DRY EYE IN DOGS

2ND EDITION
JANUARY
2025

MP LABO
Innovative by nature

Welcome to the white paper dedicated to eye health in pets!

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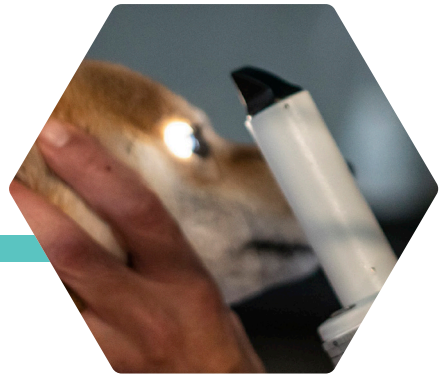

At the heart of veterinary medicine, eye health is of crucial importance

As dedicated professionals, you work hard every day to understand and solve the problems that affect the vision of our faithful companions. With this in mind, MP Labo, a pioneer in natural animal health care, is pleased to present Version 2 of its white paper dedicated to dry eye, written in collaboration with Dr. Charles Cassagnes. This new edition is enriched by additional contributions by Drs. Virginie Fouque and Thierry Azoulay.

This white paper is divided into four distinct parts, each providing essential knowledge for the better understanding and management of dry eye in dogs. We begin by exploring the **anatomy of the eye** and the physiology of the lacrimal apparatus, providing the foundations for effective management.

Part 2 will guide you **from consultation to diagnosis**, highlighting ophthalmic examinations and the diagnostic approach to dry eye. Here, you will find valuable information to help you refine your clinical skills. This section now includes a dedicated focus on anaesthesia and its effects on the cornea and ocular surface.

Part 3 will focus on the **management of dry eye**, exploring the various therapeutic options and care of animals affected by this condition.

Finally, Part 4 will present a **series of clinical cases**, illustrating the practical **management of dry eye** in everyday practice.

We hope that this white paper will become a valuable resource for your veterinary practice and that it will inspire you to tackle the challenges associated with dry eye in our four-legged friends.
Together, we can advance veterinary medicine and improve the quality of life for our pets.

Dr. Charles Cassagnes

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Dr. Charles Cassagnes graduated from the National Veterinary School in Lyon in 1997 and became assistant at the ophthalmology department of the National Veterinary School of Toulouse the following year. He holds a certificate (CES) in ophthalmology and university degrees (DU) in microsurgery and in visual function exploration.

Involved in postgraduate education, he is a former president of the South-East regional section of the French small animal veterinary association (AFVAC), and has been president of the French study group of veterinary ophthalmology (GEMO) since 2021. He is also board member of the French eye panellists for hereditary diseases in cats and dogs (AFEP-MHOC).

After more than 20 years in an ophthalmology referral practice in Nice, he is now head of the ophthalmology department at the Olliolis veterinary clinic in the Var, France. He is the author of a number of articles in French and international journals, and of award-winning veterinary reference books.

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Dr. Thierry Azoulay is a specialist in veterinary ophthalmology and head of AgoraVision, the ophthalmology department at the AgoraVet referral centre in Strasbourg. He holds a certificate (CES) and diploma (DESV) in veterinary ophthalmology, an advanced certificate (CEAV) in internal veterinary medicine and has also obtained several university degrees (DIU) in vitreoretinal surgery, in optical coherence tomography and in ocular surface.

He is a past president of the French study group of veterinary ophthalmology (GEMO) and board member of the French eye panellists for hereditary diseases in cats and dogs (AFEP-MHOC) and of the European network of veterinary ophthalmology and animal vision (REOVVA). He has published numerous scientific papers and has given presentations at national and international conferences.

He is currently lecturer for various training programmes, including certificate (CES and DE) courses in veterinary ophthalmology. He is also involved in continuing education initiatives of the German veterinary ophthalmology society (FVO) and of UNISVET in Italy.

Dr. Sarah Muller

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A 2015 graduate of the Faculty of Veterinary Medicine at the University of Liège in Belgium, **Dr. Sarah Muller** also holds a certificate (DE) in veterinary ophthalmology (Alfort).

As Marketing Manager at MP Labo, she is responsible for developing and promoting the Eye Care range.

Dr. Virginie Fouque

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Dr. Virginie Fouque graduated from the National Veterinary School of Alfort in 2009. She began her career as a general practitioner of dogs and horses, before specialising in ophthalmology.

She holds a state diploma (DE) in veterinary ophthalmology and university degree (DIU) in ocular surface.

She has been a member of the board of French study group of veterinary ophthalmology (GEMO) since 2021 and is also the author of several publications.

LIST OF ABBREVIATIONS

BUT	Tear film break-up time
IOP	Intraocular pressure
KCS	Keratoconjunctivitis sicca
NAD	No abnormality detected
STT	Schirmer Tear Test

I. ANATOMY OF THE EYE

ANATOMY OF THE EYE

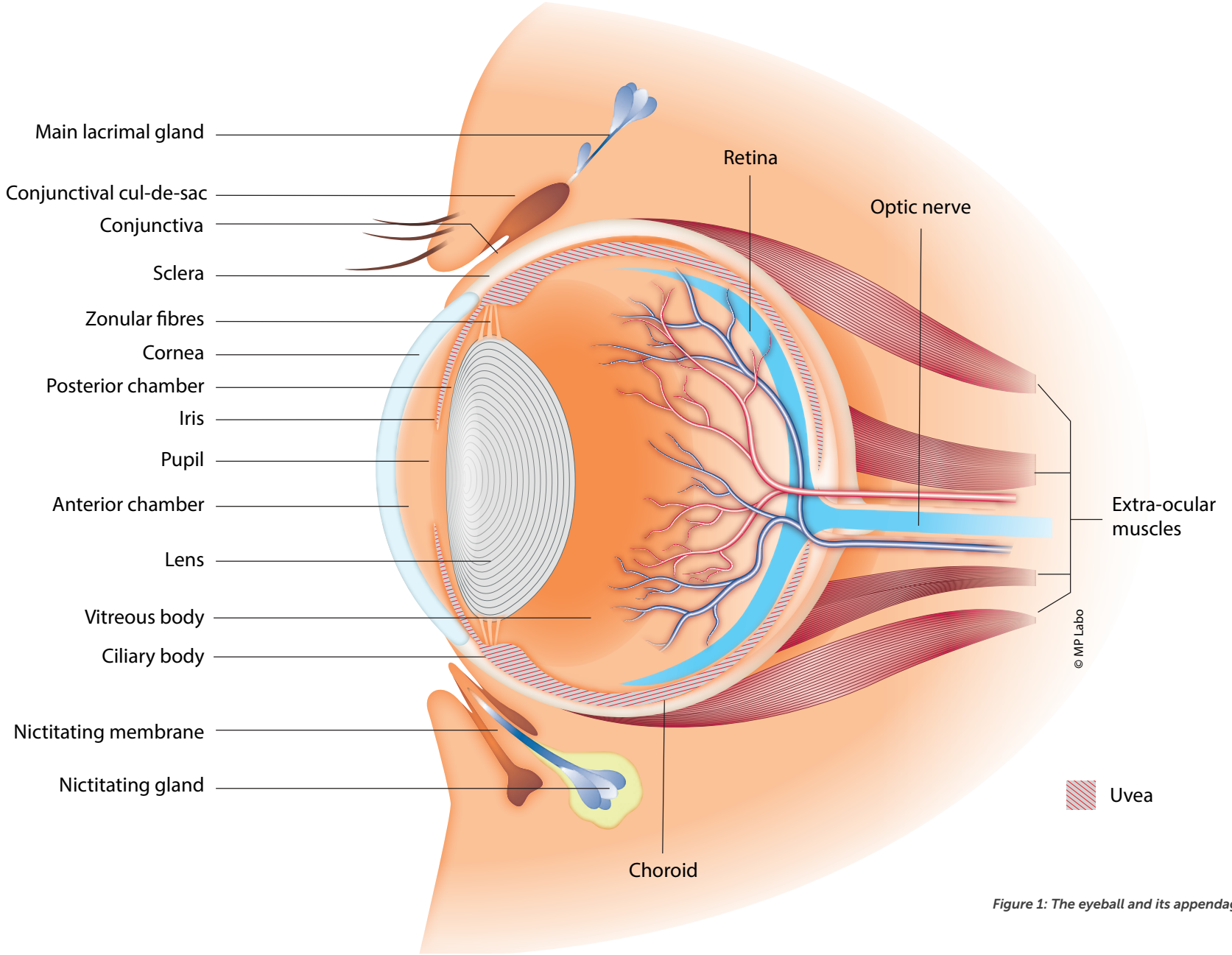


Figure 1: The eyeball and its appendages

The eyeball is made up of 3 layers:

- the fibrous tunic, consisting of the cornea and the sclera
- the vascular tunic, or uvea, is made up of the iris, the ciliary body and the choroid
- the nervous tunic, or retina

The lens of the eyeball is suspended by zonular fibres (or lenticular zonules), and its function is to focus images on the retina. It separates the anterior segment from the posterior segment of the eye. The anterior segment contains the aqueous humour, a fluid secreted by the ciliary bodies and drained at the iridocorneal angle at the base of the iris.

The aqueous humour is responsible for the eye pressure, measured by tonometry: this is the intraocular pressure. The anterior segment is subdivided into 2 chambers: the anterior chamber (between the cornea and the iris), and the posterior chamber (between the iris and the lens), not to be confused with the posterior segment. The posterior segment contains the vitreous body, which has a gel-like consistency and presses the retina against the back of the eye.

The conjunctiva surrounds the anterior part of the globe forming upper and lower conjunctival pouches.

In the lower pouch, a conjunctival fold forms the nictitating membrane, which has an internalised T-shaped section of cartilage. The eyeball is surrounded by a bony orbit, and its movements are permitted by the extraocular muscles. The front of the eye is protected by the eyelids, which blink regularly. In dogs, only the upper eyelid has eyelashes.

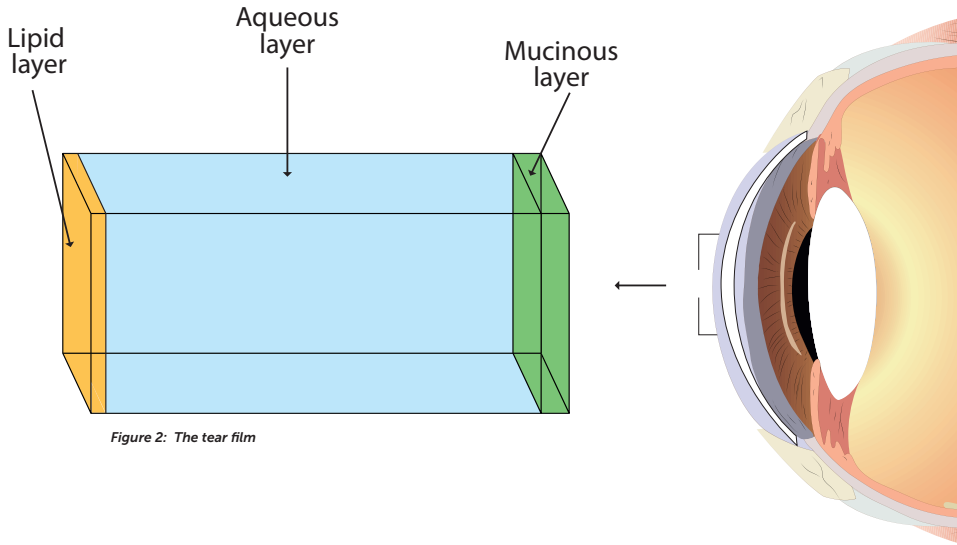
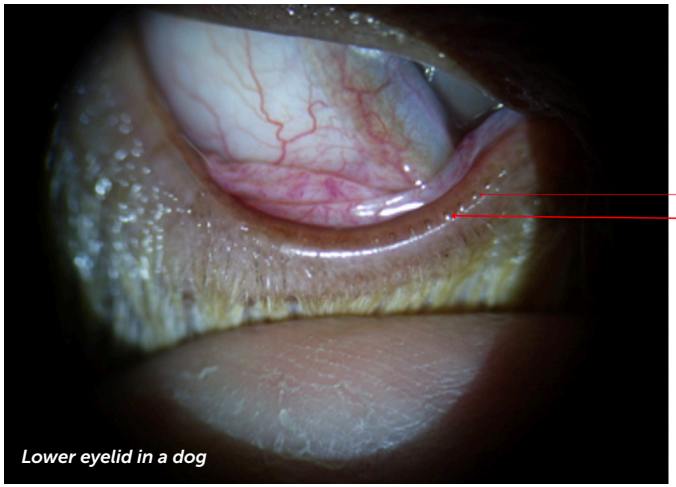


Figure 2: The tear film

The precorneal tear film is composed of 3 layers:

- **The lipid layer is the outermost layer** and is produced by the Meibomius and Zeiss glands. It limits the evaporation of tears. The quality of this lipid layer is assessed by the tear film break-up time (BUT).
- **The intermediate aqueous layer is the thickest part of the tear film** and is secreted by the lacrimal glands: the main lacrimal gland in the orbital region and the nictitating gland at the base of the nictitating membrane. The quantity of tears is assessed by the Schirmer tear test (STT) or the phenol red test.
- **The mucin layer**, secreted by the mucus cells located in the conjunctival sac. It enables the tear film to adhere to the cornea.



Lower eyelid in a dog

Tears play many roles in the cornea:

- physical protection by ensuring its lubrication,
- immunological protection, thanks to their concentration in globulins with antibacterial properties (particularly lysozyme in dogs),
- a nutritive role, providing oxygen, glucose, mineral salts, etc.

In cases of ulceration, adequate quality and quantity of tears is required to promote healing. The tear film is spread over the surface of the eyeball by the palpebral blink. Proper functioning of the eyelids is therefore essential for good lubrication of the cornea.

A dry eye is an eye with a quantitative lacrimal deficit, i.e. a reduction or even an absence of the aqueous layer. There are many causes of this dysfunction (see parts 2 and 3).

Tears are evacuated by the nasolacrimal duct, starting at 2 lacrimal points (an upper lacrimal puncta and an inferior lacrimal point) near the medial canthus, which lead into the lacrimal canaliculi.

The upper and lower canaliculi converge at the level of the lacrimal sac (vestigial in dogs) and give rise to the common nasolacrimal duct, which plunges rapidly into the nasal bone to open into the nasal ostium (or mouth in brachycephalic dogs).

The patency of these tear ducts is verified by the Jones test (fluorescein dye passage test), but numerous false negatives make catheterisation of the lacrimal puncta more reliable. Catheterisation can be performed in conscious dogs under local anaesthesia in cooperative animals: a small probe is inserted into the lacrimal points and fluorescein-stained saline is injected. **This procedure confirms the patency of the canaliculi and the upper and lower lacrimal puncta.**

Catheterisation of the lacrimal canaliculi

Positive Jones test

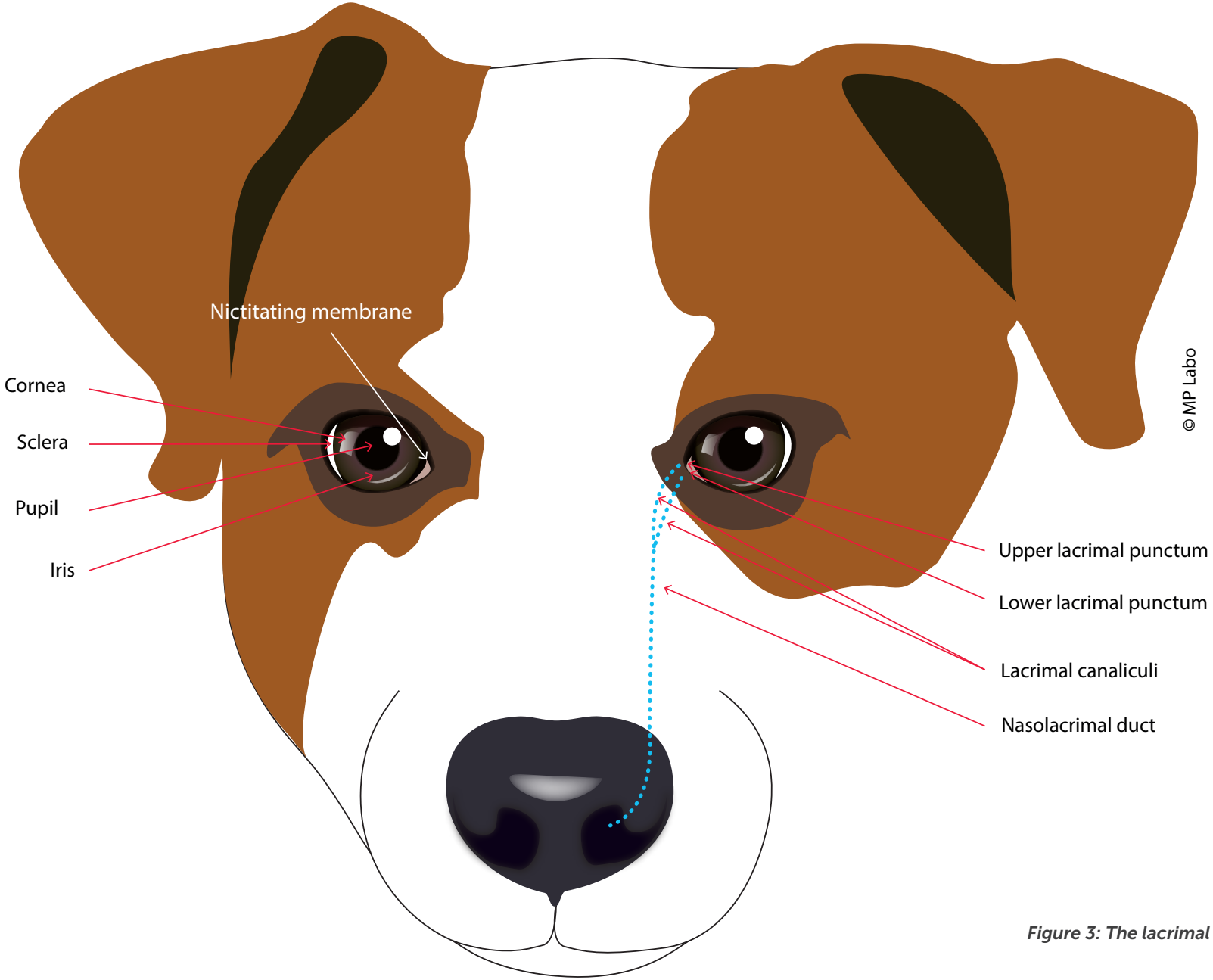
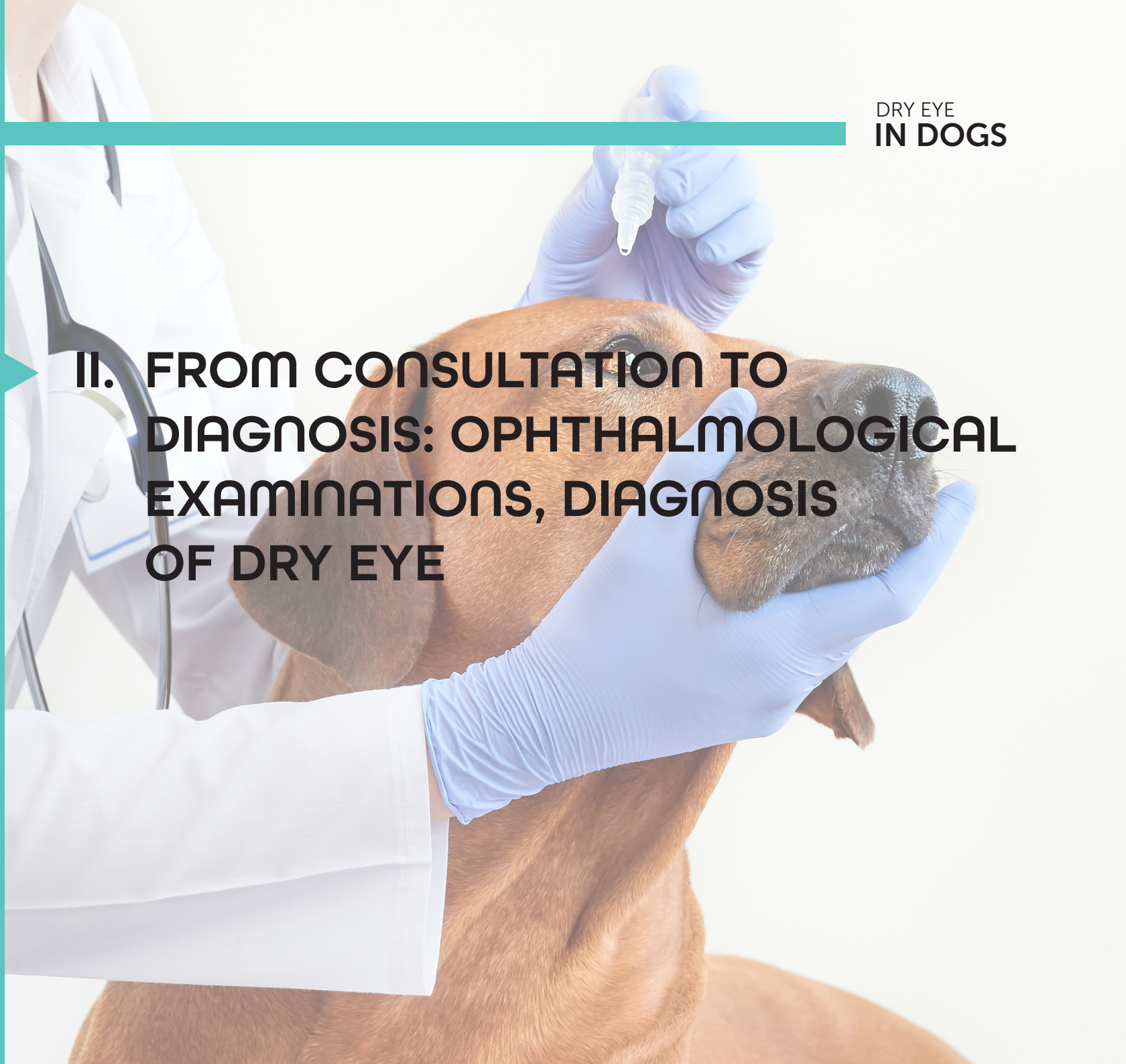


Figure 3: The lacrimal duct



II. FROM CONSULTATION TO DIAGNOSIS: OPHTHALMOLOGICAL EXAMINATIONS, DIAGNOSIS OF DRY EYE

CLINICAL DIAGNOSIS

Presenting signs of dry eyes are:

- redness of the eye
- a 'dirty' eye, with heavy secretions. The owner frequently reports an 'eye infection', confusing mucus with pus.
- a 'sticky' eye
- a painful, closed eye (blepharospasm)

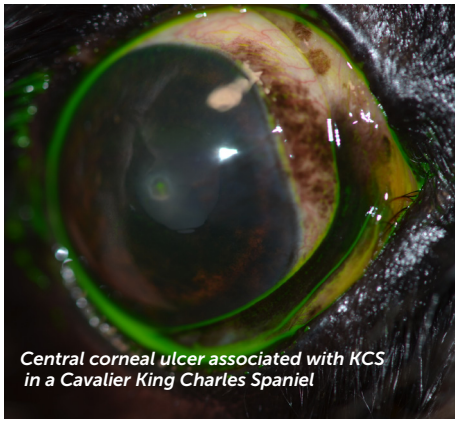
The clinical signs of dry eyes are:

- conjunctivitis
- ocular discharge
- keratitis, with superficial neovascularisation, oedema and corneal fibrosis
- blepharospasm

Keratoconjunctivitis sicca (KCS) in a Yorkshire Terrier: conjunctivitis, ocular discharge, superficial neovascularisation

Possible complications of dry eyes in the medium or long term are:

- a corneal ulcer, usually central and punctiform
- secondary corneal pigmentation



Central corneal ulcer associated with KCS in a Cavalier King Charles Spaniel

COMPLEMENTARY EXAMINATIONS

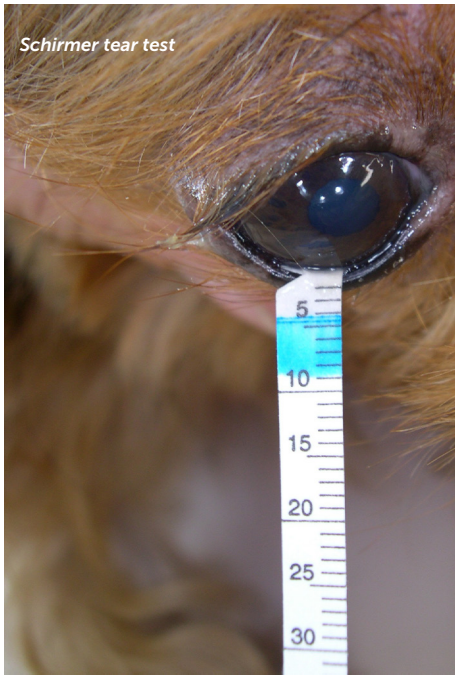
Schirmer tear test

The Schirmer tear test is used to measure the tear production.

The strip is placed in the lower conjunctival cul-de-sac for one minute.

The animal should not have received eye drops, ointment or gel in the 2 hours preceding the examination.

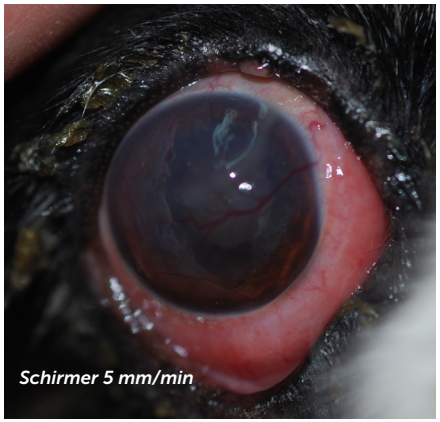
In healthy dogs, values for the test are 15 mm/minute or more.
A result of between 10 and 15 mm/min is doubtful, a result of less than 10 mm/minute confirms the diagnosis of lacrimal dryness.



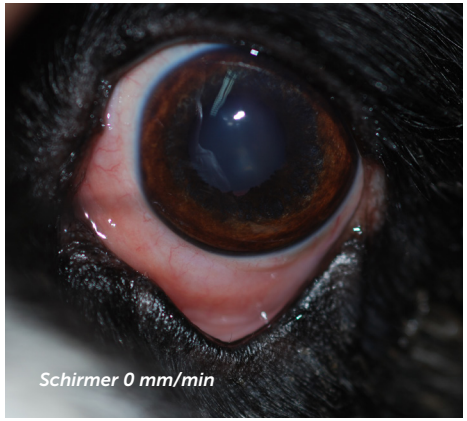
Schirmer tear test

Please note:

The result of the Schirmer's tear test is not always reliable! It is not necessarily proportional to the condition of the cornea, as the eyes of this Cavalier King Charles Spaniel show.



Schirmer 5 mm/min



Schirmer 0 mm/min

Tear film break-up time

The tear film break-up time (BUT) assesses the quality of the tear film. It is achieved by measuring the dispersion of fluorescein on the corneal surface.

A drop of fluorescein is instilled onto the cornea, the eyelids are held open, and a cobalt blue light is used to observe the appearance of striations on the surface of the dye, signs of a tear film rupture. A break-up time of less than 10 seconds indicates poor quality of the mucin layer.

Meibography and interferometry

Meibography is a recent technique for observing the meibomian glands on the inside of the eyelids.

Advanced techniques exist such as interferometry that measures the thickness of the tear-film lipid layer, or others allowing examination of the ocular surface or of the tear meniscus. However, the high cost of the equipment required means that it is only suitable for specialist use.

The tear film break-up time, meibography and interferometry explore qualitative tear deficits, i.e. alterations to the lipid layer (Meibomius gland disorders) and the layer mucinic (caliciform cell disorders). These conditions, which are rarer than dry eye syndrome, are certainly underdiagnosed.

Quantitative disorders of lacrimal secretion, known as KCS or dry eye syndrome, are detected by the Schirmer tear test and are common in dogs.

AETIOLOGY

Quantitative lacrimal deficiency can be caused by:

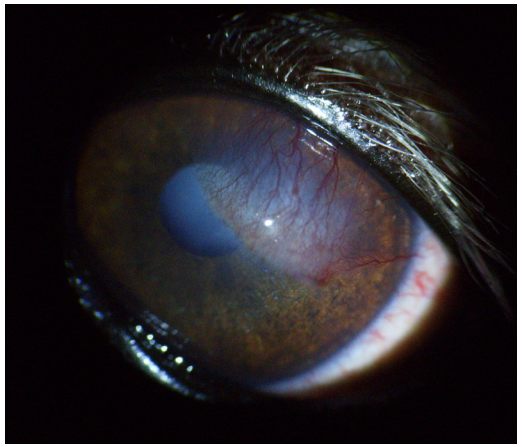
- **agenesis of the lacrimal glands**.

Medical treatments other than lubricants will be ineffective in this case. It is possible to perform surgery to transpose the parotid duct (shunting of the salivary duct from the parotid gland into the lower conjunctival cul-de-sac), but post-operative side effects linked to the difference in composition between saliva and tears are common, e.g. calcification of the superficial layers of the cornea.

- **lymphoplasmacytic infiltration of the lacrimal glands** in older dogs. Many breeds are predisposed:
  - Cavalier King Charles Spaniel
  - Cocker Spaniel
  - Lhasa Apso
  - Shi Tzu

Agenesis of the lacrimal glands in a Yorkshire Terrier. Note the blepharospasm of the left eye.

- **an infection:** canine distemper virus. Although it is uncommon thanks to vaccination pressure, it should not be forgotten!
- **an undesirable effect of certain drugs** (salazopyrine, antidiarrhoeals containing atropine, certain anti-epileptics). The use of these drugs should prompt the practitioner to be particularly vigilant during treatment about tear secretion and to carry out Schirmer tests regularly. Treatment should be reassessed in the event of reduced tear secretion, as the effects may be irreversible. It may be necessary to look for an alternative that does not have these adverse effects.
- **iatrogenic causes:** unfortunate surgical removal of a dislocated nictating gland in a young dog, or necessary removal of a neoplastic lesion (rare!) in an older dog, irradiation of the lacrimal glands during radiotherapy of the nasal cavities.
- **a neurological condition:** neurogenic KCS is unilateral, associated with dryness of the ipsilateral nostril. It is the consequence of an alteration in the parasympathetic innervation of the lacrimal gland (provided by the facial nerve). Adult female dogs are predisposed. Treatment involves oral pilocarpine (one drop on the tongue once or twice a day), and possibly topical immunomodulators (e.g. cyclosporine).



Radiation-induced KCS in a dog treated with radiotherapy for a tumour of the nasal cavities

Neurogenic KCS

Anaesthesia and ocular surface

by Drs. Virginie Fouque and Thierry Azoulay

Anaesthesia is an everyday procedure. A general anaesthetic, whether intravenous or inhalational, has an effect on the cornea and the ocular surface in general. Particular care must therefore be taken of the eyes during and after anaesthesia to limit the risk of discomfort, or of even more serious consequences, such as inflammation or corneal ulcers, upon awakening.

Direct effects of anaesthetics on tear secretion

Commonly used anaesthetics (α-2 agonists, inhalational anaesthetics) and combinations of anaesthetic substances have a negative effect on the secretion of the aqueous phase of the tear film.

Anaesthesia also causes an increase in the osmolarity of the tear film, which is a factor of inflammation of the ocular surface.

Air flow directed at an anaesthetised dog will increase ocular dryness and the risk of a corneal ulcer.

Indirect effects and environmental factors

Several factors can indirectly cause dry eyes during anaesthesia.

- **Suppression of the blink reflex:** the absence of the blink reflex prevents tears from spreading over the cornea and reduces the stimulation of secretion by the Meibomian glands. Without blinking, the eye becomes dry and painful in less than half a minute.

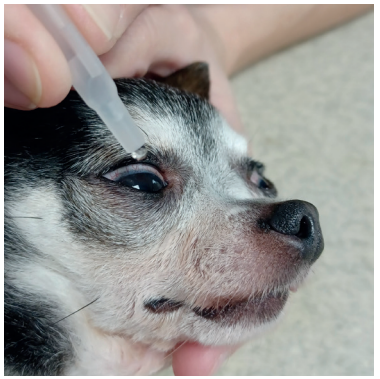
- **Air flow over the cornea:** this may come from the flow of oxygen from the anaesthesia machine if the animal is anaesthetised with a mask or in an induction cage, or from equipment in the operating theatre or recovery room (air conditioning, heating).

- **Patient heating systems** (e.g. warm air blower, heat lamp).

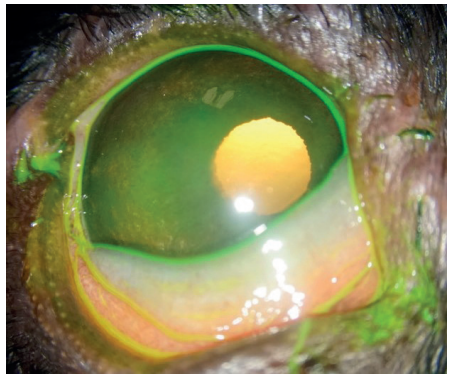
Action to be taken

The corneal surface must be lubricated frequently, both during anaesthesia and during the recovery phase, and finally on returning home. From induction to the resumption of the blink reflex, the interval between two applications of lubricant should not exceed 60 minutes. More frequent administration is necessary in animals already suffering from dry eye, in brachycephalic animals and in exotic pets, and in the presence of unfavourable environmental factors (e.g. heating, warm air blower).

We recommend instilling lubricants made from hyaluronic acid or carbomer every 30 minutes from induction until complete awakening, or even every 15 to 20 minutes in exotic pets and brachycephalic animals, then 4 to 6 times a day for 48 hours.



It is necessary to apply an ocular lubricant during anesthesia and in the hours following awakening



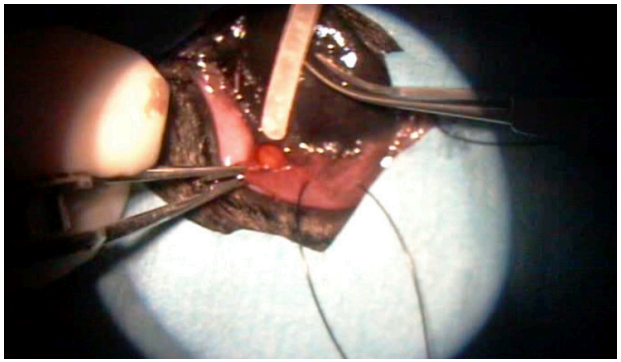
Post-anaesthetic corneal ulcer in a dog who received a lubricant during induction but in which the instillation was not renewed during the operation and on awakening.

III. MANAGEMENT OF DRY EYE

Treatment involves the use of lubricants and aetiological therapy.

Aetiological treatment

- Immune-mediated KCS: treatment involves the use of a topical immunomodulator, cyclosporine A, which inhibits the proliferation and activation of lymphocytes.Treatment should start as early as possible before atrophy of the lacrimal glands. Treatment is generally prescribed twice a day, with a check on tear secretion after one month. The frequency of administration may be reduced if the results of the Schirmer tear test show significant improvement. It is also possible to use cyclosporine implants which are surgically inserted under the superior bulbar conjunctiva. These implants are available from the University of Raleigh in North Carolina (USA).
- Iatrogenic KCS: discontinue administration of the drug in question
- Neurogenic KCS: oral pilocarpine(with possible digestive side effects)



Surgical placement of a cyclosporine implant

Topical symptomatic treatment: dacryomimetics

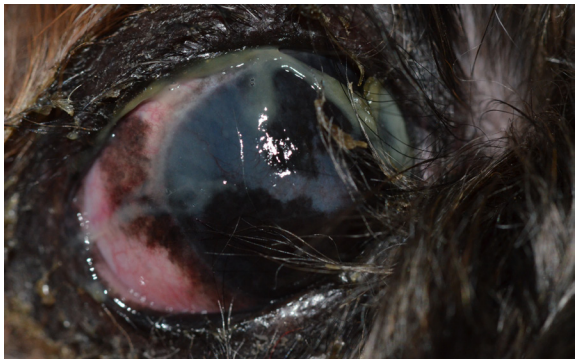
Lubricants (eye drops or gels) should be used regularly throughout the day to restore homeostasis to the precorneal tear film. Veterinary dacryomimetics are hydrogels (polymers which swell in water), and are currently mainly carbomers and sodium hyaluronate. Artificial tears available in human pharmacopoeia can be used, but their effectiveness is limited due to their short corneal contact time.

Topical antibiotic treatment

Antibiotic eye drops or ointments are regularly prescribed to manage secondary infections at the start of treatment, and especially in cases of associated corneal ulcers.

And don't forget: eye hygiene!

To be effective, treatment should be preceded by rinsing the eye with physiological saline solution if secretions are present. Trimming the facial hair is also necessary in long-haired dogs to prevent hair from touching the ocular surface.



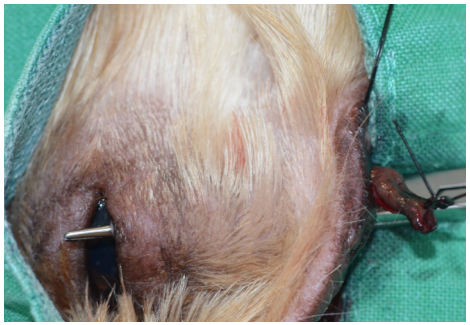
Trichiasis and rubbing of mucus-accumulating hairs on the cornea in a Shi Tzu

Surgical treatment

Transposition of the parotid duct

This involves bypassing the parotid salivary duct to compensate for the lack of tears with saliva. It is important to check beforehand that there is no xerostomia (lack of salivation) and to warn the owner of the possible side effects of ocular lubrication by saliva: possible complication of corneal calcium deposits (common in Yorkshire Terriers).

This type of surgery is used less frequently than in the past, since the advent of topical immunomodulating treatments, but is still indicated if medical treatment is insufficiently effective or not indicated, e.g. in cases of agenesis of the lacrimal glandse.



Dissection and transposition of the parotid duct

IV. CLINICAL CASES

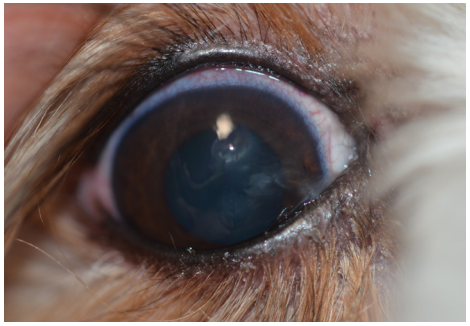
CLINICAL CASE 1: NELSON

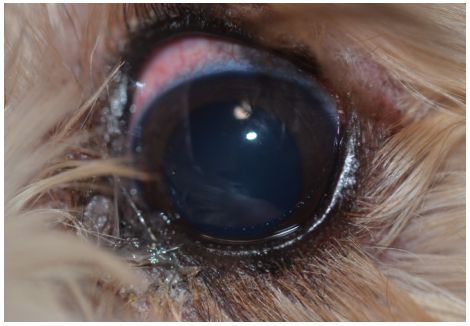
Nelson, a 5-year-old Yorkshire Terrier.

Reason for consultation
Runny eyes, redness in both eyes for several days.

Clinical examination
Good condition.

Eye examination
- Bilateral conjunctivitis, keratitis with superficial neovascularisation in the right eye.
- Schirmer tear test: 9 mm/min for both eyes.
- Tear film break-up time: 10 seconds left eye / 5 seconds right eye.
- Intraocular pressure (IOP): 17 mm Hg left eye / 15 mm Hg right eye.





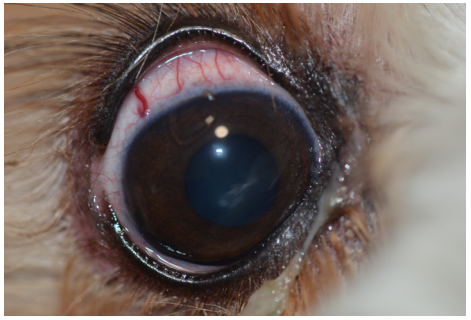
Conclusion
Dry eyes.

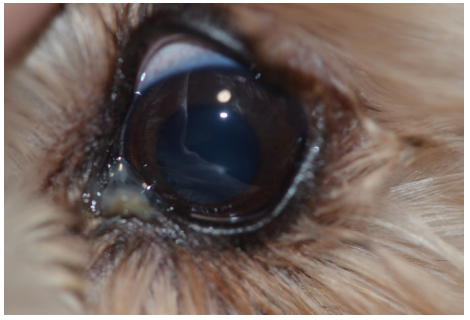
Support
Lacri+® lubricant recommended twice a day in both eyes.

Follow-up

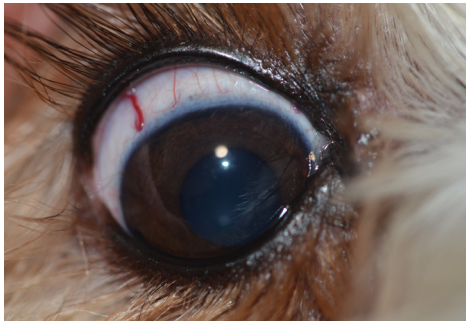
15-day check-up
- Ocular examination: bilateral conjunctivitis is still present, smooth shiny transparent avascular cornea in both eyes.
- Schirmer tear test: 12 mm/min for both eyes.
- Tear film break-up time: 10 seconds left eye / 5 seconds right eye.
- IOP: 17 mm Hg left eye / 16 mm Hg right eye.

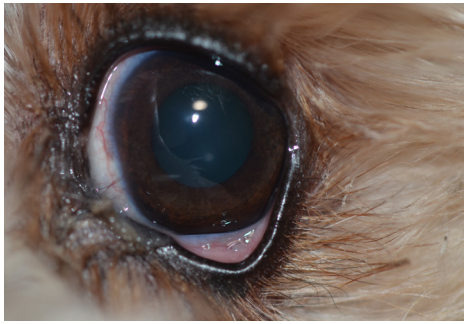
30-day check-up
- Ocular examination: regression of conjunctivitis, smooth shiny transparent avascular cornea in both eyes.





- Schirmer tear test: 14 mm/min left eye / 11 mm/min right eye.
- Tear film break-up time: 10 seconds left eye / 5 seconds right eye.
- IOP: 14 mm Hg left eye / 18 mm Hg right eye.





CLINICAL CASE 2: BOULY

Bouly, a 10-year-old French Bulldog.

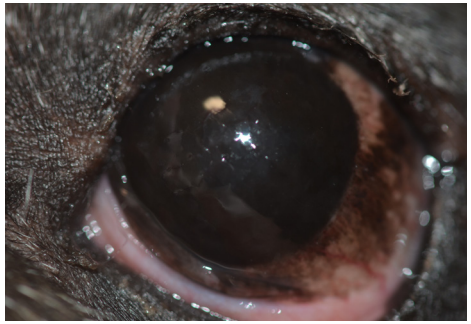
Reason for consultation
Blindness, changes in the appearance of both eyes for several months.

Case history
Dog suffering from atopic dermatitis for many years. Local treatments: antibiotic eye drops, non-steroidal anti-inflammatories, eye lubricants.

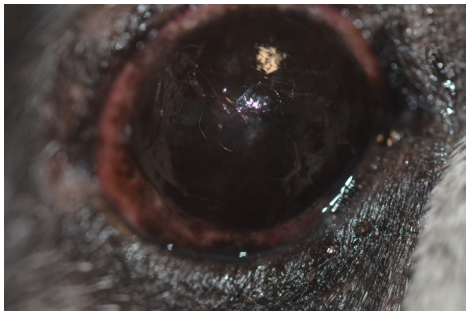
Clinical examination
Good condition.

Eye examination

Left eye
- Inconsistent menace reflex
- Pupillary light reflexes: could not be assessed
- Cornea: dull appearance, severe pigmentation
- Anterior chamber: could not be assessed
- Iris: could not be assessed
- Lens: could not be assessed
- Fundus: could not be assessed
- Schirmer tear test: 0 mm/min
- IOP: 15 mm Hg

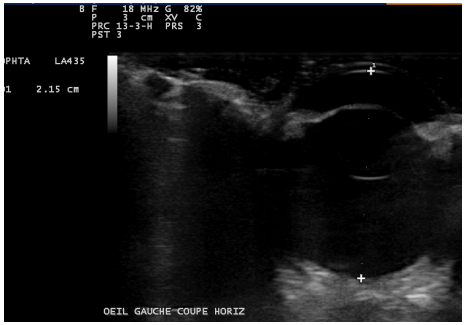


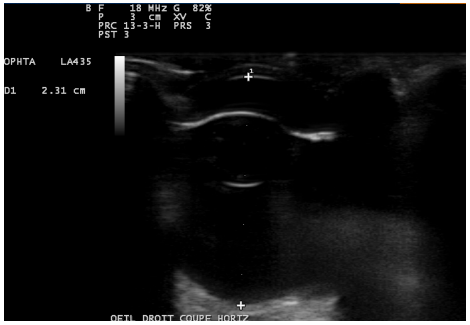
Right eye
- Negative menace reflex
- Pupillary light reflexes: could not be assessed
- Cornea: dull, severe pigmentation
- Anterior chamber: could not be assessed
- Iris: could not be assessed
- Lens: could not be assessed
- Fundus: could not be assessed
- Schirmer tear test: 0 mm/min
- IOP: 75 mm Hg



Complementary examinations

Ocular ultrasound under local anaesthetic / biometry
- Anterior and posterior segments without anomalies
- Moderate hydrophthalmia of the right eye





Conclusion

Dry eye syndrome complicated by bilateral pigmentary keratitis and unresolved glaucoma in the right eye. The visual prognosis for the right eye was hopeless. Corneal cryotherapy and a subconjunctival cyclosporine implant were scheduled for the left eye. Enucleation of the right eye is not justified in view of the absence of reported pain in this dog.

Treatment plan

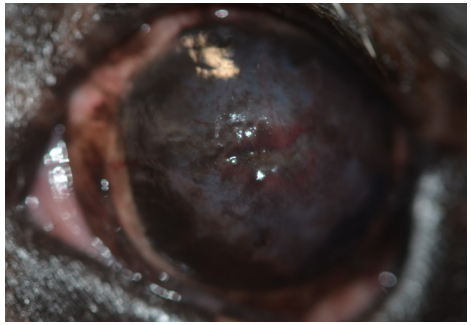
General anaesthesia, cryotherapy and placement of a subconjunctival cyclosporine implant in the left eye. Prescription of lubricant (carbomer and hyaluronic acid) and antibiotic ointment (chlortetracycline).

Follow-up

15-day check-up

Left eye

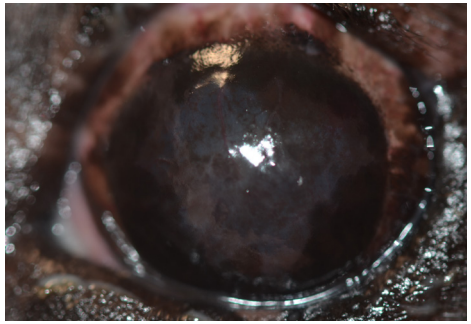
- Positive menace reflex
- Positive direct pupillary light reflex
- Cornea: neovascularisation, peripheral pigmentation, recovery of transparency in the central region
- Anterior chamber: No abnormality detected (NAD)
- Iris: clear
- Lens: could not be assessed
- Fundus: could not be assessed
- Schirmer tear test: 9 mm/min
- IOP: 18 mm Hg



30-day check-up

Left eye

- Positive menace reflex
- Positive direct pupillary light reflex
- Cornea: reduction in neovascularisation, peripheral pigmentation, recovery of transparency in the central region
- Anterior chamber: NAD
- Iris: clear
- Lens: could not be assessed
- Fundus: could not be assessed
- Schirmer tear test: 8 mm/min
- IOP: 16 mm Hg



Follow-up care

Continued lubrication (carbomer and hyaluronic acid).

Bouly regained a degree of independence since regaining corneal transparency in his left eye.

CLINICAL CASE 3: GASTON

Gaston, a 4-year-old cross-breed dog.

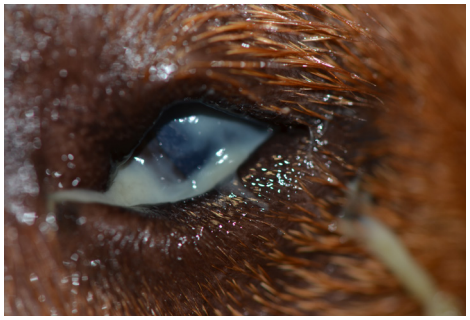
Reason for consultation
Left eye permanently painful and dirty.

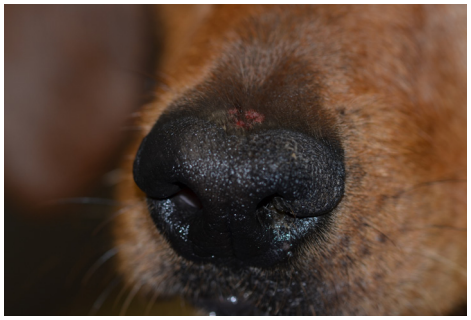
Case history
Left eye closed and dirty for several months.
Local treatment with a local immunomodulator (cyclosporine) without improvement.

Clinical examination
Good condition.

Eye examination

Left eye
- Positive menace reflex
- Positive direct and indirect pupillary light reflexes
- Cornea: neovascularisation
- Anterior chamber: NAD
- Iris: clear
- Lens: clear
- Funduscopic examination: NAD
- Schirmer tear test: 0 mm/min
- IOP: 15 mm Hg
- Dry nose





Right eye
- Positive menace reflex
- Positive direct and indirect pupillary light reflexes
- Cornea: smooth shiny transparent avascular
- Anterior chamber: NAD
- Iris: clear
- Lens: clear
- Funduscopic examination: NAD
- Schirmer tear test: 15 mm/min
- IOP: 15 mm Hg

Conclusion
Neurogenic keratitis sicca of the left eye.

Support
Prescription of oral pilocarpine and a local immunomodulator.

Follow-up

30-day check-up

No improvement in the condition of the left eye.
Poorly tolerated pilocarpine treatment (digestive problems).
Surgery was performed to transpose the parotid duct to the conjunctival pouch.

One-year post-operative check-up

Left eye

- Eye wide open
- Positive menace reflex
- Positive direct and indirect pupillary light reflexes
- Cornea: moderate neovascularisation
- Anterior chamber: NAD
- Iris: clear
- Lens: clear
- Funduscopic examination: NAD
- Schirmer tear test: 20 mm/min
- IOP: 15 mm Hg

CLINICAL CASE 4: SAM

by Drs. Virginie Fouque and Thierry Azoulay

Sam, a 13-year-old male Nova Scotia Retriever

Reason for consultation

Bilateral ocular pain which appeared suddenly following general anaesthesia the day before. Ocular pruritus.

Case history

A dog being treated for mastocytoma had been given a general anaesthetic the previous day for abdominal ultrasound and an ultrasound-guided liver biopsy. The examination was carried out under general anaesthesia (methadone, propofol, isoflurane) and lasted approximately 40 minutes. No eye lubricant was instilled during or after the intervention.

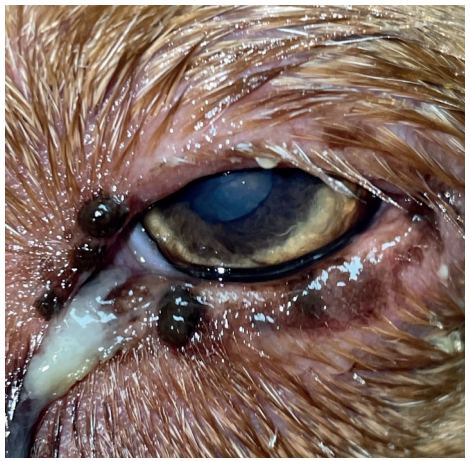
Clinical examination

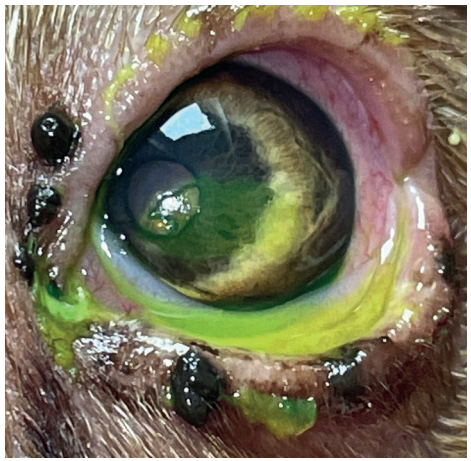
Good general condition.

Eye examination

Left eye

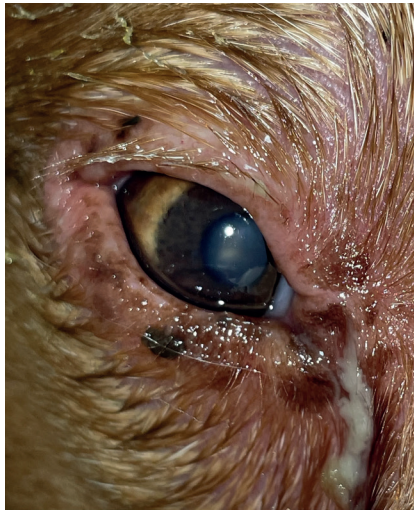
- Menace reflex and pupillary light reflex present
- Corneal sensitivity present
- Blepharospasm
- Abundant epiphora, significant mucus production
- Presence of several nodules or pigmented patches on the upper and lower eyelids
- Thickening of the free margin of the upper and lower eyelids
- Conjunctival hyperaemia with chemosis
- Transparent but slightly dull cornea. Discrete loss of superficial corneal substance in the ventrotemporal quarter of the corneal surface
- Myosis
- Mature nucleocortical cataract
- Fundus could not be assessed
- Schirmer tear test: 4 mm/min
- IOP = 12 mm Hg
- Fluorescein test: fixation of fluorescein in the ventral corneal area

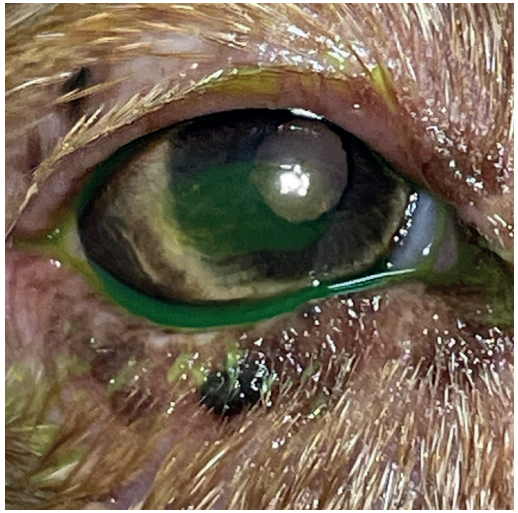




Right eye

- Menace reflex and pupillary light reflex present
- Corneal sensitivity present
- Blepharospasm
- Abundant epiphora, significant mucus production
- Presence of several nodules or pigmented patches on the upper and lower eyelids
- Thickening of the free margin of the upper and lower eyelids
- Conjunctival hyperaemia with chemosis
- Transparent but slightly dull cornea. Discrete loss of superficial corneal substance involving almost the entire ventral half of the corneal surface.
- Myosis
- Mature nucleocortical cataract
- Fundus could not be assessed
- Schirmer tear test: 5 mm/min
- IOP: 13 mm Hg
- Fluorescein test: fixation of fluorescein in the ventrotemporal area of the cornea





Conclusion

Extensive bilateral corneal ulcers involving 25% to 40% of the corneal surface and causing marked ocular pain. The ulcers are superficial and associated with a dry eye syndrome accompanied by acute inflammation of the ocular adnexa in the form of highly expressive blepharoconjunctivitis. Ocular signs appeared within hours of intervention, accompanied by marked pruritus. The absence of any previous ocular signs suggests a link between the signs observed and the anaesthesia administered a few hours prior to their appearance. The presence of a drop in tear production which was not documented also points to an iatrogenic cause.

Management

Treatment included very frequent instillations of tobramycin eye drops (q2h) combined with instillation of a sodium hyaluronate-based ocular lubricant (Lacri+®, q2h). Regular cleaning of the eyes and adnexa was also recommended, as was the wearing of an Elizabethan collar to prevent self-mutilation. Within a few hours, Sam seemed relieved and the blepharospasm had disappeared.

Follow-up

A check-up 3 days later showed complete healing of the corneal ulcers (re-epithelialised cornea, normalisation of the Schirmer tear test) and a clear reduction in adnexal inflammation. Treatment was continued for a further week, reducing the frequency to 4 instillations per day.

This case illustrates the potential consequences of anaesthesia on lacrimal secretion and the ocular surface. Regular lubrification of the eye during and after anaesthesia effectively prevents most of these complications.

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