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## THE ORBIT: HOW TO RECOGNIZE AND TREAT ORBITAL DISEASE

### Anatomy

Orbital diseases are not uncommon in the dog and cat. The fact that carnivores have an incomplete bony orbit and the close vicinity of the oral and nasal cavity, tooth roots, and paranasal sinuses renders orbital structures susceptible to disease processes extending from any of these cavities through the orbital wall. The orbit can be divided into an intraconal and extraconal space, separated from each other by the fascial sheets that envelop the extraocular muscles.

### Clinical signs and examination

A full history needs to include information on the duration, onset and progression of the disease, any signs of pain and systemic disease, a possible history of trauma, any initiated treatments, the response to those treatments and the results of any diagnostic tests that have been performed.

Clinical signs are relatively non-specific with regards to etiology. Orbital diseases result in altered orbital volume, impaired function of orbital structures, or both. Changes in orbital volume manifest as exophthalmos or enophthalmos, depending on orbital volume decrease or increase, and depending on the location of a volume increase within the orbit. Diffuse orbital volume increases, or mass lesions located inside the muscle cone behind the globe, typically displace the globe in an anterior direction. Focal lesions outside the muscle cone in a nasal, temporal, inferior or superior position in relation to the globe, will displace or rotate the globe off-axis into a direction opposite the mass lesion and also result in nictitans membrane protrusion. Careful evaluation of any asymmetries or aberrations in axis orientation of both eyes, needs to be performed by observing both pupils at arms-length distance. The degree of exophthalmos or enophthalmos is estimated by determining the position of the axial cornea relative to the orbital ligament and other eye, both from a distance and from above. The immediate retrobulbar tissues can be palpated by retropulsion of the globe. In normal mesaticephalic and dolichocephalic dogs, the globe can be displaced caudally for some distance. This is usually not possible in brachycephalic breeds. In the

presence of space-occupying orbital lesions, retropulsion of the globe will be restricted or impossible, and may also be painful.

The bony rim of the orbit and the walls of the nasal cavity and paranasal sinuses should be carefully palpated and evaluated for the presence of any asymmetry. Percussion of the paranasal sinuses can be helpful to determine the presence of sinus occupying inflammatory or neoplastic material. The presence of a symmetric flow of air through both nostrils should be evaluated, as sinonasal tumors can cause tumor invasion of the orbit.

The oral cavity is routinely inspected, because disease processes from the oral cavity or teeth may adversely affect the orbit and its contents. Conversely, orbital diseases may cause swelling behind the last upper molar tooth. Restrictive myopathies, like masticatory muscle myositis, can cause restrictions or even an inability to open the mouth. The degree to which the mouth can be opened should be recorded during the initial and follow-up examinations in such cases.

Inflammatory changes within the orbit are usually accompanied by pain, especially upon globe retropulsion and when opening the mouth. Most dogs with orbital pain will therefore display difficulties with, or will vocalize during, some activities requiring jaw movement: chewing and eating (especially dry food, rawhides, bones), playing with balls and sticks, barking or yawning.

Inflammatory changes in the orbit (cellulitis, abscess formation) causing tissue edema can be accompanied by conjunctival chemosis and periocular swelling. In more extreme cases of exophthalmos exposure keratitis and corneal ulceration can occur.

The intraocular pressure can be mildly to moderately elevated due to increased pressure on the globe from behind.

### Ancillary diagnostic tests

Physical, ophthalmic, and neuro-ophthalmic examinations should be followed by a variety of diagnostic tests. A combination of diagnostic imaging and cytology/biopsy

# COMPANION ANIMAL

## OPHTHALMOLOGY

sample acquisition is usually employed to localize and identify orbital pathologies. Although almost always available, x-ray films are not the modality of choice for ocular disease. Nevertheless, in cases of orbital disease they may serve as a first survey modality. The limitations are the same as for any other part of the skull. Soft tissue swelling with depiction of the lesion center will be possible. Also, changes in the bony structures, such as periosteal reactions, fractures in cases of trauma, aggressive bone lesions causing osseous proliferation or destruction and lesions containing radiopaque material will be depicted. We have to consider that changes visible on films are usually rather advanced. Being confronted with such lesions, a decision to continue or not may be taken with the owners. Contrast radiography of orbital tissues has largely been displaced by more recent cross-sectional imaging techniques including orbital ultrasonography, computed tomography (CT) and magnetic resonance imaging (MRI). Ultrasound is a useful technique to image the orbit, especially for an initial screening for the presence of lesions and the real time guidance of FNA or tissue biopsy acquisition. In many respects advanced orbital imaging techniques are superior to the traditional techniques of radiography and ultrasonography, due to their superior tissue contrast resolution, ability to image the entire skull, including the adjacent nasosinal and cranial cavities, and their 3D reconstruction capabilities.

### **Orbital pathology**

The diagnosis and management of various orbital pathologies will be discussed. Special attention will be given to the differentiation of inflammatory and neoplastic orbital diseases, which is of clinical importance due to the difference in prognosis and therapy for both groups of diseases.

Inflammatory orbital diseases are typically characterized by the following symptoms: acute exophthalmos, pain, leucocytosis, inappetence and fever. With proper treatment the prognosis is excellent.

Neoplastic orbital diseases are typically characterized by a slow onset of unilateral exophthalmos in older patients and an absence of pain (depending on tumor type) and systemic signs. As these tumors are typically malignant and in an advanced stage at the time of diagnosis, treatment is often difficult and the prognosis poor.