Conjunctivitis is a common ocular disorder in cats and dogs. Its etiologies are numerous and include primary conjunctival diseases as well as extraocular, intraocular, and systemic conditions. Clinical signs of conjunctivitis are frequently nonspecific and may be similar despite diverse etiologies.

Although the primary causes of conjunctivitis are common, severe ocular diseases and potentially life-threatening systemic conditions can initially present as conjunctivitis. Failure to consider both local and systemic causes of conjunctivitis can have serious consequences for ocular and general health; therefore, a methodical and thorough clinical approach to conjunctivitis should always be followed.

BASIC CONJUNCTIVAL ANATOMY AND PHYSIOLOGY
The conjunctiva is the mucous membrane covering the posterior aspect of the eyelids, palpebral and bulbar surfaces of the nictitating membrane, and anterior portion of the globe (FIGURE 1). The conjunctiva is composed of nonkeratinized, stratified epithelium and underlying connective tissue; the latter is called the substantia propria. Mucin-producing goblet cells reside in the conjunctival epithelium, and the substantia propria contains vessels, nerves, and lymphoid tissue. The rich vascular network, loose arrangement of the substantia propria, and resident lymphoid tissue contribute to the conjunctiva’s ability to respond rapidly, and often dramatically, to insults.

On the anterior surface of the globe, the bulbar conjunctiva covers the episclera and sclera proper. The sclera proper is the thickest layer of the sclera and is composed of irregular collagen fibers, fibroblasts, and melanocytes. The episclera is the most superficial layer of the sclera and is a thin, collagenous, vascular tissue. The anatomic proximity of the bulbar conjunctiva and these scleral tissues results in frequent conjunctival involvement with diseases of the episclera and sclera proper.
Conjunctivitis is invariably associated with a combination of the clinical signs listed in BOX 1. Epiphora, the overflow of serous tears, results from excessive production or inadequate nasolacrimal drainage. Chemosis appears as conjunctival swelling and is the clinical manifestation of conjunctival edema caused by increased vascular permeability with fluid extravasation into the substantia propria (FIGURE 2). Hyperemia is red conjunctival discoloration (often referred to as “red eye”) and is a clinically observable manifestation of conjunctival vasodilation and increased blood flow within the conjunctiva (FIGURE 3). Ocular discomfort and pruritus most commonly manifest as blepharospasm and periocular rubbing.

Conjunctival tissue proliferation may be divided into 2 distinct clinical types: lymphoid and epithelial. Lymphoid proliferation is frequently referred to as follicular conjunctivitis and appears as small, round, semitransparent, elevated lesions representing lymphocytic aggregates. The occasional occurrence of conjunctival lymphatic follicles on the posterior aspect of the nictitans membrane is normal; however, increased numbers of follicles or their presence in other locations is a pathologic change. Epithelial hyperplasia or keratinization results in variably sized, irregular, opaque, pink-to-red, elevated lesions. Both lymphoid and epithelial conjunctival tissue proliferation are indicative of chronic conjunctival inflammation but are otherwise nonspecific clinical findings.

**FIGURE 1.** Basic ocular anatomy and structures associated with conjunctivitis.
Ulceration of the conjunctival epithelium may occur with any severe conjunctivitis, but it is most commonly observed with viral or traumatic conjunctivitis. Conjunctival ulcers appear as flat, irregular, pale white or pink regions on the conjunctival surface that retain fluorescein stain and are surrounded by a hyperemic border.

Hemorrhage may occur in the conjunctival epithelium or subconjunctival space. Intraconjunctival and subconjunctival hemorrhages appear as bright or dark red regions of variable shape and size (FIGURE 4). When contrasted to conjunctival hyperemia, conjunctival hemorrhages tend to be opaquer and have more distinct borders, and dilated blood vessels are less discernible within the area of discoloration. Conjunctival hemorrhage is most frequently detected in dogs and cats with traumatic conjunctivitis, but it can be a manifestation of systemic disease, including coagulopathy, hypertension, hyperviscosity, platelet disorders, and vasculitis. 1

**CLINICAL EVALUATION**

The clinical approach to a case of conjunctivitis is similar to that for any nonspecific ocular lesion. A thorough and focused history must be collected, and careful general physical and ocular examinations should be performed to identify the specific etiology of the conjunctivitis when possible.

At a minimum, the clinical evaluation must narrow the differential diagnosis and exclude more serious causes of conjunctivitis such as systemic or intraocular disease. Historical details to collect are listed in **BOX 2**. All ocular and systemic drug treatments should be identified. A complete physical examination should include evaluation of body temperature, thoracic auscultation, oral cavity examination, and regional lymph node palpation.

A complete ophthalmic examination is indicated for all cases of conjunctivitis, including Schirmer tear tests, ocular surface fluorescein staining, and tonometry. This simple examination strategy maximizes the chances of correctly identifying the specific etiology of the conjunctivitis and of diagnosing serious ocular diseases that initially may present as conjunctivitis.

Examination should begin with a general evaluation of facial conformation and the size, position, and symmetry of the globes, orbits, eyelids, and pupils.
Palpation of the periocular facial regions and adnexa is performed, and menace responses, palpebral reflexes, pupillary light reflexes, ocular motility, and globe retropulsion are assessed.

Detailed examination of the adnexa, ocular surface, and intraocular structures is then performed with magnification and a bright focal light source. Eyelid conformation is assessed, and the eyelid margins and conjunctiva are methodically examined to detect foreign bodies, cilia abnormalities, masses, and other lesions. The conjunctival fornix and bulbar surface of the nictitans membrane are examined for foreign material or increased numbers of lymphoid follicles.

ETIOLOGIES AND MANAGEMENT

The etiologies of conjunctivitis include primary conjunctival diseases, secondary manifestations of other ocular diseases, and secondary manifestations of systemic diseases. Primary etiologies of conjunctivitis are those in which the disease process is predominantly limited to the conjunctiva and include allergic, frictional irritant, immune-mediated, infectious, and traumatic conditions.

Primary Conjunctival Diseases

**Allergic Conjunctivitis**

Conjunctivitis associated with allergic conditions is common, particularly in dogs, and can be divided into 3 general types: atopic conjunctivitis, drug reaction conjunctivitis, and insect envenomation conjunctivitis.

**Atopic Conjunctivitis**

Atopic conjunctivitis is typically accompanied by atopic dermatitis but can also occur as an isolated clinical lesion. Dogs and cats frequently have mild, seasonal conjunctival hyperemia, chemosis, epiphora, and ocular pruritus. Conjunctival follicle formation is common with chronicity. Atopic conjunctivitis generally is a diagnosis of exclusion; however, atopic dermatitis and seasonality are suggestive of this etiology.

Allergen immunotherapy and allergen avoidance are definitive treatments for atopic conjunctivitis, but they may not always be practical. The use of topical ophthalmic corticosteroids applied 2 or 3 times daily for short durations (1 to 2 weeks) as needed for inflammation is generally effective in controlling clinical signs.

Dogs and cats with recurrent episodes, a protracted clinical course, or contraindications to topical corticosteroid therapy may benefit from long-term treatment with topical ocular cyclosporine (0.2% to 2% solution or ointment, applied twice daily) or tacrolimus (0.01% to 0.04% solution or ointment, applied twice daily). Long-term and continuous cyclosporine or tacrolimus therapy generally reduces or eliminates the need for pulse therapy with topical corticosteroids.

**Drug Reaction Conjunctivitis**

Drug reaction conjunctivitis is a hypersensitivity reaction that often results in severe clinical lesions. Concurrent blepharitis, often with dermal ulceration, and keratitis are common. Conjunctivitis may develop at any time during drug use and with any topical medication. Ophthalmic medications containing neomycin and carbonic anhydrase inhibitors are among the medications most commonly associated with drug reaction conjunctivitis in dogs and cats.

Treatment consists of discontinuing all ophthalmic medications for 1 to 2 weeks and slowly reintroducing medications individually until the offending pharmaceutical is identified. Topical corticosteroid therapy can assist in reducing clinical signs. A medication such as prednisolone acetate 1% solution or dexamethasone 0.1% solution (without antibiotics) is unlikely to be associated with this type of reaction and is preferred. Medications that contain multiple active drug components should be avoided.
Insect Envenomation Conjunctivitis

Insect bites and stings anywhere on the body may result in severe conjunctivitis. This form of conjunctivitis typically has a rapid onset and is characterized by severe bilateral chemosis with the conspicuous initial absence of other clinical signs of conjunctivitis, including hyperemia (FIGURE 2).

Therapy consists of a single dose of systemic corticosteroid, with or without an antihistamine, followed by several days of topical corticosteroid or antihistamine administration. Rapid resolution of the conjunctivitis after starting medical therapy is typical.

Frictional Irritant Conjunctivitis

Endogenous and exogenous irritants (BOX 3) may result in conjunctivitis by causing repeated mechanical trauma to the conjunctiva. Diagnosis of frictional irritant conjunctivitis is made by identifying one of these irritants during ocular examination (FIGURE 5). Careful examination of the conjunctival fornix through the full 360 degrees as well as posterior to the nictitans membrane is sometimes required to identify trapped foreign material that might otherwise not be visible and achieve a diagnosis.

Definitive treatment involves removal of the irritant (e.g., surgical entropion correction, cryoepilation of abnormal cilia, foreign body removal), along with ocular surface lubrication and prevention or treatment of opportunistic bacterial infection with a topical ophthalmic antimicrobial.

Immune-Mediated Conjunctivitis

Immune-mediated causes of conjunctivitis are specific, idiopathic ocular conditions with a presumed autoimmune pathophysiology. These conditions are generally species-specific. In dogs, they include diffuse episcleritis, nodular granulomatous episcleritis, and atypical pannus. Immune-mediated causes of conjunctivitis in cats include eosinophilic conjunctivitis, lipogranulomatous conjunctivitis, and epitheliotropic mastocytic conjunctivitis.

Episcleritis

Despite their nomenclature, both diffuse episcleritis and nodular granulomatous episcleritis most obviously affect the conjunctiva, which is visibly inflamed, during clinical evaluation. These conditions are characterized by granulomatous inflammation of the conjunctival substantia propria and episclera with infiltration by lymphocytes, plasma cells, histiocytes, and fibroblasts. Both conditions clinically appear as conjunctival hyperemia and thickening. Peripheral keratitis adjacent to the conjunctival lesions is common. Lesions may be unilateral or bilateral. Nodular granulomatous episcleritis is also associated with formation of one or more distinct, proliferative, firm, smooth-surfaced masses. Diffuse episcleritis is likely a diffuse form of the same disease and is otherwise clinically identical, but without nodule formation.

The diagnosis is made from clinical appearance alone in most dogs; however, conjunctival and episcleral biopsy can provide confirmation. Clinical signs in most dogs can be controlled with topical therapy alone. Treatment options include topical corticosteroids, cyclosporine, and tacrolimus.
Topical corticosteroids provide rapid improvement in clinical signs but are associated with greater potential for adverse effects (e.g., corneal degeneration, ocular surface infection) with long-term use. Cyclosporine and tacrolimus have more favorable adverse effect profiles—even with long-term use—but take longer to improve and resolve clinical signs. Combining a topical corticosteroid and cyclosporine or tacrolimus is very effective, results in rapid clinical improvement, and allows the slow tapering and eventual discontinuation of the corticosteroid over several months if control is achieved; however, lifelong therapy is generally required. Once the condition is controlled, most dogs can be managed long-term with cyclosporine or tacrolimus alone. Short courses of corticosteroids may be required to control flare-ups of inflammation.

For severe cases or those refractory to topical treatment alone, a single subconjunctival corticosteroid injection (e.g., 4 to 8 mg of triamcinolone) within the lesions can be used. For dogs that do not tolerate topical therapy, the combination of oral niacinamide and tetracycline can be used. For dogs weighing more than 10 kg, 500 mg of both medications is administered 3 times daily; for dogs weighing less than 10 kg, 250 mg of both medications is administered 3 times daily. Following resolution of clinical signs, administration frequency is reduced gradually to once daily over several months to provide long-term control. In rare cases, more powerful systemic immunosuppressive medications or other treatment approaches (such as surgical debulking, cryotherapy, or strontium-90 β irradiation) may be required to control episcleritis.

Episcleritis must be differentiated from true scleritis, which occurs much less frequently in dogs, is associated with more severe ocular inflammation, is typically present concurrent with intraocular disease (e.g., uveitis, retinal detachment), and is a vision-threatening condition.

Atypical Pannus

Atypical pannus, or plasmoma, is an alternative presentation of pannus (i.e., canine chronic superficial keratitis) in which the primary clinical focus of lesions is the conjunctiva rather than the cornea. This form of pannus is observed in dogs less frequently than the “typical” form of pannus that concurrently affects the cornea and the conjunctiva. Atypical pannus is characterized by a lymphoplasmacytic infiltrate with concurrent fibrovascular proliferation and pigmentation. There are strong breed predilections for atypical pannus, including the German shepherd, greyhound, and Belgian sheepdog breeds. Atypical pannus presents clinically as a bilateral hyperemic thickening of the nictitating membrane conjunctiva, multifocal follicle formation, and varying degrees of conjunctival depigmentation and pigmentation (FIGURE 6). Atypical pannus has the clinical appearance of cobblestone granulation tissue.

Treatment of atypical pannus is very similar to treatment of diffuse episcleritis and nodular granulomatous episcleritis. Although not typically associated with discomfort, if left untreated, atypical pannus can progress to involve the cornea and become vision threatening.

Eosinophilic Conjunctivitis

Eosinophilic conjunctivitis is associated with idiopathic infiltration of the conjunctiva with eosinophils (often mixed with other leukocytes). Clinically, eosinophilic conjunctivitis appears as unilateral or bilateral conjunctivitis in cats, often with concurrent keratitis, and is frequently associated with the formation of superficial white nodules or plaques on the epithelium. Some cats also have concurrent eyelid margin depigmentation, thickening, or ulceration. Diagnosis is made by the characteristic clinical appearance and the...
detection of eosinophils on conjunctival cytology. Rarely, conjunctival biopsy is necessary. Treatment is similar to the topical medical therapy of canine episcleritis and can also include topical 0.5% megestrol acetate therapy for select cases.7-8

**Lipogranulomatous Conjunctivitis**
Lipogranulomatous conjunctivitis, seen in cats, is associated with nonulcerative white nodules in the palpebral conjunctiva adjacent to the eyelid margin (FIGURE 7). The nodules are composed of macrophages and lipids. This condition may be unilateral or bilateral and most frequently occurs in middle-aged and older cats. Either the superior or inferior eyelids may be affected, but the superior is most common. Presumptive diagnosis can be made by clinical appearance, but definite diagnosis and treatment require surgical nodule excision, which is generally recommended for irritating or enlarging masses.

**Epitheliotropic Mastocytic Conjunctivitis**
Feline epitheliotropic mastocytic conjunctivitis is a recently described condition.7 It is most commonly unilateral and associated with proliferative or nodular conjunctival lesions. Histologically, an idiopathic mixed inflammatory infiltrate of the conjunctiva is present with numerous intraepithelial and subepithelial mast cells and papillary epithelial hyperplasia. The optimal treatment for this condition is not known, but complete surgical excision of the lesions can be curative.

**Infectious Conjunctivitis**
Primary conjunctivitis may result from viral, parasitic, or bacterial infection.

**Canine Herpesvirus-1**
Primary conjunctivitis in dogs may result from viral infection of the conjunctival epithelium, including infection with canine herpesvirus-1 (CHV-1) and canine adenovirus 2.10 Conjunctivitis may also be a prominent feature of other systemic viral infections (e.g., canine distemper, canine influenza), but these dogs have concurrent systemic illness. Of the viruses causing primary conjunctivitis in dogs, CHV-1 is most often observed clinically.

Conjunctivitis may be caused by either primary or recurrent CHV-1 infection and can present as unilateral or bilateral disease. CHV-1 conjunctivitis often occurs in young dogs and dogs with immunomodulating systemic conditions or those receiving immunosuppressive therapeutics.

The clinical features of CHV-1 conjunctivitis are often nonspecific and indistinguishable from those of other types of primary conjunctivitis (i.e., blepharospasm, conjunctival hyperemia, chemosis, ocular discharge); however, conjunctival ulceration and petechiae are frequently present. Although not specific to CHV-1 infection, these clinical findings are uncommon with conjunctivitis due to most other etiologies in dogs and should prompt consideration of CHV-1 as the cause.

Definitive diagnosis of CHV-1 conjunctivitis is made by virus isolation or polymerase chain reaction (PCR) analysis of conjunctival swabs.

In otherwise healthy young dogs, CHV-1 conjunctivitis is typically self-limiting. Antiviral treatment shortens the duration of clinical disease and minimizes development of more severe ocular or systemic sequelae in immunosuppressed dogs. In addition to nonspecific treatments to prevent secondary bacterial infection, antiviral therapy with 0.1% idoxuridine, 1% trifluridine, or 0.15% ganciclovir ophthalmic gel can be used. Cidofovir is reported to be an effective treatment in some dogs with CHV-1 infection, but it can be associated with marked local ocular toxicity in dogs and should not be regarded as a first-choice therapy.11

**Parasitic Agents in Dogs**
Parasitic conjunctivitis may result from infection with
Thelazia or Onchocerca organisms. Both parasites have a restricted geographic range, which assists in making a diagnosis. If the complete travel history of an animal is not available, these potential etiologies are difficult to exclude based solely on geography.

Thelazia species are nematodes transmitted by flies. They reside in the conjunctival fornix and nasolacrimal ducts of dogs and cats. Diagnosis is made by identifying thin, white, motile, 1- to 1.5-cm-long parasites on the ocular surface. Therapy for Thelazia conjunctivitis includes manual parasite removal, dermal application of antiparasitic agents (e.g., imidacloprid 10% and moxidectin 2.5%), or oral administration of milbemycin oxime and praziquantel tablets.12

Onchocerca species are filaria that produce unilateral or bilateral conjunctivitis associated with single or multiple bulb conjunctival nodules.13 The nodules are produced when migrating nematodes become surrounded by eosinophilic or granulomatous inflammation. Diagnosis is by histopathologic, in vivo confocal microscopic, or PCR assay detection of the parasites in conjunctival tissue. Surgical excision or debulking of the nodules combined with long-term antiparasitic therapy that may include combinations of intramuscular melarsomine dihydrochloride, subcutaneous ivermectin, or oral doxycycline (for endosymbiont eradication) is the treatment of choice. Even with appropriate therapy, recurrence of ocular disease is common with canine onchocerciasis and this condition carries a guarded long-term prognosis for control.

Viral Agents in Cats
Feline herpesvirus-1 (FHV-1) is the most common infectious etiology of conjunctivitis in cats. Conjunctivitis may be present alone or in association with corneal or respiratory tract disease. The diagnosis is frequently made based on history and clinical signs; however, virus isolation, PCR, and immunofluorescence assays are available to help confirm. The interpretation of these diagnostic tests for FHV-1 should consider that ocular FHV-1 shedding can be intermittent during conjunctivitis and the detection of FHV-1 can also be induced by, or incidental to, ocular disease in cats. Cytology is unreliable, as intranuclear viral inclusion bodies are only rarely identified. Serology is also unhelpful as most cats are seropositive for FHV-1 from prior infection or vaccination.

As in dogs with CHV-1 infection, the primary goals of therapy are to shorten the duration of clinical disease and prevent development of more severe sequelae. Treatment to prevent secondary bacterial infection is always indicated and combined with topical or systemic antiviral therapy. Topical antivirals effective against FHV-1 infection include 0.5% cidofovir, 0.1% idoxuridine, 1% trifluridine, and 0.15% ganciclovir. Oral famciclovir therapy is an additional safe and effective treatment option for FHV-1 infection and is administered at a dose of 40 to 90 mg/kg 2 or 3 times daily. Recent evidence suggests that 90 mg/kg q12h daily may be the optimal famciclovir dose for cats, although this remains an area of contention.14

Feline calicivirus is another common viral etiology of conjunctivitis in cats.15 It is particularly frequent in young cats. Conjunctivitis is usually bilateral, and development of conjunctival ulcers is common. Feline calicivirus conjunctivitis is most commonly associated with concurrent upper respiratory tract disease and stomatitis. It is generally a self-limited infection, and therapy is solely supportive, as the antivirals commonly used in cats with FHV-1 infection are ineffective against feline calicivirus.

Bacterial Agents in Cats
Chlamydia felis and Mycoplasma species are considered common causes of feline conjunctivitis.16 Infection with these microorganisms produces a similar clinical appearance, and both are often associated with chronic, severe conjunctivitis that can be unilateral or bilateral. Conjunctival follicles and pseudomembranes may form with chronicity. Diagnosis can be achieved in many cases by conjunctival cytology, where the typical epithelial inclusions can be detected. Alternatively, culture or PCR assays can be used.

Treatment options include topical oxytetracycline or erythromycin. Alternatively, systemic doxycycline or azithromycin are typically effective options. For cats with C. felis conjunctivitis specifically, oral doxycycline (5 to 10 mg/kg q12h to q24h for 3 to 4 weeks) is generally regarded as the treatment of choice.

Traumatic Conjunctivitis
Blunt or penetrating ocular trauma can produce conjunctivitis. Both forms may be self-inflicted in dogs and cats with other painful or pruritic ocular diseases. Conjunctival trauma is frequently associated initially
with dramatic chemosis, conjunctival ulceration, and subconjunctival hemorrhage (FIGURE 4). In cases of ocular trauma, it is important to exclude the presence of other serious ocular injuries and foreign bodies, but this may not be possible on initial presentation if severe chemosis precludes performing a complete ocular examination. Ocular and orbital ultrasonography can be used in these situations, or reexamination can be performed after initial therapy to reduce chemosis.

Treatment includes application of cold compresses and a topical ophthalmic antibacterial to prevent opportunistic bacterial infection. Systemic nonsteroidal anti-inflammatory treatment hastens improvement in clinical signs, such as chemosis. A course of a systemic antimicrobial to prevent orbital infection is indicated when penetrating or full-thickness conjunctival wounds are present or suspected. The extensive conjunctival vascular supply that results in dramatic inflammation following trauma typically permits rapid resolution. Small conjunctival lacerations do not require surgical closure because the conjunctiva heals spontaneously and rapidly; however, all foreign material should be removed by copious irrigation.

Conjunctivitis is a frequent manifestation of a variety of potentially serious extraocular and intraocular diseases, including blepharitis, ulcerative keratitis, keratoconjunctivitis sicca, scleritis, uveitis, glaucoma, and orbital disease.

Conjunctivitis as a Secondary Manifestation of Other Ocular Diseases

Anatomic proximity, shared blood supply, and extensive vascular and lymphoid tissue may result in the conjunctiva being secondarily affected by other ocular diseases. Conjunctivitis is a frequent manifestation of a variety of potentially serious extraocular and intraocular diseases, including blepharitis, ulcerative keratitis, keratoconjunctivitis sicca (FIGURE 3), scleritis, uveitis, glaucoma, and orbital disease. In these conditions, conjunctivitis develops from an active extension of inflammation or passively from increased regional blood flow, decreased venous drainage, or inadequate aqueous tear production.

Distinct from many other species, bacterial infection is not a known cause of primary conjunctivitis in dogs. Secondary bacterial conjunctivitis, however, occurs commonly, exacerbates clinical lesions, and complicates the management of conjunctivitis associated with other etiologies in dogs. Development of bacterial conjunctivitis in dogs requires anatomic, physiologic, or immunologic compromise of the conjunctival surface. Resolution of bacterial conjunctivitis requires that the underlying cause be identified and corrected.

Recurrence of bacterial conjunctivitis is highly suggestive of a persistent and unresolved primary ocular abnormality and should prompt repeat ophthalmic examination. Failure to exclude other ocular conditions as the cause of conjunctivitis is a common error and is avoided by always performing a complete ocular examination. When conjunctivitis is a secondary manifestation of another ocular disease, therapy should be directed toward the primary ocular condition.

Conjunctivitis as a Secondary Manifestation of Systemic Diseases

Systemic diseases may first manifest in a clinically detectable manner as conjunctivitis. This is primarily because the conjunctiva is relatively accessible and observable to both clients and clinicians. The extensive vascular and lymphoid tissues within the conjunctiva also render it susceptible to generalized vascular and lymphatic systemic diseases.

Common underlying conditions in dogs with bacterial conjunctivitis include keratoconjunctivitis sicca, entropion, ectropion, euryblepharon, lagophthalmos, facial nerve paresis or paralysis, distichiasis, ectopic cilia, trichiasis, and conjunctival foreign bodies.

Concurrent treatment of the opportunistic bacterial infection hastens clinical sign resolution. *Staphylococcus* and *Streptococcus* species are the most frequent isolates, and neomycin-polymyxin-bacitracin (or gramicidin) or erythromycin administered 3 or 4 times daily until clinical signs resolve are good empiric choices for topical therapy. Recurrent bacterial conjunctivitis is highly suggestive of a persistent and unresolved primary ocular abnormality and should prompt repeat ophthalmic examination.
Numerous serious and potentially life-threatening systemic diseases can be associated with conjunctivitis. Animals with infectious, neoplastic, vascular, and hematologic conditions (BOX 4) are especially likely to present with conjunctivitis.

The systemic conditions associated with conjunctivitis may present with or without additional ocular abnormalities. In the vast majority of cases, historical and physical examination findings will suggest the presence of a systemic disease and prompt further diagnostic investigation.

**References**


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**BOX 4 Selected Systemic Causes of Conjunctivitis**

**Infectious diseases**

- Tickborne diseases
- Botulism
- Canine distemper
- Canine influenza
- Leishmaniasis
- Leptospirosis
- Listeriosis
- Protothecosis
- Systemic mycosis
- Toxoplasmosis

**Neoplastic disorders**

- Lymphoma
- Multiple myeloma
- Systemic histiocytosis

**Vascular diseases and hematologic disorders**

- Coagulopathies
- Thrombocytopenia
- Hyperviscosity syndromes
- Plasminogen deficiency
- Polycythemia
- Systemic hypertension

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Diagnosing, Treating, and Managing Causes of Conjunctivitis in Dogs and Cats

**ARTICLE OVERVIEW**
This article reviews clinically relevant etiologies of conjunctivitis in companion animals and their diagnostic and therapeutic management. The primary etiologies of conjunctivitis are emphasized, including allergic, frictional irritant, immune-mediated, infectious, and traumatic conditions.

**LEARNING OBJECTIVE**
Readers will learn the clinical signs of conjunctivitis and the basic clinical approach to managing dogs and cats with conjunctivitis. They will become familiar with the most common etiologies of conjunctivitis in companion animals and their therapeutic management.

1. Which of the following clinical signs of conjunctivitis is most suggestive of chronicity?
   a. Mucoid ocular discharge
   b. Lymphoid tissue proliferation
   c. Ulceration
   d. Chemosis
2. Which of the following ophthalmic medications is most commonly associated with drug reaction conjunctivitis in dogs and cats?
   a. Neomycin
   b. Prednisolone
   c. Fluconazole
   d. Ganciclovir
3. Which of the following conditions would be most likely to produce frictional irritant conjunctivitis?
   a. Anterior uveitis
   b. Cataract
   c. Retinal detachment
   d. Entropion
4. The primary clinical feature distinguishing between diffuse episcleritis and nodular granulomatous episcleritis in dogs is:
   a. Peripheral keratitis
   b. Conjunctival thickening
   c. Conjunctival hyperemia
   d. Formation of distinct, firm, smooth mass(es)
5. Which of the following is associated with formation of nonulcerative white nodules in the palpebral conjunctiva adjacent to the eyelid margin in cats?
   a. *Chlamydia felis* infection
   b. Epitheliotropic mastocytic conjunctivitis
   c. Lipogranulomatous conjunctivitis
   d. Plasmoma
6. The most likely diagnosis in a German shepherd presented with bilateral hyperemic thickening of the nictitans conjunctiva associated with multifocal follicle formation and depigmentation is:
   a. Atypical pannus
   b. Eosinophilic keratitis
   c. Diffuse episcleritis
   d. Epitheliotropic mastocytic conjunctivitis
7. Which of the following ophthalmic antivirals is associated with the potential for severe local ocular toxicity in dogs and should not be regarded as a first-choice therapy for canine herpesvirus-1 infection?
   a. Idoxuridine
   b. Trifluridine
   c. Cidofovir
   d. Ganciclovir
8. Parasitic conjunctivitis is most commonly associated with ocular surface infestation with which of the following in dogs?
   a. Hookworms
   b. *Thelazia* species
   c. Tapeworms
   d. Whipworms
9. Ulcerative conjunctivitis concurrent with upper respiratory tract disease and stomatitis in a cat is most suggestive of which of the following?
   a. Feline calicivirus
   b. Feline herpesvirus
   c. *Mycoplasma* species
   d. *Thelazia* species
10. Conjunctivitis can be a secondary manifestation of which of the following ocular diseases?
    a. Ulcerative keratitis
    b. Keratoconjunctivitis sicca
    c. Scleritis
    d. All of the above