

Repair of superior palpebral defect in a horse by use of silicone subdermal implant

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A 1-year-old male Thoroughbred horse was referred for a defect involving the right superior palpebra. The owner had recently acquired the horse, and a complete history was unavailable; to the owner's knowledge, the duration of the problem was 1 week, and there was no history of trauma. Previously, the right eye had been treated topically with an antibiotic-corticosteroid ointment administered every 6 hours.

On initial examination, the right eye appeared to be painful, as evidenced by moderate epiphora, photophobia, and blepharospasm. After fluorescein staining of the right cornea, a superficial axial ulcer with no indication of cellular infiltration was observed. Superficial blood vessels crossed the limbus and extended toward the ulcer. Mild (1+) flare and miosis also were noticed. The right superior palpebra was missing from the lateral canthus superiorly to the 1 o'clock position. The junction of the skin and conjunctiva in this region was thinner than normal and lacked tarsal plate, cilia, superior orbital sulcus, and meibomian gland openings (Fig 1 and 2). Trichiasis was observed in the affected area, and the facial hairs contacted the cornea. The right palpebral fissure was horizontally shorter than the left; measurement by calipers of the horizontal distance of the palpebral fissure was 38 mm in the right eye and 43 mm in the left eye. The reported mean horizontal palpebral fissure in horses is 43.5 mm.¹ The right pupil did not dilate in response to topical administration of atropine, and fundic examination, therefore, was not possible. Bilateral menace responses were elicited, and a consensual pupillary light response was observed on illumination of the right eye. The blink reflex of the right eye was incomplete because of the missing superior palpebra. Abnormalities were not found on examination of the left eye.

The diagnosis was absence of the lateral aspect of the right superior palpebra with secondary corneal ulceration and anterior uveitis. The corneal ulcer was thought to be the result of the facial hairs



Figure 1—The right eye of a horse with superior palpebral defect at initial examination. The superior palpebral margin is missing from the lateral canthus to the 1 o'clock position. The arrow points to the junction of the normal and abnormal palpebral margin. Notice the superficial corneal ulcer and vascularization.

contacting the cornea, and the anterior uveitis was likely secondary to the corneal lesion. The cause of the palpebral defect was not apparent; possibilities included trauma or congenital absence of the superior palpebra, termed a coloboma. The micro-palpebral fissure also may have been a congenital lesion.

A swab specimen from the corneal ulcer was obtained and submitted for aerobic bacterial and fungal cultures and antimicrobial susceptibility testing; the result of these cultures was nondiagnostic. Treatment included topical administration of 1% atropine sulfate ointment (q 8 h) and neomycin-bacitracin-polymyxin B ointment (q 6 h) to the right eye, and oral administration of flunixin meglumine (0.25 mg/kg of body weight, q 12 h) and sulfamethoxazole-trimethoprim (18 mg/kg, q 12 h). A contact lens^a (34 mm diameter; 18 mm base curve) was placed on the cornea to prevent further damage by the facial hairs.

On day 5 of treatment, the right pupil was di-

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^aEquine Specialty Products Inc, Denton, Tex.



Figure 2—The horse's eyes at initial examination. Compare the lack of cilia and superior orbital sulcus in the horse's right eye with the clinically normal left eye.

lated, the corneal ulcer appeared to be decreasing in size, and the eye seemed less painful; surgical correction of the palpebral defect was performed at this time. With the horse under general anesthesia, a surgical blade^b was used to separate the palpebral skin from the conjunctiva in the region of the defect. This dissection was continued superiorly to create a pocket. A horizontal, full-thickness incision also was made at the lateral canthus, extending 6 to 7 mm laterally (Fig 3). A 32 × 5 × 1.5-mm strip of medical-grade silicone subdermal implant^c was trimmed to the same length as the palpebral incision, and 3 tabs were left on the superior aspect to help stabilize the implant in the palpebra and prevent rotation (Fig 4). The implant was placed in the pocket created in the palpebra and stabilized with 3 horizontal mattress sutures of 4-0 monofilament nylon. One stabilizing suture was placed through each of the 3 tabs, and passed superiorly to emerge through the skin approximately 2 cm superior to the palpebral margin. The incision at the palpebral margin was apposed using 6-0 polygalactin 910^d in a buried interrupted horizontal mattress pattern. The lateral canthotomy was closed by apposing the conjunctiva to the adjacent skin, increasing horizontal length of the palpebral fissure. A subpalpebral lavage system, using silicone tubing, also was placed in the palpebra to facilitate treatment of the residual corneal defect without manipulation of the superior palpebra. Enlargement of the palpebral fissure and placement of the implant resulted in stabilization

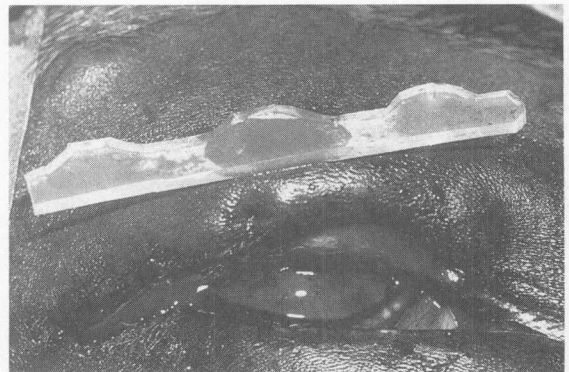


Figure 3—The affected superior palpebra has been incised, and the conjunctiva and skin have been separated, creating a pocket for the placement of the silicone implant; lateral canthoplasty also has been performed.



Figure 4—The silicone implant is shown prior to trimming and placement in the superior palpebra. The 3 stabilizing tabs are on the superior margin of the implant.

^bNo. 64 Beaver Microblade, Rudolf Beaver Inc, Waltham, Mass.

^cSilastic, Dow Corning Corp, Medical Products, Midland, Mich.

^dVicryl, Ethicon Inc, Somerville, NJ.

of the superior palpebra (normally provided by the tarsal plate), increased palpebral mobility, and elevation of facial hairs from the cornea.

After surgery, treatment of the right eye was changed to topical application of gentamicin solution (0.2 ml, q 8 h) and 1% atropine solution (0.2 ml, q 12 h). Flunixin meglumine and sulfamethoxazole-trimethoprim were continued. Palpebral swelling was minimal initially, and resolved over the next 5 days; at this time, treatment with flunixin meglumine was discontinued. Blepharospasm or epiphora was not apparent.

Two weeks after surgery, a small portion of the medial aspect of the superior palpebra, in the area of the silicone implant, dehiscd. The implant appeared to remain in place, and was not visible externally. The horse was anesthetized, and the defect was repaired by use of a pedicle of superior conjunctiva that was dissected and advanced into the defect. The conjunctiva was sutured to the skin as before. Examination during surgery revealed apparently healthy granulation tissue in the region of the implant. The corneal defect was epithelialized at this time, the subpalpebral lavage tubing was removed, and all medication was discontinued. Two weeks after the second surgery, the stabilizing sutures were removed and the horse was released to the owner.

On reevaluation 18 months after surgery, the right eye had normal blink and menace reflexes, a focal corneal scar in the region of the healed ulcer, and a normal anterior segment. Facial hairs remained elevated from the cornea. The implant was palpable, and did not appear to have migrated since surgery. The right horizontal palpebral fissure measured 42 mm (Fig 5).

The abnormalities in this horse may have had congenital or traumatic origins. Congenital palpebral defects, including entropion, micropalpebral and macropalpebral fissures, dermoid, and coloboma have been reported in several species.¹⁻⁹ Palpebral colobomas are seen most commonly in cats,⁴⁻⁶ and only 1 case has been reported in horses.² Most reported eyelid colobomas were bilateral, and involved the temporal aspect of the superior palpebra.^{5,6}

In horses, the most common reason for the absence of palpebral tissue is trauma with avulsion of the eyelid.^{3,9-11} Avulsion most commonly involves the temporal aspect of the superior palpebra, resulting in a pedicle of tissue attached medially or in complete loss of the palpebral margin.¹⁰ In the horse of this report, a history of trauma was not documented, and cicatrix was not observed.

Repair of eyelid defects in which there is loss of eyelid tissue has been described in domestic animals, using autologous grafts from the inferior eyelid^{4,5,12} and mucocutaneous tissues,¹³ and sliding grafts of adjacent skin.¹⁴ Autologous skin grafts were not used in the horse of this report because of the direction of hair growth from the graft and

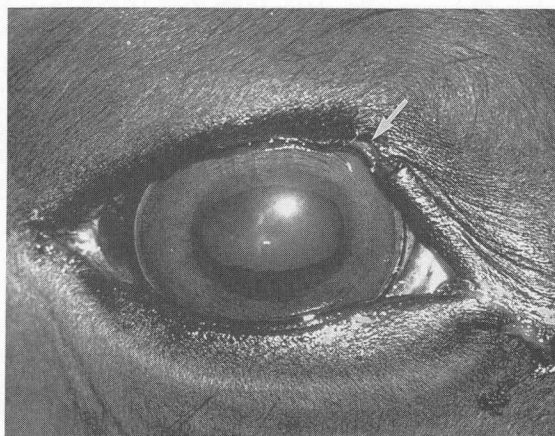


Figure 5—The right eye, 18 months after surgical repair. A notch defect remains in the superior palpebra at the junction of normal and abnormal margin (arrow). The silicone implant is not visible, and the horizontal palpebral fissure appears normal.

the distance from the oral mucocutaneous junction to the eye, and because we desired to avoid secondary complications involving the inferior palpebra.

Synthetic implants of polytetrafluoroethylene have been used in the repair of eyelid defects in human beings¹⁵ and as corneoscleral graft material in dogs,¹⁶ but this material is thin and lacks stiffness, so it was not used in the horse of this report. Synthetic implants should be noncarcinogenic, chemically inert, noninflammatory, and sterilizable.¹⁷⁻²¹ Two common materials that satisfy these criteria are polytetrafluoroethylene and silicone.¹⁸ Silicone is a stable, highly biocompatible compound that has been recommended for soft tissue restoration in plastic surgery.¹⁸ Silicone does not have antigenic activity, results in minimal tissue reaction, is inexpensive, and resists breaking, warping, and degeneration.¹⁹ Because of these properties, a silicone implant was selected as replacement for the supportive, fibrous tarsal plate in this horse.

The objectives of surgical correction in this horse were to enlarge the palpebral fissure, to provide support for the superior eyelid, and to elevate the skin and hair away from the cornea. Lateral canthotomy and canthoplasty enlarged the palpebral fissure, releasing tension on the superior palpebra and improving closure of the palpebral fissure. The implantation of silicone between the skin and conjunctiva of the superior palpebra created an artificial tarsal plate, stiffening the palpebra and preventing corneal irritation caused by trichiasis. These procedures resulted in a successful reconstruction, with improvement of palpebral function, in this horse.

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Book Review: Equine Practice

This inexpensive, British paperback is a compilation of equine-oriented articles from *In Practice*, a clinical supplement to the *Veterinary Record*. A broad range of topics from nasolacrimal cannulation to the assessment of fitness in horses is included in an easy-to-read format. Numerous illustrations and photographs, some of which are of questionable quality, and subheadings dividing chapters into clinical signs, diagnoses, and treatments make it easy to skim areas of interest.

The book is said to be directed toward the equine specialist, but detailed chapters on nasogastric intubation and Caslick's vulvoplasty are simplistic and seemingly unnecessary subjects for most equine practitioners. However, a chapter on air hygiene, which includes a discussion of building ventilation, is a useful and often neglected subject in many equine textbooks.

Descriptions of permanent tracheostomy for racing and grass sickness, characterized by neuronal changes in autonomic ganglia, are not as applicable for veterinarians in the United States as they are for veterinary surgeons in Great Britain. In addition, some terms are either not commonly used in the United States (eg, nail bind or prick), or have been believed inaccurate (eg, anaerobic threshold).

Although some treatments are oversimplified and some recommendations are disputable, chapters on lameness, local anesthesia, and radiographic anatomy may benefit veterinary students or mixed animal practitioners who wish to review these areas as they pertain to horses.—(*Equine Practice*. Edited by Edward Boden. 312 pages; illustrated. Bailliere Tindal, 24-28 Oval Rd, London NW1 7DX. Available in US from WB Saunders Co, The Curtis Center, Independence Square West, Philadelphia, PA 19106-3399. 1991. Price \$32.50)—CANDACE S. LUNDIN