

Ocular Conditions Affecting the Brachycephalic breeds

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Introduction

There are two types of disease which affect the eye of the brachycephalic breeds and both are directly or indirectly related to genetic predisposition. First and by far the commonest are those conditions which are due to be conformation of skull and are related to the exophthalmos which is the common feature of these breeds. Second there are those conditions which have been unwittingly bred into some brachycephalic breeds in the pursuit of desired breed characteristics.

In this lecture I will present an overview of all the diseases that the small animal practitioner is likely to encounter in the brachycephalic breeds of pedigree dog.

The fourteen breeds I have included for discussion are the Affenpinscher, Boston Terrier, Boxer, Bulldog, Cavalier King Charles and the King Charles Spaniels, (mesaticephalic) French Bulldog, Griffon Bruxellois, Japanese Chin, Lhasa Apso, Pekingese, Pug, Shih Tzu and Tibetan Spaniel.

Diseases Related to Conformation

The high skull and facial indices mean that the brachycephalic has shallow orbits and marked exophthalmos. This predisposes to trauma and exposure keratopathy.

a) **Trauma**

The prominent corneas are early targets for foreign body material and both blunt and incisive trauma. Adherent foreign body material may require more consideration than local anaesthesia and a cotton wool bud to effect removal, whilst trauma can result in keratitis, erosion, ulceration and penetration. Local and constant trauma can be caused by ciliated caruncles, entropion, distichiasis, ectopic cilia, trichiasis and prominent nasal folds. All usually demand corrective surgery.

- b) **Exposure keratopathy**
Lagophthalmos and impaired blink lead to premature drying out of the pre-corneal tear film (PCTF)
- i) **Keratitis pigmentosa** is a low grade superficial keratitis which finds origin at the medial limbus. It is characterised by pigmentation and eventually the whole superficial cornea can become pigmented. It is probably associated with early breakup of tear film and drying out. Management is by the use of prophylactic wetting agents, possible topical corticosteroids, possible canthoplasty and eventually superficial keratectomy.
- ii) **Corneal erosion and ulceration** can be due to corneal drying and epithelial necrosis. I will discuss specific management in the second lecture.
- iii) **Exposure keratopathy** can be managed using topical wetting agents and various canthoplasty techniques. Both the lateral and medial canthi can be closed down, thus reducing the functional length of the eyelid and the size of the palpebral fissure to ensure an adequacy of blink.

Known or Suspected Inherited Disease Problems

Some of these diseases are inherited through conformation whilst others are the unwanted results of selection relating to desired conformation.

- a) **Entropion**
A conformational defect resulting in an inward rolling of one or more eyelids which can cause ocular irritation and corneal damage. It is likely that entropion is influenced by several genes (polygenic, multifactorial) defining the skin and other structures which make up the eyelids, the amount and weight of skin covering the head and face, the orbital contents and the conformation of the skull. Take your pick!
Surgical correction in young dogs can be effected by eyelid tacking, but in the more mature animal the Hotz Celsus modification is generally in use. Medial canthus entropion and trichiasis can be corrected using a triangular skin excision or the Roberts-Jensen pocket canthoplasty (which can also be combined with the removal of the ciliated caruncle).
- b) **Distichiasis**
This commonplace condition is the presence of adventitious cilia on the margo-intermarginalis of one to four eyelids. The cilia arise from within the Meibomian gland tissue within the tarsal plate and usually emerge from the

duct openings of the glands. They can, but do not necessarily do, cause corneal irritation. Treatment where necessary can be difficult, with perhaps cryosurgery being the most reliable technique.

The ectopic cilium is a variation on the distichiasis theme in that the cilia arise in the same place in the tarsal plate, but emerge through the palpebral conjunctiva to cause intense corneal irritation and possible ulceration.

c) **Trichiasis**

In this condition it is the presence of abnormally angulated lid hair which causes corneal irritation. It is not common in the brachycephalic types, but is seen occasionally in the Pekingese. Treatment is occasionally effected by using thick ointment applied to the hair, but permanent solution has to be through Hotz-Celsus or Stades resectins.

d) **Prolapse of the membrana nictitans gland**

Breakdown of the tissue holding the nictitans gland in position at the bottom of the membrana's cartilage allows the gland to be displaced dorsally and appear at the medial canthus. As this gland is a necessary structure it should be replaced as soon as possible. The simplest effective technique is the Kaswan pocket.

e) **Keratoconjunctivitis sicca**

Within the brachycephalic breeds this condition is perhaps most commonly seen in the Bulldog and the Pekingese, but it can occur quite randomly throughout the whole of dogdom. The clinical presentation can vary from low grade discomfort with no noticeable conjunctival or corneal pathology to acute onset marked conjunctival and corneal disease with noticeable discomfort or pain. Corneal ulceration occurs in some patients and in most a characteristic thick ocular discharge is present. Today's treatment is the use of cyclosporine and topical tear preparations, but parotid duct transposition may be necessary in some patients.

f) **Corneal Lipid Dystrophy**

The term applies to the characteristic cholesterol and triglyceride deposits in the superficial corneal stroma seen most commonly in the Cavalier King Charles Spaniel. It is clinically benign and seldom affects vision to any noticeable degree.

- g) **Corneal Epithelial Dystrophy**
Simply referred to as recurrent corneal erosion, this disease seen in the Boxer is due to a defect within the epithelial columnar cells and their basement membrane in the cornea. The result is a spontaneous slough of epithelium, usually from 6 or 7 years of age onwards. There is normally a bilateral involvement, but the two eyes are rarely simultaneously affected. Surgical treatment is by extensive debridement and membrane flapping (contact lens bandage), but natural repair in the long term is effected by vascularisation and granulation . A similar condition can be seen in any elderly dog.
- h) **Corneal Endothelial Dystrophy**
Here an early bilateral degeneration of the corneal endothelium results in persistent corneal oedema in the Boston Terrier. There is an obvious effect on sight, but the condition can become painful if vesiculation and epithelial rupture occurs. A topical 5% sodium chloride ointment can be surprisingly effective in early cases, but treatment at the vesiculation stage is difficult. Keratothermoplasty and extensive keratectomy can produce pain-free opaque corneas.
- i) **Hereditary Cataract**
Hereditary cataract is seen in the Boston Terrier and the Cavalier King Charles Spaniel. It is possible too that cataract seen in the Griffon Bruxellois, the French Bulldog, The Japanese Chin, The Lhasa Apso, the Pekingese, the Pug and the Shih Tzu may have genetic origins, but the studies are incomplete.
- j) **Progressive Retinal Atrophy**
Recessive inherited progressive rod cone degenerations are seen in the Tibetan Spaniel (12 months) and Lhasa Apso (3 years) breeds, but the literature contains references to possible PRA in the Griffon Bruxellois, the Japanese Chin, the Pekingese and the Shih Tzu. However these observations require further study.
- k) **Retinal Dysplasia**
Neuroretinal folds can be seen in practically any dog breed, but specific reference has been made for the Bulldog amongst the brachycephalic types.

l) **Optic Nerve Hypoplasia**

There is unsubstantiated reports of this condition in the Shih Tzu breed in the USA.

m) **Microphthalmos (MoD)**

Again the American literature suggests that microphthalmos (MoD) may be inherited in the Cavalier King Charles Spaniel.