

# Dacryocystitis in Rabbits

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**ABSTRACT:** Dacryocystitis is inflammation of the nasolacrimal duct often accompanied by nasolacrimal duct obstruction. It is common in rabbits and is often a challenge to treat. This article discusses the anatomy and pathophysiology of the disease and suggests possible underlying disease factors. It also discusses the clinical presentation, diagnosis, treatment and prognosis for rabbits affected by this condition. DOI: 10.1111/j.2044-3862.2010.00015.x

Dacryocystitis is inflammation of the nasolacrimal duct often accompanied by nasolacrimal duct obstruction. It is a common disease in rabbits with one study finding 73% of rabbits with ophthalmic disease suffering from dacryocystitis.

## ANATOMY

The nasolacrimal system of the rabbit comprises a single large puncta leading to the duct. The duct is variable in diameter and tortuous in nature. It passes through the lacrimal and maxillary bones to the distal recess of the external nares (Fig. 1). It lies in close proximity to the roots of the molar teeth and incisors and has a rich vascular and lymphatic supply with significant undulations of the epithelium. All these anatomical factors account for the propensity of rabbits to develop duct obstruction and consequent epiphora.

## PATHOPHYSIOLOGY

Causes of dacryocystitis include dental disease, rhinitis, poor husbandry and the presence of foreign bodies in the nasolacrimal apparatus.

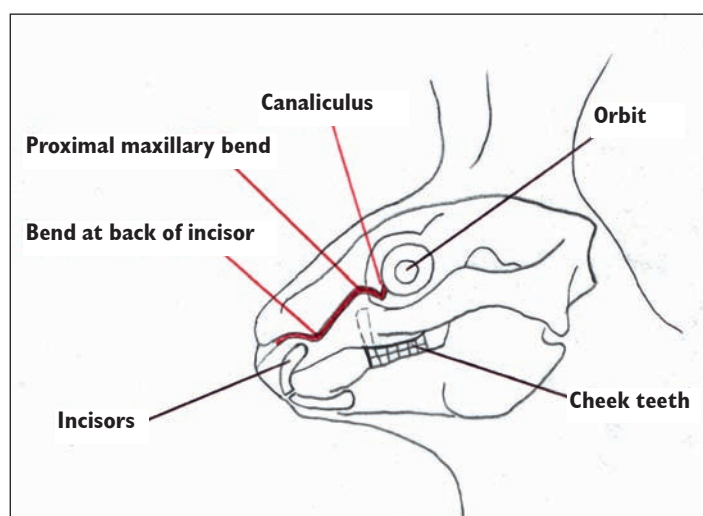
In captive-bred rabbits, dental disease is prevalent. An incorrect diet can lead to nutritional osteodystrophy due to a relative calcium and vitamin D deficiency, which in turn leads to osteomalacia of the skull and poor quality teeth with defective enamel. Progressive

loss of supporting alveolar bone and aberrant tooth growth cause malocclusion, periodontal disease and periosteal penetration of the mandibles, orbit and nasal passages by ectopic roots and in some cases blocked nasolacrimal ducts result. Elongated roots of the incisors and premolars may occlude the duct completely. In these cases there is a poor prognosis for cure of the disease. It is therefore very important to correct deficiencies in husbandry or diet that cause underlying dental disease, as well as the dental disease itself.

Some studies suggest that dacryocystitis is a manifestation of primary pasteurellosis, however the causative agent (*P. multocida*) has been cultured from the respiratory tract of many conventionally reared rabbits so infection due to this bacteria alone is considered unlikely. Culture of nasolacrimal flushes in one study of rabbits with dacryocystitis showed many organisms including *Neisseria*, *Moraxella*, *Streptococcus* and *Bordetella*, but these were also cultured from unaffected rabbits. All of these facts suggest that dacryocystitis is likely to involve bacteria colonising secondary to another disease. This secondary disease is most commonly a dental disease, but rhinitis has also been implicated as the primary disease process. A temporarily or permanently reduced immune status could also lead to bacteria colonising the duct. Primary infection by bacteria cannot be ruled out.

## CLINICAL PRESENTATION

The clinical presentation in the eyes of affected rabbits varies from epiphora with a mucopurulent discharge from the nasolacrimal puncta (Fig. 2), to

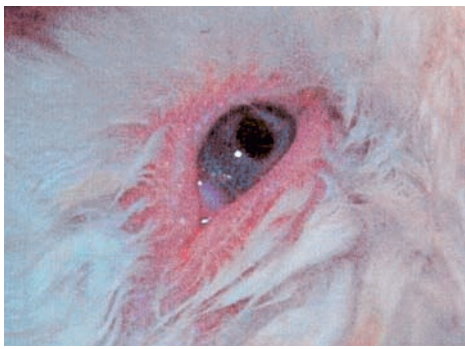


**Fig. 1:** Illustration of the rabbit nasolacrimal duct.



**Fig. 2:** Rabbit with dacryocystitis.

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**Fig. 3:** Rabbit with dacryocystitis and secondary blepharoconjunctivitis.

severe blepharoconjunctivitis associated with the discharge (Fig. 3). Other associated pathological findings include conjunctivitis, nasal discharge, keratitis, periorbital swelling and panophthalmitis. Initial presentation is generally unilateral, but it can become bilateral.

It is important when examining these cases to perform a full clinical examination. Oral examination is mandatory, as dacryocystitis is often associated with dental disease. This can be performed in the conscious rabbit with an otoscope; a more detailed view can be gained by using a mouth gag and cheek pouch dilators, which usually requires sedation or general anaesthetic.

### DIAGNOSIS

Diagnosis of this disease is relatively simple. If the lower lid is everted between forefinger and thumb and digital pressure applied over the medial canthus caseous material will be expressed from the lacrimal sac via the puncta. In some cases the lacrimal sac is even visually and palpably distended with pus.

When a diagnosis is made, it is worthwhile performing bacterial culture and sensitivity either on the discharge or on the material flushed from the nasolacrimal duct, thus allowing appropriately targeted antibacterials to be prescribed. At the very least, a gram-stained smear of the discharge may give an idea of the bacteria involved. The exudates should be heat-fixed on a slide and stained with gram stain to assess bacterial type.

As dental disease is often a causal factor in dacryocystitis, radiography of the head is recommended, paying particular attention to the tooth roots of incisor and molar arcades. Common radiographical changes include alveolar periosteitis, tooth root elongation, periosteal new bone formation or osteolysis of the maxillary bone.

Dacryocystorhinography is a very useful diagnostic aid as it will delineate structural abnormalities of the nasolacrimal duct and abnormal relationships with surrounding structures that result in occlusion of the duct. It will demonstrate any relationship between duct and dental pathology. This technique shows

large lakes of discharge in dilated portions of the duct which explains why there can often be profuse and continuous discharge. It is performed by cannulating the nasolacrimal duct, injecting 0.2 ml of non-ionic contrast medium through the nasolacrimal cannula and then taking lateral and dorsoventral radiographs of the area.

### TREATMENT

Initial treatment consists of weekly or twice-weekly nasolacrimal flushing via nasolacrimal cannulation. The duration is dependent on the severity of the disease.

Nasolacrimal cannulation is performed via the single large puncta which is situated in the medial portion of the ventral conjunctival sac at the base of the external surface of the third eyelid. It can be difficult to cannulate due to the swollen and oedematous state of the eyelids if affected. The best way of cannulating is to evert the lower eyelid, pulling it away from the nictitating membrane and exposing the duct opening. If digital pressure is applied ventrally at the same time to the lower lid this causes the punctum to 'pout' open facilitating the introduction of the cannula. A 21 or 23 gauge cannula is normally used, and if the end is removed to create a shorter tip (approximately 15 mm) this can also help. It is important not to force the flush if there is resistance to gentle attempts. It is better to begin medical treatment and attempt further flushing at a later date. In very severe cases, the punctum may be narrowed and scarred. Retrograde flushing through the nose in such cases may be the only method of flushing the duct; however the small diameter of the duct at this end makes the procedure very difficult.

Nasolacrimal cannulation can be performed in most rabbits under local anaesthetic. Following flushing, a topical antibacterial agent should be instilled. The choice of which agent is dependent on culture and sensitivity or smear results. In the absence of culture and sensitivity results instilling fusidic acid is the author's preference, as gram positive cocci are the most frequently isolated bacterial type (these are also the most commonly isolated bacteria from a normal rabbit eye). It should be noted that aqueous antibiotic solutions tend to be tolerated best. Some antibiotic preparations can sting due to pH e.g. enrofloxacin.

Other treatment options include systemic antibiotics (in the absence of culture and sensitivity results, the author's preference is enrofloxacin 5 mg/kg orally q 12h diluted in water), the use of systemic (e.g. meloxicam) or topical (e.g. ketorolac trometamol 0.5%) non-steroidal anti-inflammatories, permanent cannulation of the duct or sometimes euthanasia in refractory or severe cases.

Systemic antibiotics tend to be used in those cases where the animal is unwell, or signs such as rhinitis or blepharitis are present. The decision to use non-steroidal anti-inflammatories is dependent on the

severity of the signs. Some rabbits with hyperaemic conjunctiva benefit from this treatment and it can aid subsequent flushing attempts. Permanent cannulation with monofilament nylon is another option. This method can keep the duct from scarring and therefore permanently blocking in stubborn cases of dacryocystitis, but this technique is not widely used.

### PROGNOSIS

Many cases present at an advanced stage, and control rather than cure is the most realistic option. In long-standing cases the duct or area around the punctum may narrow and scar leaving the rabbit with permanent epiphora and intermittent infections. A recent study reported that recovery was less likely the longer the treatment was continued and that in cases where the rabbit was treated with systemic antibiotics the prognosis was worse. Interestingly, the study noted that the patency of the nasolacrimal duct was not an indicator of a positive outcome. Of rabbits with blocked ducts, 57% did not recover (as expected), but 36% had a complete recovery.

### CONCLUSION

Treating dacryocystitis remains a challenge. Cure is rewarding, but many cases will present with recurrent problems due to the specific anatomical conditions of the oculo-dental region in rabbits. Effective communication with the owner from the outset is of paramount importance in these cases as the chronic nature of the disease can be frustrating.

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*These multiple choice questions are based on the above text. Answers appear as supporting information in the online version of this article.*

- 1. Dacryocystitis is:**
  - a. always associated with dental disease
  - b. often associated with dental disease
  - c. rarely associated with dental disease
- 2. The most commonly isolated bacteria from rabbits eyes are:**
  - a. gram positive rods
  - b. gram negative rods
  - c. gram positive cocci
- 3. True or false:**

***Pasteurella multocida* is an important primary cause of dacryocystitis.**
- 4. Treatment of dacryocystitis can involve the use of:**
  - a. nasolacrimal duct flushing
  - b. systemic antibiotics
  - c. permanent cannulation of the nasolacrimal duct
  - d. topical anti-inflammatories
  - e. all of the above
  - f. answers a. and b.
- 5. The prognosis for recovery from dacryocystitis is better if:**
  - a. systemic antibiotics are used
  - b. the treatment time is prolonged
  - c. the duct is patent at initial presentation
  - d. all of the above
  - e. none of the above

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