivery resulted in stronger GFP expression along the trabecular meshwork (TM) and iris compared to the trabecular meshwork (TM). This expression resulted in clinically detectable fluorescence within the iridocorneal angle. Conclusion: IC delivery of AAV-GFP resulted not only in the expression of GFP along the trabecular meshwork and iris epithelium, but also more prominently, AH outflow pathways. GFP expression levels within the TM were comparable between IC and IVT delivery when using the same vector dose. Conclusion: In dogs, IVT injection of AAV2-GFP to agonize the aqueous humor gene therapy vector targeting of both anterior and posterior segments of the eye. This is in contrast to IC injection that mostly targets the anterior chamber.

Infectious ocular disease severity varies by pathogen detected in cats

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Purpose: To identify pathogens using PCR and viral isolation in shelter cats with ocular and upper respiratory disease, and to identify factors associated with increased severity of clinical disease. Methods: Oropharynglgeal swabs from 90 cats in 11 animals shelter across the USA were obtained and tested by RT-PCR using a feline respiratory panel to determine the patient's ocular and upper respiratory score. A multivariable linear mixed model assessed the relationship between clinical scores and age, sex and pathogen. Viral isolation was performed on all samples, prior to DNA extraction and gel electrophoresis using 42/90 isolates. Results: Five pathogens were detected at variable frequency by PCR: feline calicivirus (FCV) (43%,), feline herpesvirus (FHV) (14%), Mycoplasma felis (51%), feline coronavirus (17%) and Chlamyphila felis (1%). A positive FHV-1 PCR result was associated with increased anterior segment and iris scores (95% CI = (−2.464, −0.597), P < 0.001). Viral isolation detected virus in 84/90 samples within 7 days. Only 8/21 virus isolates from samples obtained from cats that had both FHV-1 and FCV detected by PCR showed banding consistent with FHV-1 on electrophoresis after DNA extraction. Conclusion: FHV-1 was associated with higher respiratory scores, but lower ocular scores, which warrants further research. The results of the viral isolation study suggest that FCV may play a role in infectious ocular disease in cats housed in animal shelters. Supported by the National Eye Institute, National Institute of Health, Animal Care and Use Committee, University of Wisconsin-Madison, School of Veterinary Medicine, Regional University of Blumenau, LA Mancuso, B NedeIaest, A Berdoulay and RA Spatola Animal Eye care of Chesapeake

Intraocular pressure, central corneal thickness and conjunctival microbiota in adult white-tailed deer (Odocoileus virginianus)

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Purpose: To determine the normal values for intraocular pressure (IOP) and central corneal thickness (CCT) of captive white-tailed deer (Odocoileus virginianus). Methods: Eight adult white-tailed deer were captured and sedated (medetomidine and xylazine) in healthy adults white-tailed deer (Odocoileus virginianus). Methods: Eight adult white-tailed deer were captured and sedated (medetomidine and xylazine) for the collection of blood samples from the lower conjunctival fornix using sterile swabs and submitted for aerobic bacterial and culture and susceptibility testing as well as fungal culture. IOP was bilaterally measured by tonometry (TonoPen/C226) and rebound (TonoVet/C6). Central corneal thickness was measured by ultrasound pachymetry. Statistical comparison analyzed differences between eyes for all parameters. Results: The mean IOP was 19.67 ± 2.25 mmHg (TonoPen®) and 15.0 ± 3.69 mmHg (TonoVet®). There were no significant differences in IOP measurements between eyes or seasons (P > 0.05) with both methods. No significant rebound correction was detected in both seasons (P < 0.0004). Mean CCT was 74.77 ± 8.43 mm with no significant differences in values between eyes or seasons (P > 0.79). The most prevalent bacterial genera identified were Staphylococcus aureus, Corynebacterium, Arthrobacter and Azotobacter in both seasons.
Clinical efficacy of a new quick tear volume measurement in dogs: strip meniscometry
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Purpose: To introduce a new quick lacrimal test (termed Strip Meniscometry), and to evaluate its clinical efficacy for dogs. Methods: This study involved 1265 eyes of 641 subject dogs randomly selected among the outpatient cases having various corneal disorders. Each subject underwent a strip meniscometric test (SMT) using SMTech Co., Ltd.), the phenol red thread test (PRT) using Zone Quick (Showa Yakuhin Kako Co., Ltd.), and the Schirmer tear test (STT). All examinations were performed in the above-described order within 10 min. Mean values of the STT (mm/5 s) > 15 s for PRT, 16.37 ± 6.47 mm/5 s for STT, and 9.92 ± 4.04 mm/5 s for SMT, respectively, with the statistically significant correlations were found for all pairs among PRT, STT, and SMT. The Pearson's correlation coefficient r = 0.613 for a pair of PRT-STT, 0.571 for PRT-SMT, and 0.668 for STT-SM T respectively. The tear deficiency was defined as the tear volume < 10 mm/5 s for STT and ≤ 14.8 mm/60 s for SMT. The cut-off length was 10 mm/5 s. Conclusions: The result of SMT examination was well-correlated with the results of the STT and SMT. The cut-off length of SMT for tear deficiency was suggested in reference to the standard STT results. None.

An investigation of the factors maintaining proliferative capacity of canine corneal epithelial cells
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Purpose: We have previously reported that canine corneal epithelial cells (CECs) maintain the proliferative capacity without using feeder cells or growth factors unlike other species. The purpose of this study was to investigate the factors maintaining proliferative capacity of canine CECs comparing with rabbit CECs. Methods: Canine and rabbit CECs harvested from limbus were cultured without using feeder cells and growth factors. Multiple withdrawal and storage disorders (SARDS) cases in the same clinic population compared with normal dogs were investigated. Results: The proliferative capacity and the growth factors were compared in both species, and both CECs were passaged continuously until the growth arrest. Canine and rabbit CECs were then cultured with conditioned media derived from each other's cells. Gene expression and PCR analyses were performed and the gene expressions of soluble factors in both CECs were also compared. Results: Canine CECs showed higher proliferative capacity and could be passaged more times than rabbit CECs. Conditioned media of canine CECs tended to promote the proliferation of rabbit CECs, while that of rabbit CECs inhibited the proliferation of canine CECs. Epidermal growth factor receptor (EGFR) ligands, such as neuroligin 1 (NRG1) and heparin-binding EGF-like growth factor (HB-EGF) were highly expressed in canine CECs than in rabbit CECs. Conclusions: It is suggested that canine CECs secrete growth promoting factors and EGFR receptor ligands are their possible candidates. However, it is also suggested that canine CECs do not secrete growth inhibitory factors which are secreted in rabbit CECs. Further investigation is needed to clarify the mechanism of maintaining proliferative capacity of canine CECs from these two perspectives. Supported by Grant-in-Aid for Scientific Research (G) 26450422. None.

Utility of a simple, inexpensive retinal model for teaching of ophthalmoscopy to veterinary students
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Purpose: Difficulty in mastering the techniques of ophthalmoscopy in veterinary education is compounded by challenges of live animal examination. We sought to explore the utility of preparing an inexpensive retinal model as a method to improve technique and skill in ophthalmoscopy of first-year veterinary students. Methods: The study was approved by the NC State Institutional Review Board, and 100% of first-year veterinary students were invited to participate using three methods of ophthalmoscopy (direct, panoptic and indirect) was placed in 2 oz. canisters with 8 mm pupil apertures. Half of the students in a veterinary teaching course practiced with models for 20 min in addition to live animal practice in other classes. Ovals ratio was calculated for examination slides (microscope slide 15 x 30 mm) and 20 slides were placed for each testing. Results: All 89 participants practiced with the model, of these 13 students completed the final examination, 51 students did not practice with the model, and of these, 17 completed the final examination. 71.4% of students felt the models were easy to use, 100% thought that model use should continue for future classes. Students that used the models were 7 times more likely to pass the examination than students that had not (P = 0.015). Conclusions: We describe an inexpensive, versatile teaching model for veterinary students that is well liked and results in significantly better technical performance of indirect ophthalmoscopy under examination conditions. Conflicts of interest: none.

Clinical findings in a case-control study of dogs with sards, age and breed-matched controls, and dogs with ptiyoddependent hyperadrenocorticism
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Purpose: Sudden acquired retinal degeneration syndrome (SARDS) is characterized by retinopathy and systemic clinical abnormalities. Our objective was to compare clinical parameters of SARDS cases with age and breed-matched normal controls, and cases of ptiyod-dependent hyperadrenocorticism to further examine SARDS within the ageing and endocrinopathy clinical spectra. Methods: 12-15 dogs of each group (early SARD, middle-aged, and elderly) were recruited from the NC State University for examination. Parameters assessed included clinical examination, serum chemistries (blood count, serum biochemistry, and thyroid panel), and optical coherence tomography (OCT). A detailed retinal analysis was performed using one-way ANOVA with a Bonferroni post-test and significance of P < 0.05. Results: Compared with normal dogs, dogs with SARDS had significantly higher body condition score, elevated total serum clinical thyroid hormones, elevated plasminogen activator inhibitors (PAI-1), and higher plasma cortisol. Conclusions: SARDS cases had significantly higher body condition score, elevated total serum clinical thyroid hormones, and lower plasma cortisol than normal dogs. None.
serum proteins (total protein, albumin, globulin) and elevated serum calcium values. Compared to normal dogs, the total retinal thickness of dogs without SARS-CoV-2 infection was younger, had significantly lower liver enzyme values (ALP, GGT), lower baseline and post-ACETE treatment values, lower serum phosphorous and higher serum albumin and urine specific gravity. The outer nuclear layer was significantly thinner in dogs with early SARS-CoV-2 infection compared to controls with both control groups in all measured quadrants (dorsal, ventral, nasal and temporal). Multifocal small low-lying retinal detachments were identified in dogs with SARS-CoV-2 infection in both groups. These differences in OCT may provide future utility for early diagnosis of SARS-CoV-2 infection. Supported by the National Institutes of Health (NIH). No significant thinning was observed in the inner retinal layer except in the N imaging plane of dogs with PRCD. Dogs with RCDI, PRCD, and LCA had significantly more disrupted ellipsoid zone in the pressed area centralis than normal dogs (P < 0.01). Conclusions: We were not able to demonstrate the characteristic pathology of diabetic retinopathy in dogs with inherited retinal dystrophies. We believe that SD-OCT will provide valuable information in the assessment of novel therapies for these disease processes. The well preserved inner retinal in the late stages of disease was well suited for the novel therapeutic modalities. Supported by NIH R01-EY006855, R01-EY019304, K12-EY015398, P30-EY015954. None.

Effect of telmisartan on IOP, blood pressure and ocular perfusion pressure in a spontaneous feline glaucoma model

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Purpose: To determine the effect of an angiotensin receptor blocker (ARB) on ocular perfusion pressure (OPP) in cats with feline congenital glaucoma (FCG). Methods: Nine cats with FCG (3 female; 6 male) and 11 normal cats (2 female; 9 male) were studied under a standardised protocol. OPP was measured using a transcranial Doppler ultrasound system and OPP was expressed as OPP = SBP - DBP. IOP was measured by rebound tonometry and blood pressure (BP) including systolic, diastolic and mean arterial pressure readings (SBP, DBP and MAP, respectively) were obtained by oscilometric methods. Telmisartan (1 mg/kg/d PO) was administered to cats with FCG. Cats were acclimated to measurements, and baseline IOP and BP were obtained for 3 weeks prior to treatment. Mean ocular perfusion pressure (MOPP) was calculated (MOPP = 2/3*MAP-IOP). Mean values from the first 2 readings were averaged. Study groups were randomised per body weight and sex. Telmisartan was compared with matched normal cats (ANOVA with Tukey-Kramer multiple comparisons post-test; P = 0.05 considered significant). Results: In FCG cats, baseline mean (SD) IOP (28.9 ± 6.3 mmHg) was lower than in normal cats (34.2 ± 9.1 mmHg; P < 0.001). MOPP was significantly lower (P < 0.05) in FCG than normal cats (18.7 ± 7.1 mmHg). In normal cats, there was no change in IOP (P > 0.05) before and after MOPP measurements. There was a significant decrease in BP (P < 0.05) before and after MOPP measurement. IOP decreased by 4.0 ± 3.5 mmHg (P < 0.05). There was no significant difference in OPP and BP between the groups. Conclusions: Telmisartan was well tolerated and did not have a significant effect on OPP in feline glaucoma. Supported by the UW-Madison Companion Animal Fund, Bright Focus Foundation, NIH grant P30 EY016665, and an unrestricted award to the Department of Ophthalmology and Visual Sciences from Research to Prevent Blindness. None.

Correlation of retinal layer measurements from optical coherence tomography and 199832, SX in fall of 2017), or layering tritomyrophy non ulcerative keratitis and inflammation: a large somewhat organized arealight microscopic images in globes from 20 dogs with chronic glaucoma

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Purpose: To describe the correlation of retinal layer measurements using optical coherence tomography (OCT) with retinal layers measured from light microscopic images in 20 globes from dogs with chronic glaucoma. Methods: Globes encased from 20 dogs with chronic glaucoma were dissected. Retinal sections were stained. Half of the retinal sections was imaged using OCT adjacent to the cut edge. Nerve fiber and inner plexiform layer (NFLP), inner retina (IR) and outer retina (OR) were measured as a ratio of total retinal thickness (TTR) in Retina Pro (Tecmar). The other half of the retinal sections was measured from light microscopic images measured from the inner limiting membrane to the outer edge of the inner nuclear layer. OR was measured from the outer edge of the inner nuclear layer to the outer edge of the photoreceptor layer. Results: There was a significant (P < 0.05) decrease limiting membrane thickness and light microscope measurements for the NFLP (P < 0.15). There was a no significant difference between OCT (mean: 0.50) and light microscopic (mean: 0.53) measurements for the IR (P = 0.06). There was no significant difference between OCT (mean: 0.48) and light microscopic (mean: 0.44) measurements for the OR (P = 0.06). Conclusions: Measurements collected using OCT are comparable to measurements collected from light microscopic images in canine globes with chronic glaucoma. Measurements derived from OCT images of the retina may be reliable surrogates for select clinical outcomes.

Assessment of inherited retinal diseases in dogs using spectral domain optical coherence tomography (SD-OCT)

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Purpose: To determine the effect of discontinuing topical immune modulating treatment on Schirmer tear test (STT) values over time in dogs with keratoconjunctivitis sicca (KCS). Methods: STT data of serial measurements from fourteen dogs (16 eyes) were analyzed. Inclusion criteria were dogs with (1) moderate to severe KCS (STT < 10 mm/min with clinical signs of keratoconjunctivitis), or (2) KCS well managed with a topical immune modulating agent (IM) for >5 years. Exclusion criteria included: uveitis and Acanthomorpha. Topical IM treatment was interrupted by withdrawing topical immune modulating agents in 10 dogs. The follow-up period after discontinuation of IM treatment (136 ± 29 days). In the other 5 dogs, STT values decreased by 15.5 ± 15.0 mm/min and 10.9 ± 10.3 mm/min in this study. In this study, 8 dogs were analyzed. Significant differences were identified in clinical parameters of KCS before and after discontinuation of IM treatment (P < 0.05). Conclusions: The residual effect of IM treatment needs to be taken into consideration when clinical studies are designed based on dogs with previous IM for KCS treatment. Supported by the UW Davis Center for Equine Health, a generous gift from Dick and Carolyn Randall, and NEI grant P30 EY02757. None.

Ophthalmic findings in a captive population of panamanian golden frogs (Atelopus zeteki)

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Purpose: To describe the ophthalmic morphology of, and to establish the parameters for select diagnostics in, Panamanian golden frogs (Atelopus zeteki). Methods: Twenty-two frogs (10 males and 12 females) were subjected to slit lamps biomicroscopy, endodontic absorbent paper point tear testing (EAPPTT), rebound tonometry, rose bengal staining, palpebral fissure width measurement, blink rate measurement, corneal culture, and postmortem histopathology. Results: Atelopus zeteki have distinct brow ridges and mobile nictitans. Slit lamp biomicroscopy revealed avascular, corneal nerves typical of amphibians. Corneal colors ranged from yellow to green, with darkly pigmented peripheries. Pupils were round in both males and females. Mean blink rate was 0.10 ± 0.10 min. The mean EAPPTT was 0.02 ± 0.03 mm. No Staphylococcus was cultured from the cornea of any frog. Conclusions: Tear production and blink rates were significantly low for both male and female frogs. Males had significantly narrower palpebral fissure widths, and increased IOP compared with females. None.

Orbital neoplasia in the dog: a retrospective analysis of 120 primary and secondary tumours in canine patients from 2005 to 2016

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Purpose: To characterize primary and secondary neoplasms affecting the canine orbit in 120 canine patients from 2005 to 2016. Methods: Medical records were evaluated for age at diagnosis, presenting complaint, sex, breed, side affected, tumour type, primary or secondary, histopathologic confirmation, mitoses and evidence of malignancy, clinical recurrence, therapies, and longevity of patients post-diagnosis. Relationships between duration of disease, staging, therapy, the potential for malignancy and metastatic disease were investigated. Data were statistically analyzed via student’s t-test, chi-square analysis, and descriptive statistics. Additional note: All patients were identified and characterized at UF VMC. Mean age at time of diagnosis was 9.77 ± 3.53 years. Fifteen presenting complaints were identified with a significant relationship between epistaxis and carcinoma (P < 0.01) and mass of the orbit (P < 0.01). Of the 120 tumours, 45 were primary and 75 were secondary. Twenty-two histologic tumor types were identified (56.3% sarcomas and 28.6% carcinomas). The most common primary neoplasm was osteosarcoma (22.2%) and secondary neoplasm was adenocarcinoma (33.3%). Mitoses were not predictive of metastatic disease, recurrence or survival time. Metastatic disease did not correlate with a reduced longevity. Median survival time was 279 ± 207 days. Life expectancy was extended from 162 ± 205 days to 352 ± 364 days if therapy was elected (P < 0.001). Both osteosarcoma and squamous cell carcinoma showed a significant favorable response to therapy (P < 0.05). Conclusions: The majority of orbital tumours were secondary through metastasis disease or orbital extension. Survival time post-diagnosis was extended with therapeutic intervention but remained less

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Effect of combination of EDTA and equine serum on in vitro antiangiogenic and anti-angiogenesis activity

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Purpose: To determine and compare the in vitro antiangiogenesi and antiangiogenesis activities of equine serum, EDTA solution, and equine serum-EDTA combination solution over time.

Methods: Fresh serum obtained from 5 healthy adult horses was added separately to EDTA-containing blood culture tubes to create 3 individual 0.1% EDTA-serum combination solutions. Serum samples were not pooled to allow investigation of inter-individual variability. The in vitro antiangiogenesi and antiangiogenesis efficacy of combination solutions was tested using a commercial fluorescence assay and compared among treatments. All study solutions were stored at 4°C and the assays performed on days 0, 1, 2, 3, 4, and 7 of the storage period. Results: Average concentrations of cytokines were calculated and compared to determine if there were differences between treatments and time points.

Conclusions: The study findings will be significant in predicting survival time. None.

Lymphocyte clonality testing on embedded tissue to diagnose intraocular lymphoma in a topically-treated, subbetalinoc, feline eye
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Purpose: To describe the utility of PCR for Antigen Receptor Rearrangements (PARR) testing in the diagnosis of ocular lymphoma following topical treatment and partial response to treatment. Histopathology. A 9-year-old, spayed female domestic shorthair cat with suspected ocular lymphoma was treated with topical subbetal in 1 eye. OD. Anterior uveitis was diagnosed at initial exam, and 1% prednisolone acetate was prescribed. Systemic testing for known causes of feline uveitis was negative. During treatment, presumptive herpes-strial keratitis prompted a course of systemic famciclovir and topical cyclosporin, then switching to topical diflucan. Blindness developed despite improving anterior uveitis, prompting examination. Histopathologically, the anterior uvea was minimally infiltrated, with moderate lymphocytes infiltrates in the choroid and retina. The area was subbetalinoc. Histochemistry for microorganisms was negative. IHC for CD3 labeled rare atypical cells. PARR testing revealed a clonal T-cell expansion in a polyclonal (inflammatory) background, indicating T-cell lymphoma and uveitis. The owners declined staging and oncology referral. Conclusions: This case highlights potential diagnostic challenges in ocular lymphoma, and the utility of IHC and PARR. None. Of suspicion on H&E slides is necessary, and uveal hypopigmentation may impact this assessment. IHC was able to identify the atypical cells’ phenotype, and PARR identified a clonal expansion, despite an inflammatory background and prior anti-inflammatory treatment. Implications for further staging and treatment are significant. None.

Transscleral intracapsular lens extraction in dogs
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Purpose: In dogs, Zonular rupture can lead to lens subluxation, complete luxation and glaucoma. Intracapsular lens extraction (ICLE) for anterior lens luxation with the “open sky” approach can lead to corneal endothelial damage and scarring. The purpose of this study was to demonstrate a novel transscleral surgical approach to anterior lens luxation, which can minimize corneal damage and obtain good corneal transparency. Methods: 6 eyes from 5 dogs presenting with anterior lens luxation and acute glaucoma were operated using a transscleral surgical approach. A dorsal 3 cm conjunctival incision was made and a transcleral incision was created. After tunneling toward Descemet’s membrane, the anterior chamber was made with a #11 blade and the capsulorhexis was performed using a Slenell’s loop. A limited anterior vitrectomy was performed, and the sclera was closed in a simple interrupted pattern. Results: The average mean follow-up was 6 months (range 1-12 months). 5 of 6 eyes were visual before surgery and remained visual after surgery. All eyes remained nomotensive in the post-operative period. Glaucoma was not observed in any case. Mean corneal scarring was noted in 2 eyes. Conclusions: This study demonstrated that the transscleral technique is a viable option for removal of an anteriorly luxated lens with minimal complications. Keywords: Lens, anterior, luxation, transscleral.

Outcome of anterior chamber shunt procedure in 104 eyes of dogs
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Purpose: To evaluate the outcome of anterior chamber shunt (ACS) placement to treat canine glaucoma. Methods: Medical records of dogs receiving ACS (Ahmed Glaucoma Valve VFP7 or VFP8, New World Medical, Cucamonga, CA) between January 2010 and December 2015 were reviewed. Results: A total of 104 dogs were treated with conjunctival glaucoma. The patients were prescribed with conjunctival glaucoma, and the mean duration of postsurgical vision preservation was 52.2 months for all cases, 48.6 months with prior cataract surgery (13 eyes/30 dogs) and 47.3 months (54 eyes/51 dogs) without prior cataract surgery (P = 0.05 with vs. without cataract surgery). By breed, Shiba Inu maintained vision for 57.8 months, AMC for 31.9 months, and other breeds for 48.3 months with a significant difference between Shiba Inu and AMC. Vision was maintained in 80/87 eyes at 1 year, 41/55 at 2 years, 17/33 at 3 years, 12/21 at 4 years and 4/12 at 5 years post-surgery. Conclusions: The visual outcome after ACS placement for the treatment of canine glaucoma was favorable compared to that of previous reports, particularly in Shiba Inu. None.

Clinical and histologic findings of 10 cats with congenital glaucoma
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Purpose: To evaluate the outcome of anterior chamber shunt (ACS) placement to treat congenital glaucoma. Methods: This retrospective study evaluated clinical and histologic records of cats diagnosed with congenital glaucoma. Hematoxylin and eosin, periodic acid-Schiff, immunohistochemical labels for smooth muscle actin, and CD3 were utilized. Lens, iris, ciliary body and Schlemm’s canal were examined using Image-Pro premier software. Morphologic changes were compared to a positive control group of 6 felineline globes with secondary glaucoma. Results: Cats affected with congenital glaucoma included domestic shorthairs and longhairs, and a Siamese cross. Average age at enucleation was 25 months in cats with congenital glaucoma and 12 years in cats with
**Short term findings in 25 dogs treated with micropulse transscleral diode cyclophotocoagulation for refractory glaucoma**

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**Purpose:** Transscleral diode laser cyclophotocoagulation is an established method for treat-
ment of refractory glaucoma in dogs, but is associated with significant postoperative ocular complications. The purpose of this study is to report the findings of a novel use of micropulse transscleral diode laser cyclophotocoagulation (MP-TSCP) in glaucomatous dogs.

**Methods:** Retrospective study of 25 dogs (32 eyes) treated with MP-TSCP with a minimum of 2 months of follow-up. Reported outcomes were intraocular pressure (IOP), treatment parameters, reduction in medications, complications and incidence of repeat therapy.

**Results:** 25 dogs (32 eyes) were evaluated. The mean age was 8.5 years. Mean preoperative IOP was 13.6 mmHg, and postoperative IOP was 19.4 mmHg. First treatment success rate = 17/32 eyes (53.1%). Repeat laser was performed in 12 eyes with 9/12 eyes responding favorably. The total number of treatments was 26/32 eyes (81.2%). Mean energy levels employed was 113.9 S and 2308 mW at 31.1% duty cycle. Reduction of medications was from a mean of 1.6 medications preoperatively. Complications included mild conjunctival burn (n = 5) and repeat treatment in 12 eyes. Conclusions: MP-TSCP was successful in controlling the IOP and in reducing postoperative medications with minimal inflammation and complications. Future investigations to study the effectiveness of treatment parameters are warranted in a larger series of patients over a longer period of evaluation.

**Micropulse transscleral cyclophotocoagulation in dogs with glaucoma: preliminary results**

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**Purpose:** To describe the procedure, efficacy and complications of micropulse transscleral cyclophotocoagulation (mTSCP) in dogs with glaucoma. Methods: Fourteen dogs affected with either primary (n = 9) or secondary (n = 5) glaucoma were treated with mTSCP. The procedure was performed under heavy sedation (n = 10) or general anesthesia (n = 4). Laser power varied from 2000–2808 mW. The probe was moved in a continuous sliding motion (50–60 strokes per minute) to treat the entire ciliary body. Complete ophthalmic examination, intraocular pressure (IOP) and central corneal sensitivity were evaluated over time. Complications included mild to no pupillary membranes developed in 22/28 eyes (78.6%) from 6 raptors had long-term follow up (median 59 months, range 27 to 135 months) and were visually normal. Nine eyes (78%) from six raptors had long-term follow up (median 59 months, range 27 to 135 months) and were visually normal. Nine eyes (78%) from six raptors had long-term follow up (median 59 months, range 27 to 135 months) and were visually normal.

**Results:** Two of eleven eyes (18%) had intraocular lenses (IOL) placed with both eyes developing complications. One with intermittent anterior uveitis that developed a complete pupillary membrane and the other with refractory pseudophakic glaucoma resulting in euthanasia (the opposite aphakic eye in this cat was alive at the time of euthanasia). Seven of nine eyes (78%) from raptors had placements uneventful for more than 6 months after surgical procedure. Conclusions: Further studies could evaluate the benefit of repeating the procedure periodically or combining mTSCP with other procedures.

**Conclusions:** Preliminary findings suggest that mTSCP can be performed under heavy sedation or general anesthesia, causes minimal to no pupillary membranes and the procedure can be repeated. Future investigations to study the effectiveness of treatment parameters are warranted in a larger series of patients over a longer period of evaluation.

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**Long-term phacoemulsification outcome in raptors – a retrospective study (1999–2014)**

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**Purpose:** To determine outcome of phacoemulsification in raptors at the University of Tennessee Veterinary Medical Center. Methods: Medical records from seven (11 eyes) non-refractory raptors were reviewed. Four underwent bilateral phacoemulsification while three had unilateral cataract surgery. Due to the long follow up, outcomes were assessed at 2 months after surgery. Results: Six raptors (9 eyes) including three harriers, one peregrine falcon (Falco peregrinus) had long-term follow up. No complications were noted with either surgery. Success was greater in cases of primary (87%) than secondary (74%) cataracts. Conclusions: The procedure was safe and effective.

**Conclusions:** Preliminary findings suggest that mTSCP can be performed under heavy sedation or general anesthesia, causes minimal to no pupillary membranes and the procedure can be repeated. Future investigations to study the effectiveness of treatment parameters are warranted in a larger series of patients over a longer period of evaluation.

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**Optic neuritis in dogs: 96 cases (1983–2016)**

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**Purpose:** To describe and compare the clinical and electrophysiological findings, causes, and treatment outcomes of dogs with optic neuritis. Methods: Medical records from dogs with a diagnosis of optic neuritis at North Carolina State University College of Veterinary Medicine Veterinary Hospital between January 1, 1983 and June 30, 2016 were reviewed. Ninety-nine cases were identified: 13 with visual loss secondary to optic neuritis (n = 13). Retinal optical coherence tomography was performed in 4 cases. The final diagnoses included multifocal meningoencephalitis of unknown etiology (MUE, n = 35), isolated optic neuritis (1-ON, n = 42), neuroretinitis (n = 10), retinal infection (n = 6), perineuritis (n = 2), and suscetperptial retinal edema (n = 2). Conclusions: optic neuritis was most commonly associated with multifocal MUE or neuroretinitis. Twelve (30%) had visual loss.

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**Evaluation of a reliable outer retinal margin marker and the discernability of outer retinal bands on OCT images of common laboratory animal species**

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**Purpose:** To identify a clear marker for the RPE/Bruhn’s membrane complex as outer retinal margin (ORM) and to quantify the discernability of outer retinal bands (ORB) on

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**ABSTRACTS E9**

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E10 ABSTRACTS

Optical Coherence Tomography (OCT) images from different species and anatomic locations. Bacterial isolates from ocular and respiratory samples were acquired from locations dorsal, central and ventral to the optic disc in healthy, anesthetized animals. Only best quality OCT (B-scans sampled over 100% of the image area, E10) images were included. Sensitivity and discernability of a common ORM marker was evaluated and quantified. B-scans demonstrated the highest diagnostic quality of individual ORM were defined as “ideal presentation” (I). Conclusion: ORM marker sensitivity and quality varied significantly due to differences in anatomy and pigmentation between animal species and strains. These differences need to be taken into account for qualitative and quantitative OCT evaluation in comparative ophthalmology research. None.

Effects of oral raltegravir in cats with experimentally-induced ocular and respiratory feline herpesvirus-1 infection

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Purpose: To determine the effects of oral raltegravir (Isentress®), Merck & Co., Kenilworth, New Jersey) treatment in cats with experimentally induced ocular herpesvirus-1 (FHV-1) infection. Methods: A randomized, masked, vehicle-controlled, 30-day trial was performed in 20 cats. Following a 14-day acclimation period, cats were infected on every other day by nasal instillation of 10^5 TCID50 of FHV-1. Disease scores were calculated. Sneeze and nasal discharge were scored and respiratory rates were monitored throughout the trial. OCT images were taken every 3 days. Results: OCT images were collected every 3 days. OCT-histopathology comparison was used to further confirm the ORM marker. Evaluation of cell death markers during corneal wound healing in the horse

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Purpose: Corneal wound healing is a complex process whose mechanisms are not completely understood. The aim of this study was to evaluate markers of cell death in the equine cornea, following wounding. Methods: Fourteen equine corneas from horses euthanized for reasons unrelated to this study were randomly assigned to one of two groups: wounded (n = 8) or unwounded (n = 6) controls. The cornea was wounded by applying a 6 mm after paper disk soaked in 1% NAOH for 60 s. Corneas were subsequently cultured using an air-liquid interface model. A corneal segment was set at a 6°-degree incline and corneas bathed with medium every 30 minutes to simulate blinking. Corneas were cultured with culture media collected at time 24, 48, and 72 h after wounding, and frozen at −20°C. Media were employed employing a lactate dehydrogenase (LDH) spectrophotometric assay, and caspase-3 and caspase-9 enzymatic assay to assess cell death and apoptosis, respectively. Results: All corneal ulcers healed within 72 h. Average (±SD) LDH absorbance units (AU) for wounded corneas were 1.61 ± 0.47 AU for T48 and 0.80 ± 0.17 AU for T72. In wounded corneas 0.58 ± 0.07, 0, and 0 AU for T24, T48 and T72, respectively. No caspase-3 activity was detected in media from either wounded or unwounded corneas at any time point.

Conclusion: Cell death markers during experimental corneal wound healing. This study was partially supported by Iowa State Veterinary Clinical Sciences Research Incentive Grant and the American Quarter Horse Foundation. None.

Safety of topically applied 0.5% and 1% pirfenidone in a model of canine subconjunctival fibrosis

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Purpose: To evaluate the safety and tolerability of topically applied 0.5% and 1% pirfenidone in the treatment of experimental canine subconjunctival fibrosis. Methods: A subconjunctival collagen scar model was developed in 7 dogs. Two weeks after the scar model was established, 1.8 mm collagen scar models were inspected every 3 weeks for 6 weeks. Topical application: 0.5% pirfenidone, 1% pirfenidone or 0.9% saline. Results: No adverse effects were noted. Conclusion: Topical application of 0.5% and 1% pirfenidone appears to be well tolerated and safe in dogs, supported by a NCSU CVM Intramural Research Grant. None.

Evaluation of anti-angiogenic properties of equine amniotic membrane homogenate in tears of dogs with vascularized ulcerative keratitis

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Purpose: To evaluate the anti-angiogenic property of equine amniotic membrane homogenate (EAMH) and its anti-infective effect in tears of dogs with vascular ulcerated keratitis. Methods: Equine pigment epithelium-derived factor (PEDF) and vascular endothelial growth factor (VEGF) were evaluated by enzyme immunoassays (ELISA) in EAMH from ten mares. Tear samples (n = 40) from affected contralateral eyes of vascular corneal ulcers were used. Tear samples from affected eyes were pooled as: untreated tears (G1), tears with buffer (G2), tears with 0.21 mg/ml EAMH (G3), tears with 0.42 mg/ml EAMH (G4), and contralateral tears (G5). PEDF and VEGF levels in G1, G2, G3, and G4 were also analyzed. Results: Samples were submitted to ELISA and Western Blot (WB) for evaluation. Evaluation of VEGF revealed significantly higher VEGF in G1 (57.0 ± 12.0 ng/ml) compared to those treated with buffer (G2). Conclusions: EAMHs maintained a high concentration of PEDF after processing. VEGF concentrations are elevated by 11-fold in tears of dogs with vascularized ulcerative keratitis. High dose of EAMH was able to decrease the concentration of tears in dogs with vascularized corneal ulcers. Results suggest that EAMH may be able to reduce VEGF concentration in tears of dogs with vascular keratitis. Supported by The Foundation for Ophthalmology Research and Education International. None.

Biofilm formation in ocular bacterial isolates

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Purpose: To evaluate bacterial isolates from diseased ocular surfaces of dogs and horses for biofilm formation as this may explain why some infections are difficult to resolve. Standard culture and microtiter plate assay was more sensitive in detecting biofilm formation. Microtiter plate assay was more sensitive in detecting biofilm formation. Eighteen isolates were from dogs and 6 from horses. Thirteen isolates were from conjunctivitis and keratitis (CCT) and corneal diameter (CD).

Conclusions: OCT-histopathology comparison was used to further confirm the ORM marker. Using regression analysis, the raltegravir treatment group had significantly lower ocular disease scores, respiratory disease scores, and respiratory rates over time compared to the vehicle treatment group. The median duration of oral viral shedding was significantly shorter in the raltegravir group compared to the vehicle group. Although the raltegravir treatment group had lower viral ocular loads in comparison to the vehicle treatment group, the difference was not statistically significant. OCT, tear volume, and serum biochemical values were unremarkable throughout the study. Conclusions: Oral raltegravir, administered twice daily, may be a viable treatment option to alleviate the ocular and respiratory clinical signs associated with FHV-1 infection in cats. Supported by the Foundation for Ophthalmology Research and Education International. None.
Use of 0.03% aqueous tacrolimus for suspected immune-mediated ocular surface inflammation in cats

AM Willis

Purpose: To describe the use, tolerability and efficacy of compounded aqueous ophthalmic 0.03% tacrolimus suspension in cats in the steroid-sparing management of corneal and conjunctival neoplasms suspected to have an immune-mediated pathogenesis. Methods: Retrospective evaluation. Cats treated with tacrolimus for management of eosinophilic keratitis (EK, n = 10), idiopathic non-ulcerative keratitis (INUK, n = 4), stromal keratitis (n = 5), eosinophilic conjunctivitis/keratitis (EC/CS; n = 7), follicular conjunctivitis (FC; n = 6), and proliferative conjunctivitis/keratitis associated with symblepharon (PK/CS; n = 7) were included. Treated cats received topical tacrolimus twice daily until the development of anterior chamber cells or flare, at which time the dosage was reduced to q12 h dosing. Adjunctive antiviral and antibiotic therapy were used selectively. Results: Eosinophils, neutrophils, or both were identified in either cytology preparations or histopathology of all cats diagnosed with EK or FC. Lymphoplasmacytic inflammation was the predominant characteristic in cytology of FC and PK/CS patients. Aerobic corneal C&S was negative in one patient and positive in one patient tested. Multplex PCR was negative for FIV-1 in 5/7 cases tested, but positive for Mycoplasma felis in 3/5 patients. Aqueous-based tacrolimus was well tolerated by all cats. Revisi- sion of active disease was achieved in 9/10 cats with EK, 5 cats with INUK, 5/5 cats with SK, 1/7 cats with EKC/B, 4/5 cats with FC and 7/7 cats with PK/CS. Corneal ulceration associated with EK and PK/CS healed without complication with tacrolimus treatment and supportive antibiotic and antiviral therapy. Missions was a consistent side effect of treatment, suggesting intracellular or systemic absorption. No negative topical or systemic effects were noted. Conclusions: Tacrolimus was generally well tolerated by cats with dacryocystitis, lacrimal gland, corneal or conjunctival disorders. Aqueous-based tacrolimus has the highest reported incidence of side effects of topical treatment, regardless of compounding source or preservative. None.

Anterior segment parameters in normal dogs using the Pentacam-HR® Scheimpflug system

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Purpose: To describe and compare normative anterior segment parameters between different age groups of normal dogs using the Pentacam-HR® Scheimpflug system (Pentacam). Methods: Thirty-six sedated canines (60 eyes) of varying ages and breeds were imaged with the Penta- cam, only non-diseased anterior segments were included. Dogs were divided into three age groups: young (1–3 years), middle-aged (6–10 years), and old (11–15 years). Values assessed included central corneal thickness (CCT), anterior and posterior corneal elevation (ACE, PCE), anterior corneal curvature (AC), posterior corneal curvature (PC), and posterior corneal astigmatism (APA), anterior chamber depth (ACD), anterior chamber volume (ACV), and anterior chamber angle (ACA). Tuck adjusted pairwise comparisons were performed. Results: CCT overall (mean ± SD) was 631.07 ± 59.91 μm and by age was as follows: CCTT1, was 608.60 ± 48.63 μm, CCTT2, equaled 648.57 ± 51.06 μm, and CCTT3, was 653.17 ± 57.71 μm. ACE, was 0.28 ± 0.58 mm. PCE, measured 8.04 ± 0.30 μm. CCT, and PCV was 58.13 ± 5.19 mm. Antiglaucoma values were 1.34 ± 0.94D for AA and 0.45 ± 0.94D for PA. Anterior chamber values were 3.76 ± 0.56 mm for ACD, 38.68 ± 6.62 mm3 for ACV, and 23.62 ± 29.35 for ACA. Significant differences were only found between young and middle age groups for CV with CV1 was 54.04 ± 0.88 mm significantly lower than CV2 was 54.12 ± 4.09 mm1 (p = 0.02). Conclusions: Multiple canine anterior segment parameters were successfully measured with the Pentacam and age differences were found. While central corneal thickness does increase from young to middle- aged dogs, there was not statistically significant with our sample size. Corneal volume was signifi- cantly increased with age between young and middle-aged dogs. Other anterior segment parameters did not consistently show variation between age groups of normal dogs. Funded by Young Investigator Grant Program, Center for Companion Animal Studies, Colorado State University.

Safety and efficacy of treatment with mycophenolate mofetil in dogs with sudden acquired retinal degeneration syndrome

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Purpose: Sudden acquired retinal degeneration syndrome (SARDS) is a poorly understood cause of canine blindness of which there is no established therapy. As SARDS may be an immunemediated condition, some veterinary ophthalmologists advocate treatment with immunosuppressive corticosteroids. However, these may exacerbate some clinical signs asso- ciated with SARDS. Clinical case. A ten-month-old female mixed breed dog was admitted for bilateral retinal degeneration syndrome (retinopathy) with visual acuity difficulties identified by ophthalmic examination, electroretinography, testing of visual navigation ability, and optokinetic nystagmus. Previous episodes of retinal degeneration syndrome were associated with severe effects on vision, poor visual navigation ability significantly impacted visuomotor learning conditions, and the outer nuclear layer thinned significantly despite treat- ment. Conclusions: Although well tolerated, mycophenolate mofetil had no measurable effect on visual acuity in dogs with SARDS. Mycophenolate mofetil as a sole therapy is not effective in reversing retinal dysfunction and preventing degeneration associated with SARDS. ACVO Vision for Animals Foundation Resident Grant VAF2016-03. None. Stokes Pharmacy, 607 S Main St, King, NC 27021.

Retrospective evaluation of canine palpebral masses treated with debulking and cryotherapy: 46 cases

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Purpose: To evaluate the frequency of recurrence of canine palpebral masses treated with a formed gel and cryotherapy method. Methods: Medical records of dogs that underwent debulking and cryotherapy for palpebral masses from December 2010 to November 2015 at the University of Minnesota’s Veterinary Medical Center were reviewed. All masses included in the study were submitted for histopathology between 6 months (33%), 6–12 months (41%), 1 year (7%), 1–3 years (3%) and ≥3 years (9%). Recurrence was defined as the highest reported recurrence rate. Histopathological exami- nation was performed on all samples. Results: Seventeen (37%) were adenomas, 7 (15%) were epitheliomas (14%), 7 (15%) were adenocarcinomas (14%), 6 (13%) were inflammatory masses (13%), and 6 (13%) were mixed neoplasms containing both adenomas and epitheliomas (13%), and mixed neoplasms containing both adenomas and papillomas (64%). Of the 7 masses that were noted to recur, 2 (29%) were adenomas, 2 (29%) were epitheliomas, 1 (14%) was an adenocarcinoma, and 2 (29%) were adenocarcinomas and papillomas. Conclusions: Debunking and cryotherapy is an effective method of treatment for eyelid masses in dogs with a study recurrence rate of 15.2%. Results also sug- gest that adenocarcinomas may be the highest risk, followed by adenomas, epitheliomas, adenomas-papillomas (50%), and epitheliomas (25%), although more extensive research is necessary.

Surgical treatment for enucleation of a canine eye that has previously undergone a parotid duct transposition

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Purpose: To identify techniques for enucleation following parotid duct transposition (PDT) surgery in clinical practice as well as to characterize outcomes and complications associated with the procedure. Methods: An online poll of ACVO members and residents was performed to assess the surgical technique employed, complications observed and additional therapy instituted. Results: Thirty-three dogs fit the inclusion criteria. Small breed dogs (≤15 kg) made up 77% of patients. The time between PDT and enucleation was ≤6 months (33%), 6–12 months (33%), 1–2 years (18%) and ≥2 years (8%). Reasons for enucleation included: advancing corneal disease (6/13), disconform (5/13), reaction to saliva (2/13), decreased saliva production (1/13) and glaucoma (1/13). Surgical techniques included: formal enucleation (11/13), marginal ligation of the parotid duct for 7/13 and re-routing the duct to the oral cavity for 4/13. One patient who underwent duct ligation experienced prolonged dilation of the parotid duct that resolved without additional therapy. No other complications were reported. Conclusions: Ligation or re-routing of the parotid duct to the oral cavity are appropriate adjunctive surgical techniques following PDT and enucleation. None. Stokes Pharmacy, 607 S Main St, King, NC 27021.


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Purpose: To describe a successful, simple, and widely available treatment for canine distichi- a. Methods: Retrospective analysis of medical records for canine patients who under- went transconjunctival thermal electrosurgery treatment (TCEG) for distichiasis alone or with concurrent eyelid surgery between 2013 and 2016 at BluePearl Pennsylvania. Results: Twenty-six dogs (n = 88 eyelids) were included in the study. Sixty eyelids (68%) were treated for distichia only while 28 eyelids (32%) had concurrent eyelid surgery. Successful treat- ment was defined as resolution of clinical signs attributable to distichiasis. Twenty-five dogs (96%; 84 eyelids) were successfully treated with a single treatment (mean follow-up 187 days). Sixty-six eyelids (75%) had post-treatment recurrences. Twenty-two eyelids (25%) had recurrence at or near a previously treated site (mean follow-up 186 days). Most dogs (96%) with distichia recurrence remained asymptomatic, requiring no further treatment. Treatment for distichia margin pigment loss and mild to moderate eyelid swelling was seen in all treated eyelids postoperatively. One dog had significant recurrence on all eyelids requiring re-treatment which resulted in focal entropion in one eye. Suspected treatment site infec- tion (1/13) occurred in 2 days postoperatively (8%). One additional treatment was performed on all eyelids (88 distichia per eyelid) developed qualitative tear deficiency (54 days) and responded to topical tear stimulant therapy. Conclusions: Transconjunctival thermal electrosurgery is a successful, simple treatment for canine distichiasis.

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POSTER ABSTRACT

Does tropicamide affect intraocular pressure in the healthy anesthetized guinea pigs?
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Purpose: The aim of this study was to determine the concurrent effects of tropicamide and anesthesia on intraocular pressure (IOP) in healthy guinea pigs. Methods: Twenty-eight healthy adult guinea pigs (12 males and 16 females) were used in this study, which randomly assigned to four groups. Prior to anesthesia, baseline IOP (T0) of each group was recorded. Then, one drop of tropicamide was instilled randomly into one eye of each animal and the contralateral eye was served as control. Ketamine (30 mg/kg), midazolam (1 mg/kg), medetomidine (0.5 mg/kg), and one drop of anesthetic state maintenance were instilled into each eye. IOP measurements were repeated at 10 min (T10), 30 min (T30), 60 min (T60), 120 min (T120), and 180 min (T180). Results: No significant differences were found between tropicamide treated eyes and control eyes at each time point in all groups. Mean ± SD baseline IOP of ketamine, midazolam, medetomidine and control groups were 10.58 ± 0.55, 10.57 ± 0.47, 10.57 ± 0.56, and 10.67 ± 1.23 mmHg, respectively. In ketamine and midazolam groups, the IOP increased over the time, however, this increase was only statistically significant in the midazolam group (P < 0.05). Medetomidine administration produced a significant increase in IOP, which was more pronounced in medetomidine and ketamine group, the IOP was increased in these groups after 10 min. In tropicamide instilled eyes, IOP increased after 10 min and reached to a maximum at 30 min compared to control eyes. Conclusions: Tropicamide significantly increase IOP in the control group measured with systemic effect of tropicamide. None.

Ocular volume determination in normal feline eyes
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Purpose: The object of this study was to determine the ocular volume by three-dimensional (3D) ultrasound and Computed Tomography (CT) in clinically normal adult domestic Tishe Shorthair (DHS) cats. Methods: In this study, ten adult DHS cats (6 males, 4 females) weighing between 2.90 and 6.76 kg were used. All physical examinations performed and cats were selected based on normal physical and ophthalmic examinations. Ocular volume was measured in each cat with euthanasia. Each enucleated globe was instilled with a combination of Ketamine (10%), Alfasan, Woerden, Netherlands and midazolam (Midamax, Tehran Chemical Pharmaceuticals Company, Tehran, Iran) injection and ocular volume were calculated by CT. All data statistically were analyzed and compared with gender as well as the correlation with the body weight was done. Results: The mean ± SD ocular volume by 3D ultrasound and CT evaluation was 4.32 ± 0.47 cm3 and 4.43 ± 0.74 cm3, respectively. No significant difference was found between the right and left eyes, nor males and females in both imaging methods. There was a positive correlation between ocular volume and body weight (r² = 0.22, P = 0.002 and 0.009, respectively). Conclusions: This is the first report describing the normal value of ocular volume in the cats. The results of this study would ameliorate the ability of interpretation on 3D ultrasound and CT images and would be useful for diagnosis and treatment of some ophthalmic diseases. None.

Development of a novel multi-species ex vivo corneal fibrosis model
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Purpose: To develop a multi-species ex vivo corneal culture model in which wounded tissues predictably epithelialize and form subepithelial haze, while preserving natural radius of curvature and biomechanics of wound healing. Methods: Cornealerm tissues were harvested from clinically normal globes of dogs (~ 16 cornerae) and rabbits (~ 21 corneas). All were then cultured in a buffered DMEM / Ham’s F-12 based medium and maintained at 37°C and 5% CO2. The control group (dog n = 8, rabbit n = 10) contained unwounded corneas. The treatment group (dog n = 8, rabbit n = 11) contained corneas which received axial stromal wounds with an eximer laser (depth: 250 μm in dogs, 155 μm in rabbits; diameter: 6 mm). Each cornea was fluorochrome-stained and photographed every 6-12 h until full epithelialization occurred. Wound surface area (mm2) was calculated for each cornea to assess epithelialization rate. All corneae were also photographed at 0, 7, 14, and 21 days to record changes in optical clarity ( haze). Results: The mean epithelialization time was 47 h in the canine experimental group and 63 h in the lagomorph experimental group. All wounded canine and lagomorph corneal specimens which survived for 21 days developed significantly increased area associated fibrosis, characterized by a roughly circular, diffuse, cloud-like pattern of optical haze. All corneas maintained a normal radius of curvature throughout the study period, and unwounded control corneas did not develop axial haze. Conclusions: Stromal-wounded ex vivo corneal reliably produced axial haze analogous to that of a wounded cornea ex vivo. In addition, the model successfully supported tissues from two morphologically diverse species with minimal modifications. Future models may be adapted for additional species based on these results. Support: UF internal grants. None.
Enrofloxacin concentration in aqueous humor and humor vitreous of fetuses and foals after administration in pregnant mares
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Purpose: To determine the ability of enrofloxacin to cross the placenta and the ocular barriers
through the last stage of pregnancy in mares, and cause ocular alterations in fetuses and foals.
Methods: Enrofloxacin was given to 12 healthy mares around 250 days of gestation, at doses of 5 mg/kg IV (G1, n = 4), 7.5 mg/kg orally (G2, n = 10), 10 mg/kg IV (G1, n = 4) and 15 mg/kg orally (G4, n = 2), every 24 h for 15 days. In G1 and G4, 24 h after the last dose, parturition was induced for reasons unrelated to this study. In G2 and G4, normal parturition was performed and foals were maintained for 10 days. Fetuses and foals were humanly euthanized for reasons unrelated to this study. Both eyes were enucleated and submitted for histologic evaluation. Levels of enrofloxacin in the aqueous humor and vitreous (G1 = 199.5 ± 38.3 μg/ml, G3 = 417.8 ± 22.1 μg/ml) of all individuals and in the fetuses’ aqueous humor (G2 = 1.35 ± 1.49 μg/ml, G2 = 1.1 ± 1.13 μg/ml) and vitreous (G3 = 1.25 ± 0.07 μg/ml, G2 = 2.3 ± 0.56 μg/ml) of all individuals. No histologic abnormalities were detected in any individual. Conclusions: Enrofloxacin was able to cross the placenta and the ocular barriers and reach the aqueous humor and humor vitreous in fetuses and foals. However, it did not induce to any histologic abnormality. Supported by Department of Veterinary Clinical Medicine Funds and USDA Hatch Funds. None.

Automated versus manual refractive error measurements in domestic cats
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Purpose: To compare the results of streak retinoscopy (SR) vs. the Welch Allyn SureSight pediatric (WASSpediatric) to determine the ability of enrofloxacin to cross the placenta and the ocular barriers and reach the aqueous humor and humor vitreous in fetuses and foals. Methods: Enrofloxacin was given to 12 healthy mares around 250 days of gestation, at doses of 5 mg/kg IV (G1, n = 4), 7.5 mg/kg orally (G2, n = 10), 10 mg/kg IV (G1, n = 4) and 15 mg/kg orally (G4, n = 2), every 24 h for 15 days. In G1 and G4, 24 h after the last dose, parturition was induced for reasons unrelated to this study. In G2 and G4, normal parturition was performed and foals were maintained for 10 days. Fetuses and foals were humanly euthanized for reasons unrelated to this study. Both eyes were enucleated and submitted for histologic evaluation. Levels of enrofloxacin in the aqueous humor and vitreous (G1 = 199.5 ± 38.3 μg/ml, G3 = 417.8 ± 22.1 μg/ml) of all individuals and in the fetuses’ aqueous humor (G2 = 1.35 ± 1.49 μg/ml, G2 = 1.1 ± 1.13 μg/ml) and vitreous (G3 = 1.25 ± 0.07 μg/ml, G2 = 2.3 ± 0.56 μg/ml) of all individuals. No histologic abnormalities were detected in any individual. Conclusions: Enrofloxacin was able to cross the placenta and the ocular barriers and reach the aqueous humor and humor vitreous in fetuses and foals. However, it did not induce to any histologic abnormality. Supported by Department of Veterinary Clinical Medicine Funds and USDA Hatch Funds. None.

Manual and automated refractive error measurements in domestic cats
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Purpose: To compare the results of streak retinoscopy (SR) vs. the Welch Allyn SureSight pediatric (WASSpediatric) to determine the ability of enrofloxacin to cross the placenta and the ocular barriers and reach the aqueous humor and humor vitreous in fetuses and foals. Methods: Enrofloxacin was given to 12 healthy mares around 250 days of gestation, at doses of 5 mg/kg IV (G1, n = 4), 7.5 mg/kg orally (G2, n = 10), 10 mg/kg IV (G1, n = 4) and 15 mg/kg orally (G4, n = 2), every 24 h for 15 days. In G1 and G4, 24 h after the last dose, parturition was induced for reasons unrelated to this study. In G2 and G4, normal parturition was performed and foals were maintained for 10 days. Fetuses and foals were humanly euthanized for reasons unrelated to this study. Both eyes were enucleated and submitted for histologic evaluation. Levels of enrofloxacin in the aqueous humor and vitreous (G1 = 199.5 ± 38.3 μg/ml, G3 = 417.8 ± 22.1 μg/ml) of all individuals and in the fetuses’ aqueous humor (G2 = 1.35 ± 1.49 μg/ml, G2 = 1.1 ± 1.13 μg/ml) and vitreous (G3 = 1.25 ± 0.07 μg/ml, G2 = 2.3 ± 0.56 μg/ml) of all individuals. No histologic abnormalities were detected in any individual. Conclusions: Enrofloxacin was able to cross the placenta and the ocular barriers and reach the aqueous humor and humor vitreous in fetuses and foals. However, it did not induce to any histologic abnormality. Supported by Department of Veterinary Clinical Medicine Funds and USDA Hatch Funds. None.
cause from an autoimmune mediated disease (case 6, 3 days with worse condition). The conventional treatments were replaced by application of the substitute and additional antibiotics 4 times per day. Results: All cases of superficial CUs were cured with the treatment of the substitute and antibiotics within 7–12 days (cases 1–3) or 52 days (case 4). The treatment also resulted in healing within 2 months in case 5. In case 6, improvement of the lesion was observed after 1 week of replaced treatment, but cure of the lesion could not be confirmed because of the sudden death. Conclusions: The 0.1% PVA / 0.1% SHF 5% DMSO tear substitute is available as an adjunctive drug for treating canine CUs in addition to its use for keratoconjunctivitis sicca.

### Sebaceous carcinoma in a Bengal tiger (Panthera tigris tigris) in captivity

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Purpose: To describe the first case of a sebaceous carcinoma in the caruncle area of a Bengal tiger (Panthera tigris tigris) in captivity. Methods: A 16-year old zoo-kept intact male tiger was examined with an altered and blending mass of 1.5 mm in diameter located on the left eye caruncle. The mass was completely removed under general anesthesia by a medical cannthoplasty at one week after the initial presentation. Recheck examinations were performed on days 1, 5, 15, and 30 and 18 months after surgery. Results: Histological evaluation confirmed the diagnosis of sebaceous carcinoma. There were no recurrences at 1.5 years after surgery. Conclusion: This is the first case of a sebaceous carcinoma in a tiger in captivity described in South America, and the first in an atypical anatomic location (caruncle) which was early and successfully removed. There was no recurrence at 1.5 years.

### Anatomical features of the optic canal and the cephalic index in the cranial bone of healthy dogs

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Purpose: We studied the anatomical features of the optical canal among brachycephalic, mesocephalic, and dolichocephalic dogs, which are characterized by cephalic indexes, by analyzing computed tomography (CT) images of the head in healthy dogs. Methods: Thirty-two adult healthy dogs were divided into three groups. The eight brachycephalic dogs included three Cavalier King Charles spaniels, two French bulldogs and Chihuahuas, and one Shih Tzu. The 13 mesocephalic dogs included four American cocker spaniels and Cardigan Welsh corgis, two toy poodles and Yorkshire terriers, and one Labrador retriever. The 11 dolichocephalic dogs included nine miniature dachshunds, one Great Dane and Shetland sheepdogs. OstiX Lite software (v.8.0.2; Neuro SRL, Switzerland) was used to measure the length and diameter of the optic canal and the angle of the paired canals, and cephalic indexes, with the CT images of the heads. Values among the groups were analyzed using a post hoc test. Results: Stockard’s and Evans’ cephalic index in the brachycephalic group were 94.3 ± 3.7 and 79.4 ± 12.0, respectively, and significantly higher than those of the mesocephalic and dolichocephalic groups. The angle of paired canals in the brachycephalic, mesocephalic, and dolichocephalic groups was 103.1 ± 12.8, 82.9 ± 8.1, and 79.7 ± 5.7 degrees, respectively. There was a positive correlation between the angle of optic canals and the cephalic index. There was no significant difference in the length and diameter of the optic canals among the groups. Conclusion: The position of the optic canal varies with cranial morphology in dogs.

### Fibrin glue obtained from concentrated self-plasma for treating chronic superficial corneal problems in senior dogs

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Purpose: To evaluate and compare the fibrinogen levels concentrated from plasma using a rapid method and a conventional procedure, and to apply the fibrin glue, obtained from concentrated self-plasma using the rapid method, for treating chronic corneal problems in senior dogs. Methods: Topical 5% fluorouracil as adjuvant therapy for ocular fibropapilloma tumors in green sea turtles (Chelonia mydas)

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Purpose: To evaluate the fibrinogen levels concentrated from plasma using a rapid method and a conventional procedure, and to apply the fibrin glue, obtained from concentrated self-plasma using the rapid method, for treating chronic corneal problems in senior dogs. Methods: Topical 5-fluorouracil (5FU), an antimetabolite chemotherapeutic agent, formulated as a 1% topical ophthalmic solution, was used to treat 204 Green Sea Turtle eyes (107 turtles) after surgical removal or debulking of ocular and periocular fibropapilloma (FP) tumors. Methods: Treatment consisted of twice daily application of 5FU for 6–8 weeks post surgical tumor removal. Turtles were kept for observation at least 9 months from the time of tumor removal. Results: Eighty-eight of 107 turtles had no recurrence of eye tumors. Forty-five turtles were released and 10 turtles are still in rehabilitation. Fifty-two turtles died or were euthanized due to systemic problems, sepsis, or fibropapilloma tumors with the time of observation. Nineteen turtles had regrowth of ocular tumors. Conclusions: 5FU adjuvant therapy improves the visual outcome and chance for release of turtles affected with bilateral ocular FP tumors compared to previous treatment protocols.

### Assessment of meibomian glands morphology using non-contact meibography in Shih Tzu dogs with or without keratoconjunctivitis sicca

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Purpose: To investigate, using non-contact meibography, meibomian gland (MG) morphology in Shih Tzu dogs with keratoconjunctivitis sicca (KCS). Methods: Fourteen eyes of 12 Shih Tzu dogs presented to Yakumo Animal Hospital and Triangle Animal Eye Clinic from 2011–2017, and with clinical signs and Schirmer tear test (SST) results consistent with KCS (>10 mm/minute) were examined. Their mean (range) age was 10.7 (7–13) years. Twenty-eight eyes of 16 Shih Tzu with normal eyes and SST >18 mm/minute served as controls. Their mean (range) age was 12.3 (10–13) years. Both groups of dogs underwent routine slit lamp biomicroscopy followed by meibography of the upper eyelid using SD-03 (Topcon Japan) and Meibomian (JFC Japan). Results: Meibography revealed morphological changes in the MGs of 13 eyes of 11 dogs with KCS. These included MG atrophy in 64% and loss of glandular structure in 64% of eyes. Morphological changes were also seen in the MGs of 11 dogs in the control group. This included atrophy in 50%, and loss of glandular structure in 21% of eyes. Loss of a glandular structure was significantly more common in dogs with KCS than control dogs (P < 0.05). Conclusions: Altered MG structure occurs commonly in Shih Tzu with KCS. This suggests that altered tear quality and associated increased tear evaporation and decreased tear film stability probably compounds decreased tear volume in patients with aqueous deficiency. None.
Effect of 0.15% sodium hyaluronate on tear film breakup time in dogs with keratoconjunctivitis sicca and in healthy dogs

Conclusions: It can be concluded that in dogs with KCS, SH lasts longer periods on the positively when the healthy and diseased eyes were grouped (r = 0.01). TFBUT in non-anaesthetized cats at any time point (<0.05). GCD was quantified as 0.5% carboxymethylcellulose on tear film breakup time (TFBUT) in 10 healthy dogs and in 32 eyes of dogs with keratoconjunctivitis sicca (KCS). In addition, the goblet cell density of 0.15% sodium hyaluronate (SH) did not increase in non-anaesthetized cats at any time point (P = 0.31). GCD correlated positively with TFBUT (r = 0.02; r = 0.60). TFBUT decreased significantly in control eyes at all time points after anesthesia, when compared with baseline of non-anaesthetized cats (P < 0.0001). TFBUT increased significantly in SH-treated eyes, only at T40 after anesthesia, when compared with baseline of non-anaesthetized cats (P < 0.0001).

Investigation of histopathology and locations of eyelid tumors in 120 dogs

Purpose: To analyze clinical characteristics, locations and histopathology of eyelid tumors cases in 120 dogs. Methods: We collected canine eyelid tumors diagnosed at the National Taiwan University Veterinary Hospital (NTUHV) and Vision Eyearee Center for Animals (VECA) between 2012 and 2017. All eyelid tumors of 120 dogs were surgically excised and the excised specimens were submitted for histopathological analysis. All specimens were initially fixed in 10% neutral buffered formalin for 48 hours. Staining was performed according to the type of stain used, including hematoxylin and eosin (H&E), periodic acid Schiff (PAS), and Masson’s trichrome (MT). Results: No significant difference of eyelid tumors was found between female and male dogs. The average age of eyelid tumors at diagnosis was 9.18 years. Benign tumors largely predominate over malignant ones, representing 83% of all cases in this study. The most frequent tumor types were epithelium (32%), melanoblastoma (25%), and melanoblastoma gland adenoma (21%). Precise locations of eyelid tumors in the patients were analyzed. We found that eyelid tumors involved the upper eyelid in 62% of patients. The most common site of tumor involvement was in the upper lateral lid (52%), followed by upper central lid (20%), lower medial lid (15%), lower central lid (14%), upper medial lid (11%), and lower lateral lid (8%).

Investigation of pattern and severity of posterior capsular opacification in rabbits with pseudophakic and aphakic eyes

Purpose: The purpose of this study was to compare the pattern and severity of posterior capsular opacification (PCO) between implanting injectable canine IOL, human IOL, and canine IOL. Methods: The rabbits were divided into 7 groups: group 1: Aikreos (Bausch & Lomb). The contralateral eye was aphakin (a = 0). 7 weeks post-surgeries, photos were recorded under Miyake-Apple view. Gross PCO scores were calculated by multiplying the density of opacification (gradated from 0 to 4) by the percentage of capsula area that PCO involved. Gross PCO scores of central capsule (under IOL optic or central 6.0 mm area) on retina and intraocular pressure (IOP) in rats. Histopathological analysis confirmed the space-occupying effects by IOLs. Anterior-posterior capsular adhesion in aphakin eyes formed a strong barrier of intraocular pressure (IOP) in rats (46). Results: Gross PCO scores listed in order as below: (1) periphery of aphakin eyes (>2) periphery of pseudophakic eyes (>1) central aphakin eyes (>4) central of pseudophakic eyes. Statistical differences were showed between (1) (2) (3) and (4) groups. Histopathological evaluation confirmed the space-occupying effects by IOLs. Anterior-posterior capsular adhesion in aphakin eyes formed a strong barrier of intraocular pressure (IOP) in rats (46).

The effects of generalized oxidative stress on retina and intraocular pressure in rats

Purpose: The aim of the study was to investigate the effects of generalized oxidative stress on retinal and intraocular pressure (IOP) in rats. Methods: A rat model of oxidative stress was induced by low dose D-galactose (100 mg/kg, SC, s.i.d) for 8 weeks. We investigated biochemical parameters of fundus fluorescein angiography (FFA) and retinal function tests. Results: Reduced retinal capillaries and stroma (4) central of pesudophakic eyes. Statistical differences were showed between (1) (2) (3) and (4) groups. Histopathological evaluation confirmed the space-occupying effects by IOLs. Anterior-posterior capsular adhesion in aphakin eyes formed a strong barrier of intraocular pressure (IOP) in rats.

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Bandage lens induced eosinophilic keratitis in a cat
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Purpose: To describe a case of eosinophilic keratitis in a cat occurring after application of a bandage lens
Methods: A 10-week-old male domestic shorthair cat was referred for a chronic indolent ulcer of the right eye. Ophthalmic examination of the right eye revealed a waxy anterior stromal opacity with loss of epithelial edges of the medial cornea, superficial and stromal vascularization of the lateral cornea and central corneal degeneration. The ulcer was defended under local anaesthesia with a bandage lens and a bandage lens was applied. Topical 0.1% diflucan and 1% chloramphenicol were prescribed every 8 h for the right eye. Results: Two weeks later no ulceration was seen and the bandage lens was removed. No conjunctival effusion was present over the nasal side of the right eye. The bandage lens had a black score of 1 and a white coloured tissue was noted on the inside of the lens. Intraocular pressure was normal.

Conclusions: The bandage lens revealed an anterior stromal ulcer which was caused by the bandage keratitis was made more evident with topical dexamethasone QOD. Two weeks later the eosinophilic keratitis had resolved. None. Efficacy of long-term topical flurbiprofen in limiting posterior capsular opacification following phacoemulsification in dogs – a pilot study
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Purpose: To assess posterior capsular opacity (PCO) following phacoemulsification in dogs receiving long-term ophthalmic flurbiprofen as compared to placebo.
Methods: Prospective, randomized, masked clinical study assessing two groups of dogs (flurbiprofen Group-F versus saline Group-S) for six months following phacoemulsification. Complete eye examination and photographs were undertaken at each visit, beginning 3 weeks post-surgery, at 2, 3, 6, and 12 months post-surgery. Post-operative treatment protocols were similar for each group except that Group-F received a hyperosmotic flurbiprofen solution, 0.5% (CIBA) once daily for the remaining duration of the study, and Group A received artificial tears once a day for 6 months. Digital photographs were analyzed by two independent observers using ImageJ software (NIH, USA). Results: The mean initial score for Group A was 0.94 and Group F was 1.1. The mean change in subjective PCO score for Group A was 0.5, and was 0.2 for Group F at six months post-surgery. There was no statistically significant difference between the groups at 6 months. None.

Conclusions: Topical flurbiprofen 0.5% applied once daily for 6 months following phacoemulsification does not appear to lead to statistically significant difference between the groups at 6 months.

Comparison of schirmer tear test, phenol red thread test and endodontic absorbent paper point tear test for measurement of the aqueous tear film fraction in healthy cats and their correlation to stress level
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Purpose: To compare measurements of the aqueous tear film fraction in healthy cats obtained using different quantitative tear tests while exploring the impact of stress level.
Methods: A prospective, randomized, cross-over study was performed using twenty-three healthy adult cats with normal ophthalmic exams. Three quantitative tear tests (STT, PRT and SST) were performed within a period of 24 hours and stress level was quantified prior to and during each individual test using a published modified Demeanor Score. Tear production values and stress level were compared using analysis of variance (ANOVA), except for the correlation between tear stress scores and stress scores which was verified by Scatterplot and Pearson's correlation coefficient. Results: Mean STT (mm/15 s) was 26.39 (± 4.9), mean PRT (mm/15 s) was 26.19 (± 5.06) and mean SST (mm/15 s) was 11.95 (± 2.7). There was no significant difference in stress score assessed between STT and PRT (P = 0.099). A weak negative correlation was found between STT and stress score in both eyes (r = -0.4) and between PRT and stress score OS (r = -0.26). No correlation was noted between PRT OD and stress score or between PTTT and stress score in both eyes. Conclusions: Stress level may influence STT and PRTT results, but does not appear to influence PPTT results. None.

Pleomorphic iridociliary adenocarcinoma with extracocular extension in a dog
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Purpose: To report a case of pleomorphic iridociliary adenocarcinoma with extracocular extension in a dog.
Methods: A 7-year-old male boxer weighing 32 kg presented with a 4-month history of visual impairment. Physical examination revealed ocular closure, external globular proptosis and a 1 mm retrobulbar mass. Results: Examination revealed a multifocal, pink, raised mass extruding from inside the eye of the right eye. Externally, there was a firm, non-pulsatile, 5 × 3 × 1 cm mass located to the nasal side retrobulbar mass. MRI of the right eye revealed a large extraocular mass that was hypo-intense to the cornea. The remainder of the globe could not be visualized. Complete staging did not reveal any metastatic involvement. Gross examination of the globe revealed an expanding, unencapsulated, poorly circumscribed and invasive neoplasm effacing the iris, anterior and posterior chamber, cornea, sclera, and choroid with exophytic extension through the cornea. Neoplastic cells originated from the ciliary body and were arranged in tubules, cords, nests and clusters. Neoplastic cells were cuboidal to polygonal, with marked anisocytosis and anisokaryosis, with 150 mitotic figures in ten high power fields. Neoplastic cells were found in blood vessels. Electron microscopy revealed the neoplastic cells were immunoreactive for neurofilaments and vimentin. The neoplasm was diagnosed as pleomorphic adenocarcinoma of the ciliary body with extracocular extension.

Conclusions: To the authors’ knowledge, this is the first report

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Ocular manifestations of Cryptococcus gattii in a dog in Oregon: case report

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Purpose: To describe the ocular clinical signs and the progress over 3 months of a dog with retrobulbar cryptococcosis, which was confirmed as Cryptococcus gattii via retrobulbar aspirate culture. Methods: A 2-year-old intact male Doberman Pinscher – mix breed dog was presented to the right eye with photophobia, orbital pain, and blepharospasm. Fine needle aspiration of the retrobulbar tissues was performed for diagnostic evaluation. Results: Based on clinical signs and results of fine needle aspiration, a presumptive diagnosis of orbital cellulitis was made. The dog was started on a course of oral antibiotics (Marbofloxacin and Augmentin) for a presumptive diagnosis of cellulitis. However, his clinical signs did not improve, so further diagnostic workup was pursued. The retrobulbar aspirate was sent to the lab for bacterial/fungal culture and cytology. The results of the culture were negative for bacteria, but cytology showed numerous broad-base budding yeast cells consistent with Cryptococcus gattii. Conclusion: To the author’s knowledge, this is the first report of Cryptococcus gattii diagnosed via fungal culture from a retrobulbar aspirate. None.

Correlation between spectral domain optical coherence tomography and histographic evaluation of the retina of blue-fronted parrots (Amazona aestiva)

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Purpose: To perform standardized spectral domain optical coherence tomography (SD-OCT) in the retina of healthy, adult, mix-breed parrots (Amazona aestiva) and compare the measurements to those taken on histographic evaluation. Methods: Forty-three parrots had their pupils dilated with topical instillation of cyclopentolate (0.5 mg/ml). They were anesthetized with midazolam IM (0.5 mg/kg) and propofol IV (5 mg/ml), and then examined by SD-OCT (Heidelberg Engineering Spectralis OCT; Heidelberg Engineering, CA, USA). Measurements of the retinal (RT), neurosensory retina (RN), and the thickness of ganglion cells (GCC) consisting of tenebrosa fiber layer, ganglion cell layer, external plexiform layer were acquired. Two parrots were euthanized, their eyes enucleated, and then retinal analysis and measurement using the fluorescence microscope BX61VS (Research System Microscope Olympus BX61VS, Olympus Corporation, Tokyo, Japan) and VS-ASW® software. Results: SD-OCT measurements were obtained for the retinal thickness, 279.4 ± 17.4 μm for RT, 60.5 ± 5.3 μm for RN, and 60.5 ± 5.3 μm for CCG respectively. The histologic measurements were 260.0 ± 68.8 μm, 218.2 ± 50.3 μm and 129.9 ± 29.2 μm for RT, RN and CCG respectively. The correlation between these two measurements obtained by OCT and by microscopy was high (r = 0.86, P < 0.0001). When each was analyzed separately, GCC showed a better correlation (r = 0.69, P < 0.0001). Conclusions: OCT was an excellent instrument to measure the blue-fronted parrot retina, providing detailed and accurate images of the posterior segment when compared to histographic evaluation. Support: FAESF grant n°2011/24039-8.

Post-treatment effects of two steroid anti-inflammatory ophthalmic drugs on protein concentration in the secondary aqueous humor of dogs

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Purpose: To investigate the post-treatment effects of two topical anti-inflammatory ophthalmic drugs on the breakdown of blood-aqueous barrier (BAB) in rabbits. Methods: 24 ocular-normal dogs were equally divided into one control and two treatment groups (n = 8/group). Non-leaking anterior chamber paracentesis (450 μl) was performed in one eye of each dog. Drugs in the control group received no medication and those in the treatment groups received topical anti-inflammatory medication (difluorinated prednisolone emulsion (DFBA), 0.05% or betamethasone sodium phosphate ophthalmic solution (BMZ), 0.1%) at 0, 15, 30 and 45 min after initial paracentesis in the treated eyes. The secondary aqueous humor (AH) was collected 60 min after the initial paracentesis. Protein concentration in AH was determined using the bicinchoninic acid assay. Results: The treatment with both drugs, particularly DFBA (P < 0.05), reduced protein concentration in the secondary AH. With both drugs, there was no significant difference in the intracameral pressure and pupil diameter between the groups at any post-treatment points. Conclusion: Post-treatment effects of DFBA were more effective than those of BMZ for reducing aqueous protein content in dogs with paracentesis-induced BAB breakdown. These results indicated that DFBA may be an appropriate treatment in an early stage of acute anterior uveitis caused by intraocular surgery in dogs. Supported by the Sasakawa Scientific Research Grant from The Japan Science Society (19-419).

Detection of papillomavirus DNA in canine lobular orbital adenoma

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Purpose: Our study aims are (1) to evaluate phenotypically normal canine conjunctival and orbital tissue for the presence of Papillomavirus DNA, (2) to determine if papillomavirus DNA is present in tissue from canine lobular orbital adenomas and (3) to determine if papillomavirus DNA is present in tissue from canine lobular orbital adenomas and (4) to determine if papillomavirus DNA is present in tissue from canine lobular orbital adenomas. Methods: Seventy-five formalin-fixed paraffin-embedded (FFPE) canine conjunctival and orbital tissue samples were obtained from the Comparative Ocular Pathology Lab of Wisconsin. In addition, a fresh ex vivo tumor sample was collected for analysis. Exfoliative biopsies of conjunctival and orbital tissues were collected from seven phenotypically normal dogs. Four FFPE tissue samples previously confirmed to be positive for papillomavirus DNA were used as positive controls. Non-exfoliative samples served as negative controls. Genomic DNA was extracted from all samples and evaluated via a non-species specific papillomavirus polymerase chain reaction (PCR). Results: Polymerase chain reaction results verified negative and positive controls. None of the exfoliative samples collected in this study were positive for canine papillomavirus DNA. Further research is needed to evaluate if other viruses play a role in the pathogenesis of canine conjunctival orbital adenoma. Supported by the MCVO Vision for Research Program and by the Sasakawa Scientific Research Grant VF17F01-01 and in part by the University of Missouri Piazza Honor Program. None.
Investigation of post-stabilization hyphema in shelter cats
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Purpose: Formally confirm and characterize cases of hyphema in shelter cats following stabilization surgery. Methods: In Part 1, a short survey regarding past experiences was sent to veterinarians in shelter, as well as High-Quality High-Volume Spa-Neuter (HOSVSN) practice members. They were asked to identify cats with hyphema that had been treated. In Part 2, a survey was conducted in shelters. A total of n = 35 shelters were surveyed and 180 cases of hyphema were collected. In Part 3, a total of n = 180 cases of hyphema were confirmed and characterized. Results: Of the 180 cases, 55% resulted in hyphema in the left eye, while 45% resulted in hyphema in the right eye. The majority of cats were male (75%) and the most common breeds were domestic longhair (44%) and domestic shorthair (35%). The most common causes of hyphema were trauma (50%) and iatrogenic (30%). Conclusion: Post-stabilization hyphema is a common and varied clinical problem in shelter cats.

Comparison of retinoid amino acid sequences across 11 species
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Purpose: To investigate microinjection of canine plasma eye drops using two types of eyedropper bottles.

Methods: Forty-six bottles containing plasma were dispensed for use on 42 dogs with corneal keratitis. Of these, 23 were standard eyedropper bottles and 23 were Novelia bottles. A mixed population of 11 species important to veterinary medicine was then selected for the study. The purpose of this study was to determine the overall microbial contamination rate. Results: The overall microbial contamination rate was 17.4% (8/46 bottles), however, only one bottle had growth from the plasma inside. There was a lower contamination rate with Novelia bottles (3/23 = 13.0%) compared to standard bottles (5/23 = 21.7%), but this was not statistically significant (P = 0.57). There was also a nonsignificant increase in contamination rate with bottle use time longer than 7 days (5/23 bottles = 21.7%) compared to 7 days or less (1/23 bottles = 4.3%). There were 4 times fewer samples for bacterial culture were obtained from a drop of plasma, the bottle tip, the plasma inside the bottle, and the corneal surface. Fungal culture was performed from a drop of plasma. Results: The overall microbial contamination rate was 17.4% (8/46 bottles), however, only one bottle had growth from the plasma inside. There was a lower contamination rate with Novelia bottles (3/23 = 13.0%) compared to standard bottles (5/23 = 21.7%), but this was not statistically significant (P = 0.57). There was also a nonsignificant increase in contamination rate with bottle use time longer than 7 days (5/23 bottles = 21.7%) compared to 7 days or less (1/23 bottles = 4.3%). There were 4 times fewer samples for bacterial culture were obtained from a drop of plasma, the bottle tip, the plasma inside the bottle, and the corneal surface. Fungal culture was performed from a drop of plasma.

Evaluation of microinjection of canine plasma eye drops using two types of eyedropper bottles
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Purpose: To investigate microinjection of canine plasma eye drops using two types of eyedropper bottles.

Methods: Forty-six bottles containing plasma were dispensed for use on 42 dogs with corneal keratitis. Of these, 23 were standard eyedropper bottles and 23 were Novelia bottles. A mixed population of 11 species important to veterinary medicine was then selected for the study. The purpose of this study was to determine the overall microbial contamination rate. Results: The overall microbial contamination rate was 17.4% (8/46 bottles), however, only one bottle had growth from the plasma inside. There was a lower contamination rate with Novelia bottles (3/23 = 13.0%) compared to standard bottles (5/23 = 21.7%), but this was not statistically significant (P = 0.57). There was also a nonsignificant increase in contamination rate with bottle use time longer than 7 days (5/23 bottles = 21.7%) compared to 7 days or less (1/23 bottles = 4.3%). There were 4 times fewer samples for bacterial culture were obtained from a drop of plasma, the bottle tip, the plasma inside the bottle, and the corneal surface. Fungal culture was performed from a drop of plasma. Results: The overall microbial contamination rate was 17.4% (8/46 bottles), however, only one bottle had growth from the plasma inside. There was a lower contamination rate with Novelia bottles (3/23 = 13.0%) compared to standard bottles (5/23 = 21.7%), but this was not statistically significant (P = 0.57). There was also a nonsignificant increase in contamination rate with bottle use time longer than 7 days (5/23 bottles = 21.7%) compared to 7 days or less (1/23 bottles = 4.3%). There were 4 times fewer samples for bacterial culture were obtained from a drop of plasma, the bottle tip, the plasma inside the bottle, and the corneal surface. Fungal culture was performed from a drop of plasma. Results: The overall microbial contamination rate was 17.4% (8/46 bottles), however, only one bottle had growth from the plasma inside. There was a lower contamination rate with Novelia bottles (3/23 = 13.0%) compared to standard bottles (5/23 = 21.7%), but this was not statistically significant (P = 0.57). There was also a nonsignificant increase in contamination rate with bottle use time longer than 7 days (5/23 bottles = 21.7%) compared to 7 days or less (1/23 bottles = 4.3%). There were 4 times fewer samples for bacterial culture were obtained from a drop of plasma, the bottle tip, the plasma inside the bottle, and the corneal surface. Fungal culture was performed from a drop of plasma.

Corneal squamous cell carcinoma and actinic keratosis: a retrospective case series with dogs living in a high ultraviolet index region in Brazil
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Purpose: Squamous cell carcinoma (SCC) is rare in dogs and there are few published case reports. This study reports a case series of 6 dogs with SCC and 1 dog with actinic keratosis (AK) treated at São José do Rio Preto Veterinary Hospital from 2009 to 2019. Results: Of the 7 dogs, 6 were diagnosed at the Veterinary Hospital “Dr. Halim Atique” in University Center of Rio Preto – UNIRP, and 1 dog with AK was treated at “Pet Visão”. The mean age of the affected dogs was 12 years and 2 months. Two males and 2 females were treated. One dog was a Boxer with AK. Surgical keratinocyte ablation was performed on both eyes at the Veterinary Hospital “Dr. Halim Atique”. Conclusions: Given that corneal SCC and AK are rarely reported in dogs, this case series observed in the same geographic location in a relatively short timespan suggest that some special factors may be contributing to the development of these neoplastic and pre-neoplastic lesions. According to the literature, exposure to ultraviolet light could increase the risk of developing SCC or AK. Since São José do...
Flicker fusion point of white-tailed deer and management implications for deer vehicle collisions

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Purpose: To measure the critical flicker fusion point (CFF) of white-tailed deer. Methods: 7 ophthalmically normal, captive raised white-tailed deer were anesthetized with xylazine 2 mg/kg combined with either ketamine 6 mg/kg or telazol 4 mg/kg. A custom electroretinogram (ERG) was performed measuring responses at frequencies of 0.5, 10, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90 and 100 hz at light intensities of 10-10,000 mcLm2/s for the scotopic study and 2500-10,000 mcLm2/s for the photopic study. Each waveform peak-to-peak amplitude was measured and the average at each stimulus frequency was calculated. The average peak-to-peak measurements (μV) were plotted against the stimulus frequency (hz) and a least means linear regression line was fit to the data. The CFF was determined at the x intercept with the x-axis representing a background noise amplitude of zero. CFF at each intensity was averaged. Results: CFF in the scotopic study ranges from 41 ± 4.7 Hz, 77.5 ± 21 Hz with each doubling of light intensity resulting in a 2-7 hz increase in the CFF point. The photopic study showed a CFF between 98 ± 4 Hz and 107 ± 9.8 Hz. Conclusion: Under scopic conditions, the CFF point in white-tailed deer is approximately 50 hz whereas under photopic conditions the CFF point is approximately 100 hz. The results show the importance of further investigation for the white-tailed deer management. For future studies, we hope to determine if developing a headlight below the CFF of deer, yet higher than the CFF of humans would decrease deer vehicle collisions. None.

Bacterial characterization and antimicrobial susceptibility of conjunctival flora in healthy dogs in Ibagué, Colombia

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Purpose: Identify bacterial conjunctival microflora and its susceptibility to antibiotics in healthy canines in Ibagué, Colombia. Methods: The study included 30 adult clinically normal dogs without ophthalmic alterations. Samples were obtained by passing a sterile swab moistened in sterile saline across the lower conjunctival sac of the right eye. The swabs were transported on Amies agar gel, inoculated in blood and MacConkey agars and incubated at 37°C under aerobic conditions for 24-48 h. Bacterial colonies were identified by classical methods (morphology, colony morphology and biochemical tests for identification). Results: Staphylococcus intermedius (7.14%), Actinomyces spp (14.28%), Corynebacterium striatum (14.28%), Staphylococcus spp (19.28%), Bacillus cereus (19.28%), Klebsiella pneumoniae (28.57%) and Enterococcus faecalis (28.57%). Conclusion: The most common findings had a history of recent arrival from another state with significant climatic difference. The results suggest that bacterial flora might be regionalized.

An overview of procollagen amino-propeptide type I (PINP) and procollagen amino-propeptide type III (PIIINP) protein expression in the normal and diseased canine corneal stroma

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Purpose: Determination of the corneal stroma by disease or injury often causes permanent scarring or blindness. One hypothesis is that the normal parallel organisation of collagen type I fibres is disrupted by the increased synthesis of disorganised collagen type III fibres that occurs during the initial reparative process following injury and disease. The aim of this study was to characterise the morphologic and immunohistochemical features of type I and type III collagen fibre organisation in white-tailed deer cornea.

Methods: Eighteen normal and four abnormal canine corneas were examined. Sagittal corneal sections were stained for histological examination with H&E and PAS, and immunohistochemically with anti-PINP and anti-PIIINP antibodies. PINP and PIIINP protein distribution was identified using confocal laser scanning microscopy; and quantified as the ratio (CFF) of [number/keratocyte] and [ng/100 μm2/keratocyte] using ImageJ. Results: PINP protein was expressed uniformly at a constant but low level across collagen fibre lamellae throughout all normal canine stroma whereas PIIINP protein was expressed sparsely or not detectably. In the diseased stroma, PINP and PIIINP protein expression was considerable increased in both distribution and volume. Distribution of PINP and PIIINP, in particular, was typically disorganised.

Conclusions: This study provides the arrangement and degree of expression of PINP and PIIINP protein in normal and diseased canine corneal stroma. Any protein synthesis was increased during injury; therefore, targeting collagen type III gene and protein expression may reduce scarring after corneal injury and disease. Supported by the Canine Research Foundation, the John and Mary Knoble Trust and The University of Queensland, Australia. Commercial Relationships: NY Vu, None; N Hamilton, None; DJ Whitworth, None; CR Green, None; and JD Wright, None.

Modified evisceration and intrascleral prosthesis in a Dusky Gopher Frog, Lithobates sevossus, due to corneal perforation and iris prolapse

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Purpose: The aim of this study was to evaluate the feasibility of a modified evisceration technique for treatment of a corneal perforation in a Dusky Gopher Frog, Lithobates sevossus. Methods: A mature female Dusky Gopher frog, Lithobates sevossus, an endangered species, presented to the University of Minnesota veterinary Medical Center for evaluation of right-sided traumatic corneal perforation of one-day duration. Results: Modified ocular evisceration was performed, removing the cornea and all intraocular contents while preserving the integrity of the cartilaginous sclera. This technique was selected to maintain normal swallowing capability through preservation of the globe's role in food propulsion. A 5 mm diameter silicone intracocular prosthesis was implanted, and the defect was closed via permanent suture, suturing the incising membrane to the immovable upper lid; anterior recovery was uneventful. Unfortunately, the frog died 24 h post-operatively. The official necropsy report implicates unrelated underlying renal disease as the ultimate cause of death. Conclusion: This report demonstrates the potential to utilize a modified evisceration technique for treatment of corneal perforation in frogs. Adequate depth of anesthesia was obtained and no adverse anesthetic effects were noted in the peri-operative period. Long-term follow-up was not available. None.

Conjunctival flora of normal thoroughbred horses in Rio de Janeiro, Brazil

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Purpose: To report and compare the prevalence of aerobic bacterial flora on the conjunctival fornix of normal eyes of horses stabled at Jockey Club Brasileiro and in a training facility in Rio de Janeiro. Methods: The investigation included 14 healthy race horses. 27 animals were stabled inside the racetrack and 7 at the training center 120 km from Jockey Club Brasileiro. Each animal had the ventral conjunctival fornix of right eye swabbed with sterile culture. Aerobic cultures were sent to the laboratory the same day. Results: Of 14 normal equine eyes, 21 were positive for Staphylococcus spp only (61.76%), the next most frequently isolated alone was Proteus spp. (17.65%) in 6 cases, one single sample was positive for Streptococcus spp (9.29%), 6 horses presented mixed bacterial flora. The most frequent aerobic flora were Staphylococcus spp/ Corynebacterium spp (8.83%), Staphylococcus spp/ Pseudomonas spp. (2.94%), Staphylococcus spp/ Klebsiella spp (2.94%) and Klebsiella spp/ Corynebacterium spp (2.94%). Conclusions: Among the Thoroughbred horses stabled inside Jockey Club Brasileiro Staphylococcus spp was the most frequently isolated organism, among the animals at the Training center (Proteus spp. was the most common aerobic bacteria. The horses that presented mixed flora findings had a history of recent arrival from another state with significant climatic difference. The results suggest that bacterial flora might be regionalized.