

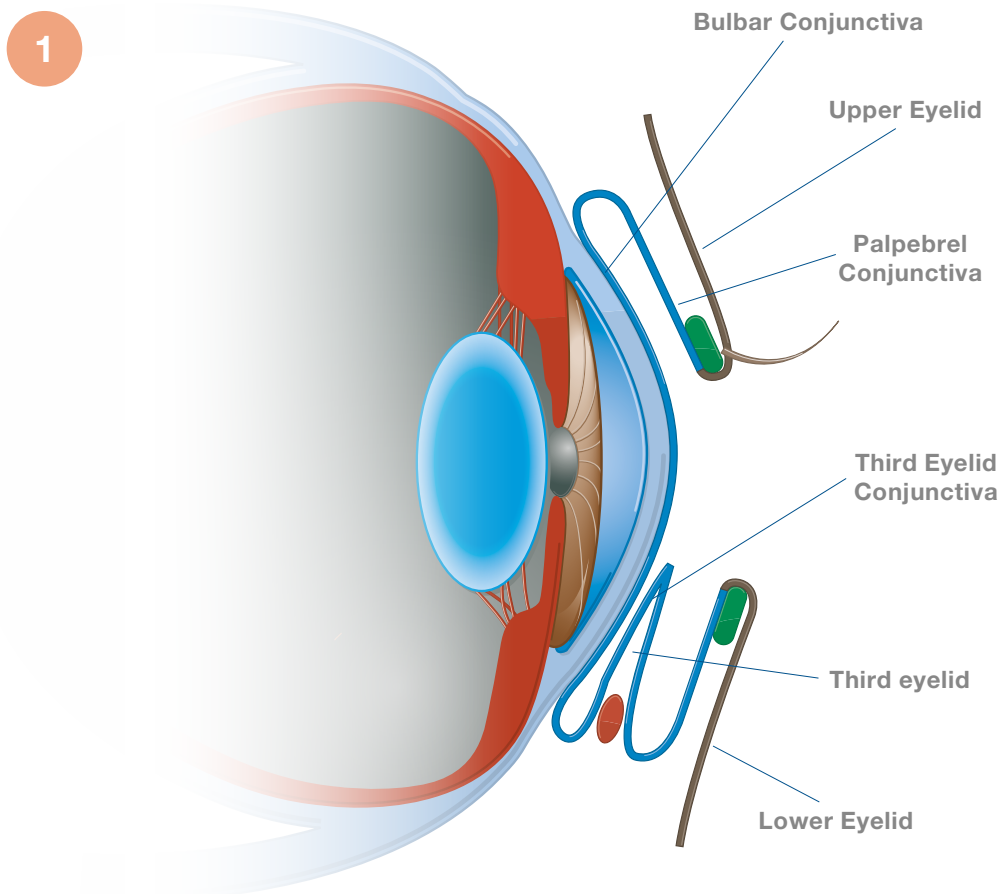


Canine and Feline Conjunctivitis



Anatomy and physiology of the conjunctiva.

The conjunctiva is the term given to the thin, mobile, mucous membrane which lines the inner surface of the upper and lower lids, the palpebral and bulbar surfaces of the third eyelid and extends across the anterior portion of the globe until it meets the limbus. Diagram 1 depicts the different anatomical areas of the conjunctiva.



The conjunctiva consists primarily of stroma, which is split into a deeper fibrous layer (mainly connective tissue, blood vessels and nerves) and a more superficial adenoid layer, which contains conjunctiva-associated lymphoid tissue. Above this sits the conjunctival epithelium, which contains goblet cells. The conjunctival epithelium is coated by the pre-ocular tear film, which provides the conjunctiva with protection and nutrition.

Given the close association between the tear film and the conjunctiva, any abnormality of either will impact the other. The goblet cells within the conjunctival epithelium are responsible for the production of the mucin component of the tear film, therefore a reduction in these cells can cause reduced tear film stability and therefore secondary corneal disease. Equally, if there is a change in the tear film, it has the potential to impact on conjunctival health, leading to conjunctival disease.

The conjunctiva is a highly exposed mucous membrane, and is highly responsive to noxious stimuli due to its rich vascular supply and lymphoid content. Clinically, it is useful to be able to distinguish between the superficial conjunctival vasculature, and that of the deeper episclera (hyperaemia of which may indicate the presence of sight-threatening disease as opposed to superficial surface ocular disease).

The conjunctival vessels are fine, freely mobile and frequently branching. They are pink to lighter red in appearance and often form looping patterns. When 2.5% phenylephrine is applied to the eye, these vessels should blanch easily. This can be contrasted to the deeper episcleral vessels which are wider, fixed in position and darker red in appearance. Each individual vessel can be seen more distinctly, branching only on occasion. Equally, they blanch much more slowly upon topical application of phenylephrine.

Just like skin, the conjunctiva have a 'normal' commensal bacterial population.

Studies have reported that the majority of bacteria cultured from the conjunctiva of clinically normal cats and dogs are Gram-positive, with *Staphylococcal spp.* being most common^{1,2}. It is important to understand the normal flora when assessing potential pathology in small animal practice.

An overview of small animal conjunctivitis

Inflammation of the ocular mucous membranes, or conjunctivitis, is commonly encountered in small animal first opinion practice, and therefore you would assume that diagnosis and treatment would be easily achieved. However, finding the root cause can sometimes be problematic.

The clinical signs of conjunctivitis include:

- 1 conjunctival hyperaemia
- 2 ocular discharge
- 3 conjunctival oedema (otherwise known as chemosis)
- 4 haemorrhage (both conjunctival and subconjunctival)
- 5 conjunctival thickening / swelling / ulceration
- 6 follicle formation
- 7 pruritus

Unfortunately, these signs are very non-specific and can occur with other disease processes. Equally, given the reactive nature of the conjunctiva, it often becomes inflamed with almost all other ocular disease processes. Conjunctivitis can result in a red eye, however not every red eye has conjunctivitis. It is essential that any eye with inflammation of the conjunctiva undergoes a full range of diagnostic testing to determine the cause.

The most useful way to classify conjunctivitis would be by aetiology. There are multiple potential causes of conjunctival inflammation and these can be split into primary causes (including infection, allergic and environmental) and secondary (including uveitis, adnexal disease, trauma, foreign bodies and neoplasia).

In dogs, conjunctivitis is most commonly secondary in nature, as a result of adnexal abnormalities or as a result of keratoconjunctivitis sicca. In contrast, for cats, primary infectious disease is more commonly encountered.

In some cases, it is not possible to classify disease by cause, therefore classification can be based upon the duration of disease (e.g. acute, chronic, recurrent) or the appearance of any ocular discharge (e.g. mucoid, purulent, haemorrhagic).

Feline Conjunctivitis

The diagram below details some of the primary infectious causes of conjunctivitis in cats, which may be more commonly encountered in practice. For further information on other primary and secondary causes, please refer to the further reading. Where you are unsure with regards to any ocular case, conversation with, and/or referral to a veterinary ophthalmologist should be considered.

Key

- Required in most cases
- Required only in certain specific cases
- Not required

HERPESVIRUS 1 (FHV-1)

Presentation

This is the most common primary cause of conjunctivitis in the cat. Clinical signs differ according to the cat's age and immune status. For older kittens and young cats, presentation is either acute or chronic. In the acute form, alongside bilateral conjunctivitis, which often involves severe chemosis and ocular discharge, keratitis and upper respiratory tract (URT) signs may also be present. Chronically, URT signs are less commonly seen, with the main complaint being bilateral ocular discharge.

Diagnosis

FHV-1 can be confirmed by virus isolation, and infected cats shed the virus for 1-3 weeks post-infection. Bear in mind that virus isolation is frequently negative, and false negative results are possible. Diagnosis of ocular FHV-1 infection is primarily based on clinical signs and response to treatment. A negative virus isolation result should not automatically mean that FHV-1 infection is ruled out. Infection is often complicated by secondary bacterial infection, and viral reactivation and shedding are common even in healthy felines. Over 80% of infected cats will become carriers, and for half of these cats disease will reoccur.

Topical

Lubrication	●	To support the cornea and conjunctiva
Antibiotics	●	Where secondary infection documented

Systemic

Broad spectrum antibiotics may be required where there is URT involvement. Anti-viral agents are usually reserved for severe cases.



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CHLAMYDOPHILA FELIS

Infection with this Gram-negative bacteria is the most common bacterial cause of conjunctivitis in cats. Infection causes a unilateral conjunctivitis with serous discharge which progresses to bilateral hyperaemia and chemosis. Discharge also becomes mucopurulent. Unlike with other infectious agents, the cornea should remain unaffected.

Diagnosis

Diagnosis is by clinical signs, consistent history (with the potential involvement of other in contact felines) and bacterial detection by PCR.

Treatment

Should include all in contact cats to ensure treatment aims are achieved. Disease can reoccur as the urogenital tracts can act as a bacterial reservoir.

Systemic

First line. Usually susceptible to tetracyclines, with doxycycline being the drug of choice in adult cats.

Topical

Antibiotics	●	Normally susceptible to tetracyclines, however choose based upon the results of cytology / culture & sensitivity
Lubrication	●	To support the conjunctiva / cornea where required

CALICIVIRUS

Presentation

A less common viral cause than FHV-1, any cat may become infected but signs are more severe in the young. Cats present with signs of URT infection and oral ulceration. Conjunctival ulceration may also be seen.

Diagnosis

Confirmed by virus isolation using PCR.

Treatment

Supportive nursing care.

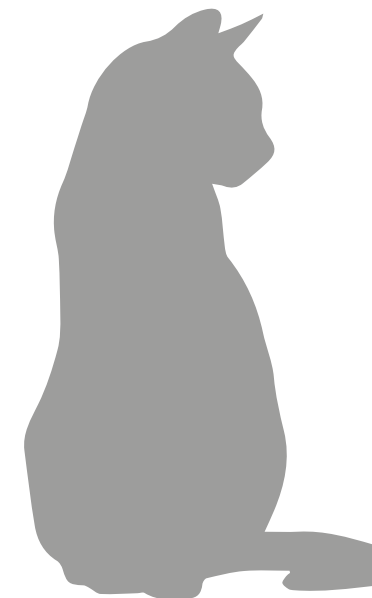
Topical

Lubrication	●	To support the cornea and conjunctiva
Antibiotics	●	Where secondary infection documented

Systemic

Broad spectrum antibiotics may be required where there is URT involvement. Anti-viral agents are usually reserved for severe cases.

PRIMARY CAUSES



MYCOPLASMA SPP.

The involvement of *Mycoplasma* as a primary pathogen is debated. Initially, signs of conjunctivitis (hyperaemia and ocular discharge) are seen, however within a couple of weeks, marked pallor of the conjunctiva may be observed.

Diagnosis

Diagnosis is by culture, however around 90% of healthy cats will harbour *Mycoplasma spp.* without disease.

Treatment

Systemic

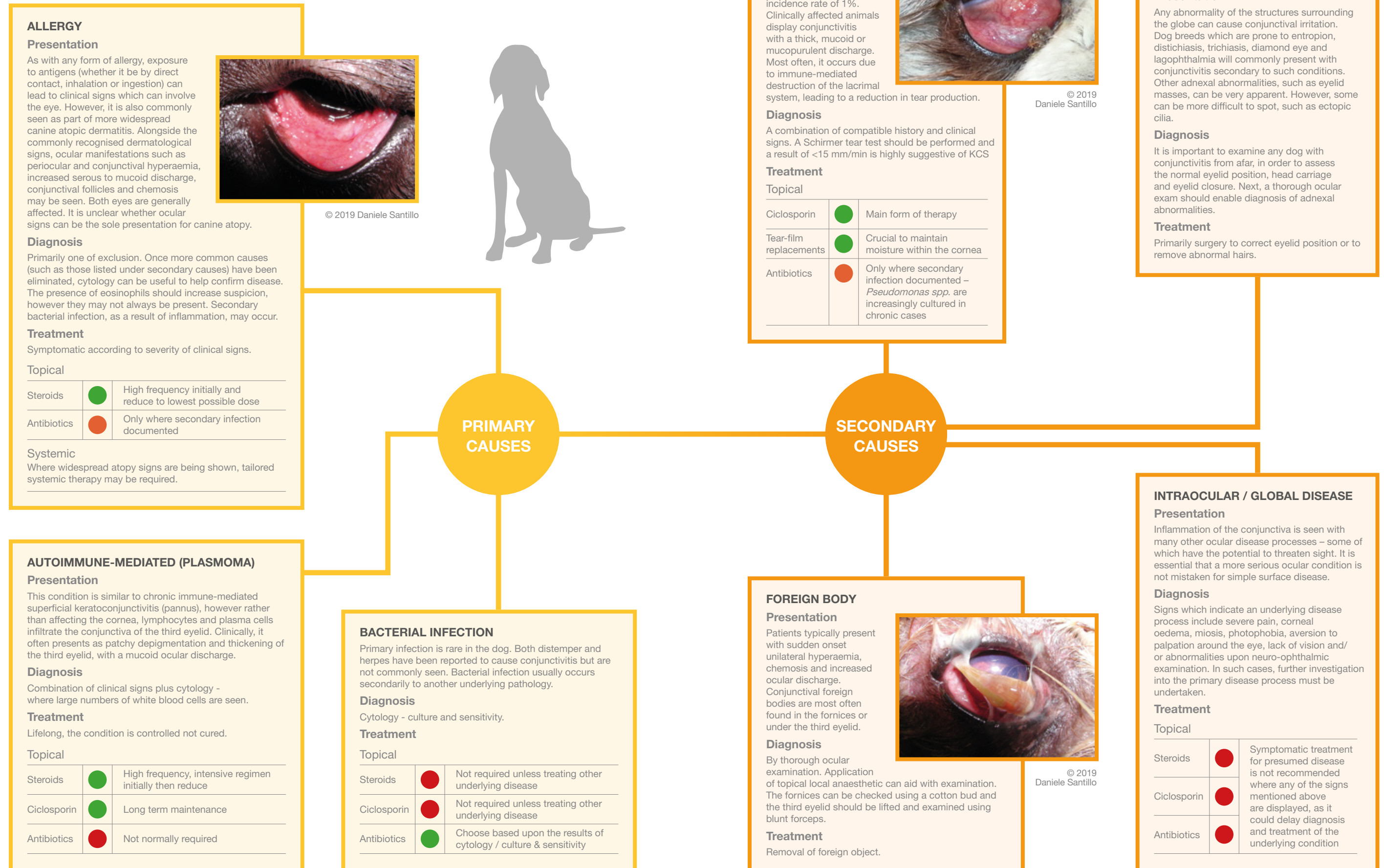
First line. Usually susceptible to tetracyclines.

Topical

Antibiotics	●	Normally susceptible to tetracyclines, however choose based upon the results of cytology / culture & sensitivity
Lubrication	●	To support the conjunctiva / cornea where required

Canine Conjunctivitis

The diagram below details some of the primary and secondary causes of conjunctivitis in dogs, which may be encountered in practice. For further information on other causes, please refer to the further reading. Where you are unsure with regards to any ocular case, consultation with, and/or referral to a veterinary ophthalmologist should be considered.



ALLERGY

Presentation

As with any form of allergy, exposure to antigens (whether it be by direct contact, inhalation or ingestion) can lead to clinical signs which can involve the eye. However, it is also commonly seen as part of more widespread canine atopic dermatitis. Alongside the commonly recognised dermatological signs, ocular manifestations such as periocular and conjunctival hyperaemia, increased serous to mucoid discharge, conjunctival follicles and chemosis may be seen. Both eyes are generally affected. It is unclear whether ocular signs can be the sole presentation for canine atopy.



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Diagnosis

Primarily one of exclusion. Once more common causes (such as those listed under secondary causes) have been eliminated, cytology can be useful to help confirm disease. The presence of eosinophils should increase suspicion, however they may not always be present. Secondary bacterial infection, as a result of inflammation, may occur.

Treatment

Symptomatic according to severity of clinical signs.

Topical

Steroids	●	High frequency initially and reduce to lowest possible dose
Antibiotics	●	Only where secondary infection documented

Systemic

Where widespread atopy signs are being shown, tailored systemic therapy may be required.

PRIMARY CAUSES

AUTOIMMUNE-MEDIATED (PLASMOMA)

Presentation

This condition is similar to chronic immune-mediated superficial keratoconjunctivitis (pannus), however rather than affecting the cornea, lymphocytes and plasma cells infiltrate the conjunctiva of the third eyelid. Clinically, it often presents as patchy depigmentation and thickening of the third eyelid, with a mucoid ocular discharge.

Diagnosis

Combination of clinical signs plus cytology - where large numbers of white blood cells are seen.

Treatment

Lifelong, the condition is controlled not cured.

Topical

Steroids	●	High frequency, intensive regimen initially then reduce
Ciclosporin	●	Long term maintenance
Antibiotics	●	Not normally required

BACTERIAL INFECTION

Primary infection is rare in the dog. Both distemper and herpes have been reported to cause conjunctivitis but are not commonly seen. Bacterial infection usually occurs secondarily to another underlying pathology.

Diagnosis

Cytology - culture and sensitivity.

Treatment

Topical

Steroids	●	Not required unless treating other underlying disease
Ciclosporin	●	Not required unless treating other underlying disease
Antibiotics	●	Choose based upon the results of cytology / culture & sensitivity

KERATOCONJUNCTIVITIS SICCA (KCS)

Presentation

KCS is one of the most common causes of conjunctivitis in dogs, with an estimated incidence rate of 1%. Clinically affected animals display conjunctivitis with a thick, mucoid or mucopurulent discharge. Most often, it occurs due to immune-mediated destruction of the lacrimal system, leading to a reduction in tear production.



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Diagnosis

A combination of compatible history and clinical signs. A Schirmer tear test should be performed and a result of <15 mm/min is highly suggestive of KCS

Treatment

Topical

Ciclosporin	●	Main form of therapy
Tear-film replacements	●	Crucial to maintain moisture within the cornea
Antibiotics	●	Only where secondary infection documented - <i>Pseudomonas spp.</i> are increasingly cultured in chronic cases

SECONDARY CAUSES

FOREIGN BODY

Presentation

Patients typically present with sudden onset unilateral hyperaemia, chemosis and increased ocular discharge. Conjunctival foreign bodies are most often found in the fornices or under the third eyelid.



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Diagnosis

By thorough ocular examination. Application of topical local anaesthetic can aid with examination. The fornices can be checked using a cotton bud and the third eyelid should be lifted and examined using blunt forceps.

Treatment

Removal of foreign object.

ADNEXAL ABNORMALITIES

Presentation

Any abnormality of the structures surrounding the globe can cause conjunctival irritation. Dog breeds which are prone to entropion, distichiasis, trichiasis, diamond eye and lagophthalmia will commonly present with conjunctivitis secondary to such conditions. Other adnexal abnormalities, such as eyelid masses, can be very apparent. However, some can be more difficult to spot, such as ectopic cilia.

Diagnosis

It is important to examine any dog with conjunctivitis from afar, in order to assess the normal eyelid position, head carriage and eyelid closure. Next, a thorough ocular exam should enable diagnosis of adnexal abnormalities.

Treatment

Primarily surgery to correct eyelid position or to remove abnormal hairs.

INTRAOCULAR / GLOBAL DISEASE

Presentation

Inflammation of the conjunctiva is seen with many other ocular disease processes - some of which have the potential to threaten sight. It is essential that a more serious ocular condition is not mistaken for simple surface disease.

Diagnosis

Signs which indicate an underlying disease process include severe pain, corneal oedema, miosis, photophobia, aversion to palpation around the eye, lack of vision and/or abnormalities upon neuro-ophthalmic examination. In such cases, further investigation into the primary disease process must be undertaken.

Treatment

Topical

Steroids	●	Symptomatic treatment for presumed disease is not recommended where any of the signs mentioned above are displayed, as it could delay diagnosis and treatment of the underlying condition
Ciclosporin	●	
Antibiotics	●	

References

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