# AFFECTIONS OF ORBIT IN ANIMALS

**Anatomical considerations:**

- The orbit is cone-shaped bony cavity and is incomplete laterally.
- Formed by six bones: **frontal, lacrimal, sphenoid, palatine, zygomatic and maxillary.**
- In brachycephalic group the lacrimal doesn't reach the orbit margin.
- On the frontal bone there is a rudimentary process called zygomatic process and on the zygomatic bone below it, there is another prominence called the frontal process. These two are joined by a fibrous tissue containing smooth muscle bands, the **orbital ligament.**
- The orbit houses the eyeball, optic nerve, extraocular muscles, the lacrimal gland, blood vessels and other nerves along with fat and fasciae; all the structures being enclosed in a fibrous **periorbital membrane.**
- **The optic foramen** is the pathway for the nerves and the internal ophthalmic artery.
- **The lacrimal gland** lies within the periorbital, shaped like a spatula.

**Affections:**

**a. Anophthalmia:** It is the congenital absence of the eyeball and the globe is replaced by a small solid or cystic mass. A rarest condition.

**b. Microphthalmia:**

- It is a congenital rudimentary ocular tissue resulting from the under development leading to the small sized globe.
- The eyeball is diminished in all diameters.
- Seen in all the breeds but most common in Chihuahuas, Collies, Poodles and Schnauzers.
- The vision is not affected.
- Doesn't require any treatment. Removal of the eyeball is indicated when there is extreme reduction in the size and blindness is there.

c. **Strabismus (Squint):**

- Deviation of one or both the globes from the normal visual axis.
- Mostly congenital but can be an acquired condition.
- Mostly seen in Pekingese, Pug, Boston terrier and Chihuahua breeds.
- Acquired strabismus mostly results from the orbital injury, luxation of the globe, cellulites, sinusitis or retrobulbar neoplasia.
- Normally there is impairment in the vision. However the appearance of the affected eye can be improved by repositioning the extra ocular muscles.

**Treatment:**

- When due to the injury, hot packs with pressure bandage provide temporary relief. The deviation is corrected with the reduction in the swelling.
- Use antibiotic and anti-inflammatory drugs.
- **Surgical treatment:** Elevate medial rectus muscle. Severe at its insertion on the sclera. In convergent type of strabismus, the muscle is cut and in divergent strabismus it is fixed laterally.

**d. Enophthalmos:**

- It is the sinking of the eyeball, may be caused by the trauma and surgical procedures.
- May result following intraocular haemorrhage, perforation of cornea, exudative uveitis. Sometimes the eyeball gets atrophied following these conditions and recedes into the orbit.
- Absorption of the orbital fat in aged and cachetic dogs may result into Enophthalmos.
- Temporary Enophthalmos is associated with spasm of retractor bulbi muscle because of ocular pain and is also a characteristic sign of tetanus.
- In Horner's syndrome there is a lesion of cervical sympathetic chain leading to the narrowing of palpebral fissure on the affected side and Enophthalmos results.

**Treatment:** Temporary Enophthalmos can be treated by using pain killers.

e. **Exophthalmos:** It is protrusion of the eyeball from the orbit and is also known as ***Proptosis.***

§ The globe often appears larger than normal and there is widening of the palpebral fissure without any increase in the intra ocular pressure.

§ Etiological factors include trauma, paranasal sinusitis, orbital cellulitis, orbital neoplasia, orbital haemorrhage, advanced glaucoma and temporal myositis.

§ The condition can be congenital when associated with buphthalmos (enlargement of the globe).

**Treatment:**

- Temporary Exophthalmos (sudden developments) can be treated by using topical antibiotics with corticosteroids for 7-9 days after the eyeball is retro pulsed i.e. pushed into the orbit.
- When Exophthalmos is associated with intra ocular tumors, Enucleation is recommended.

**f. Orbital cellulitis:** Also known as ***Retrobulbar abscess.***

- Most common **causes** for the development of retrobulbar abscess are

penetrating foreign body through conjunctiva, paranasal sinusitis. Exophthalmia is a prominent clinical sign.

- Mostly unilateral.
- **Clinical signs** include swelling of the lids with inflammation and protrusion of 3rd eyelid, chemosis, impairment of the mobility of the eyeball, blepharospasms, simple epiphora to blood-stained mucopurulent discharge and sometimes pyrexia and anorexia.
- Drainage of the abscess is mostly behind the upper molar tooth on the affected side

**Treatment:**

- Achieve general anaesthesia and intubate the animal.
- Insert the mouth speculum.
- Make a small incision using No. 11 BP blade just behind the last upper molar tooth.
- Insert a small artery forceps cautiously into the softest part of the abscess.
- The jaws of the forceps are spread apart as it is advanced. Mucopurulent exudate is usually seen at the opening. The pus drains out from the opening. Instill broad spectrum antibiotic into the incision.
- Use systemic broad spectrum antibiotics along with anti-inflammatory drugs for 5-7 days.
- Use topical ophthalmic antibiotic ointments to protect the exposed cornea.

g. **Orbital neoplasms:**

- Tumors arise in the orbit from any disease within the bony orbit.
- Most common orbital tumors are dermoids, carcinomas, melanosarcomas, eosinophilic granulomas and lipomas.
- Tumors can metastise from the frontal sinus, intra ocular tumors through vascular and nerve channels.
- **Clinical signs** include Proptosis, fever, marked pain, exophthalmos, swelling around the globe, globe deviation with diminished movement, prominent third eyelid, dilated pupil and may be blindness.

**Treatment:**

- Extirpation of the eyeball along with the tunics.
- Postoperative systemic antibiotics and anti-inflammatory drugs for 5-7 days.
- Local antiseptic dressing of the suture line.

- Sutures are removed after complete healing.

**h. Prolapse of the eyeball:** Mostly seen in brachycephalic dogs due to the trauma to periorbital or temporal region.

- **Clinical signs** include trapping of prolapsed eyeball outside the lids due to spasms of orbicularis oculi muscle.
- The cornea is dry and there is loss of appearance (cloudiness).
- The pupillary reflex may be delayed, incomplete or absent.
- Normally there is increase in the intra ocular pressure.
- Corneal erosion or ulceration may be seen.

**Treatment:**

- Prompt treatment is must to preserve the eyeball as well as the vision. Immediately replace back the prolapsed eyeball into the orbit (after lateral canthotomy, if needed) under general anaesthesia and go for temporary tarsorrhaphy after Subconjunctival injection of antibiotic and corticosteroid.
- Provide systemic antibiotics and anti-inflammatory drugs for 5-7 days.
- If extensive trauma, go for enucleation.
- When extent of damage to intra ocular structures can't be determined immediately because of corneal opacity, it is best to replace the prolapsed eyeball and wait for 1-2 weeks before deciding about the enucleation.

## SURGICAL TECHNIQUES OF EYEBALL

## EXTIRPATION OF Eye ball

### Indications

1. Neoplastic growth of the eye ball and adjacent tissue.
2. Penetrating wounds associated with evacuation of ocular contents and causing irreparable injury to the eye.
3. Supportive destruction of the eye.

### Surgical anatomy

- The eye ball is situated in the anterior part of the orbital cavity. It is protected in front by the upper and lower eye lids, bulbar and palpebral conjunctiva and its middle by the complete orbital ring. It is related behind to the fascia bulbi, fat and ocular muscles.
- The eye ball consists of three tunics, the fibrous tunic; sclera and cornea; the vascular tunic; choroids, ciliary body, the iris; and the nervous tunic: retina, within which three

refractive media, the aqueous humor, the lens substance and vitreous humor are enclosed.

- The third eye lid or membrana nictitans is situated at the antero-medial angle of the eye.
- The movement of eye lids is governed by orbicularis oculi and levator palpabrae superioris muscles.
- The movement of the eye ball is controlled by four straight, two oblique and a retractor muscles.

  a) The straight muscles which are band like arise close together around the optic foramina and end into the sclera. They are designated according to their position as rectus dorsalis, rectus ventralis, rectus medialis and rectus lateralis. These straight muscles rotate the eye ball about the transverse axis.

  b) The oblique dorsalis superior which is the longest and narrowest of the ocular muscles, arises near the ethmoidal foramina and inserts into the sclera between dorsal and lateral recti. It rotates the eye ball about the longitudinal axis and raises the lateral end of the pupil.

  c) The oblique ventralis, a wide and shorter muscle arises from the middle of the orbit behind the lacrimal fossa and inserts into the .sclera beneath the rectus lateralis. It lowers the lateral end of the pupil.

  d) The retractor oculi entirely surrounds the optic nerve. It arises from the optic foramina and inserts into the sclera behind the recti. It draws the whole eye ball backwards.

- The arteries of the vascular tunic come from the ciliary branches of the ophthalmic artery while the eye lids and conjunctiva is supplied by the facial arteries. Venous drainage is by satellite veins.
- Sensory innervation is by the branches of ophthalmic and maxillary nerves while motor innervation is by facial, oculomotor and sympathetic nerves.

**Site of operation**

Between eye ball and orbital rim through the skin of both eye lids about half cm from the border.

**Control and anaesthesia**

1. The animal is controlled in lateral recumbency with the affected side up.
2. Sedative/tranquilizer or general anaesthesia can be administered depending upon the temperament of animal.
3. Analgesia at the site of operation is achieved by auriculo palpebral and retrobulbar nerve blocks or by infiltration of local anaesthetic into upper and lower eye lids and deeper tissues at the site of incision, in case sedative or tranquilizers are used.

**Surgical technique**

1. The upper and lower eye lids are sutured together with a continuous suture leaving the suture ends at least 15-20 cm long for grasping and applying traction during the operative procedure.

2. An incision completely encircling the eye lids is made approximately 1/2 cm from the margin of the lids
3. The incision is extended around the entire circumference of the lid margin between the orbital rim and eyeball by blunt dissection taking care not to puncture conjunctiva.
4. Haemorrhage is carefully controlled either by ligation or forcipressure.
5. Conjunctiva from the lids back to its attachment to the orbit 'is separated leaving its attachment to the border of the lids. The dissection is carried out back to the point of insertion of the conjunctiva to the orbit.
6. All the muscles of the eye are incised with scissors and finally the optic nerve is cut. Before cutting, the optic vessels are ligated firmly in order to control the haemorrhage
7. All the periorbital fat is left in place.
8. The haemorrhage is controlled with gauze pressure temporarily packed up inside the orbital cavity. All the blood clots are removed from the cavity.
9. Temporary pack is removed and a 70-80 cm long piece of bandage impregnated in antiseptic lotion is inserted into the orbital cavity. Outer skin edges of the lids are sutured with interrupted sutures in order to close the wound leaving a little portion of impregnated gauze outside towards the inner canthus.

**Post operative care**

1. A pressure bandage should be tied for about 24 hours after the Operation.
2. A 15-20 cm piece of impregnated bandage should be removed on 3rd and 7th day, and the rest on l0th day after the operation.
3. A course of antibiotics should be administered for 4-5 days or till the healing is complete.
4. The sutures of the lids should be removed 8 to 10 days after the operation or till the healing is complete.