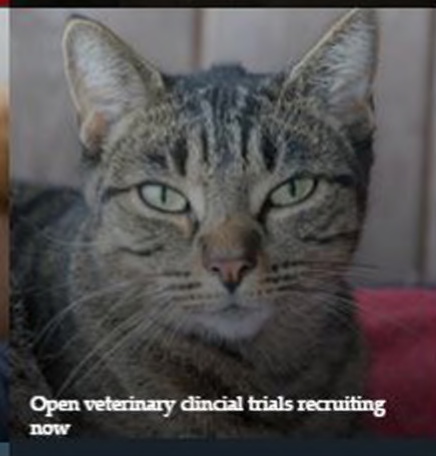
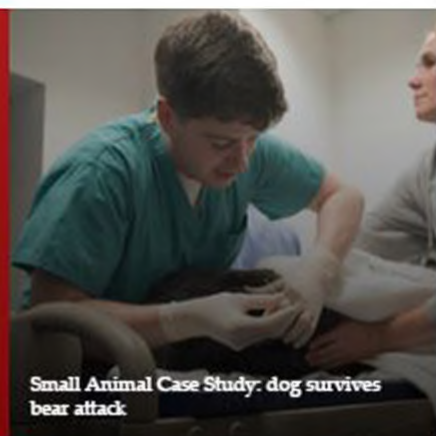
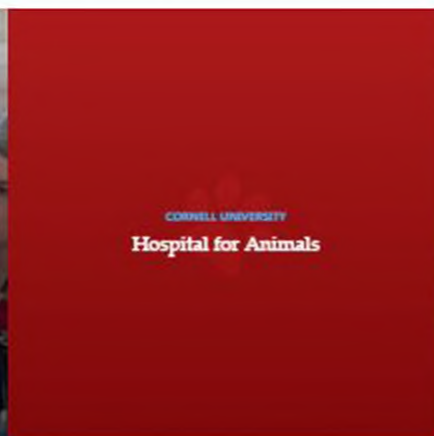




CUHA Beat

April 2017

The pulse of the Cornell University Hospital for Animals





Cornell University College of Veterinary Medicine

[Home](#) > [About Us](#) > [News & Publications](#) > [Publications](#) > [CUHA Beat](#) >

Large Animal Case Study: Temporohyoid Osteoarthropathy in a Mare

Summary

A 13-year-old Quarter Horse mare, "Ruby", presented to the Cornell Large Animal Internal Medicine Service for left-sided facial paralysis and a corneal ulcer in the left eye. Cornell University Hospital for Animals (CUHA) clinicians diagnosed her with temporohyoid osteoarthropathy (THO), and performed a left-sided ceratohyoidectomy to treat the problem. This case is unique in that this patient did not exhibit the vestibular deficits commonly seen with this problem, but instead exhibited trigeminal deficits, which have not been described in widespread literature.

A stormy start

One week prior to presentation, Ruby had been placed in a new stall. There had been a bad storm that night, and the left-sided facial paralysis was noted the following morning. "Acute signs of facial paralysis may arise from trauma or a fracture," explains Rachelle Ludwick, the fourth-year veterinary student attending this case. "So, was assumed that Ruby hit or otherwise injured her head related to fear during the storm."

Five days later, a corneal ulcer developed. Corneal ulceration is a common occurrence following facial nerve paralysis because the facial nerve (cranial nerve VII) is responsible for motor innervation to the muscles of facial expression as well as carrying parasympathetic innervation to the lacrimal and salivary glands. Therefore, decreased tear production may accompany facial nerve damage. Tears and blinking of the eyelids are the primary means the cornea has to protect itself from drying out. When the eyelids cannot blink and the cornea is dry the cornea is highly susceptible to ulceration.

The referring veterinarian placed a subpalpebral lavage system to facilitate delivery of medications to the eye and placed a temporary tarsorrhaphy to protect the cornea. The mare was initially treated with topical atropine, topical antibiotics, sulfamethoxazole, flunixin meglumine, and dexamethasone. When Ruby's facial nerve deficits did not respond to initial treatment, her primary veterinarian referred Ruby to the Cornell University Hospital for Animals.

Pinpointing the problem

On presentation, Ruby was bright, alert, and responsive. Her vital parameters were within normal limits. She had hyperemic oral mucous membranes and difficulty prehending food. She was drooling, primarily from the left side of her mouth. Her left ear was dropped, her nose was deviated to the right and she had left-sided eyelid and nostril paresis consistent with left-sided facial nerve paralysis. She had reduced tear production in the left eye. A large corneal opacity on the ventrotemporal aspect of her left eye was fluorescein positive. She had mild atrophy and decreased tone in the left temporalis and masseter muscles and her mandible was deviated to the right. Neurologic exam did not reveal any vestibular deficits, ataxia or other problems.

Baseline bloodwork was unremarkable. A standing, C1-C2 spinal tap was performed; cerebrospinal fluid cytology was within normal limits and was negative for equine protozoal myeloencephalitis, a disease that could cause similar clinical signs. Bilateral guttural pouch endoscopy revealed the entire left stylohyoid bone to be markedly thickened, with severe proliferation near the temporohyoid joint on the left side, confirming the suspected diagnosis of unilateral temporohyoid osteoarthropathy (THO).



A radiograph of the patient's skull highlighting the offset mandible relative to the maxilla.



Endoscopy image showing patient's abnormal left guttural pouch. Note the thickened stylohyoid bone and the proliferation around the temporohyoid space.

Unique combination of clinical signs

THO appears to be unique to horses. It is a unilateral or bilateral, progressive disease of middle ear, temporohyoid joint, stylohyoid bone, and the adjacent portions of the base of the skull. Chronic inflammation in the area is believed to be the cause of bony proliferation in and near the middle ear cavity and at the articulation of the stylohyoid bone with the petrous portion of the temporal bone of the skull. This can eventually lead to fusion of the stylohyoid bone to the skull. Once the joint fuses, increased movement of the stylohyoid bone from any cause (trauma, dental work, excess tongue movements and so on) can result in a fracture of the fused joint with secondary, acute neurologic signs, most commonly involving cranial nerves VII (facial nerve) and VIII (vestibular nerve). These nerves exit the brain in the same area and are often disrupted by inflammation, hemorrhage, and so on secondary to a fracture or other bony changes. The exact pathogenesis of THO remains unclear.

While Ruby did exhibit the classic clinical signs associated with facial nerve disease (muzzle deviation, ear droop, eyelid droop, corneal ulceration, etc.), she did not have vestibular deficits (no ataxia, circling, head tilt, nystagmus, strabismus, etc.) that are sometimes seen with THO. Additionally, Ruby exhibited some cranial nerve V (trigeminal nerve) deficits, which have not been previously been described in association with THO. "We suspected that the extent of her fracture accounted for disruption of the trigeminal nerve,"

says Rachelle Ludwick. "Her combination of clinical signs was a unique presentation of THO."

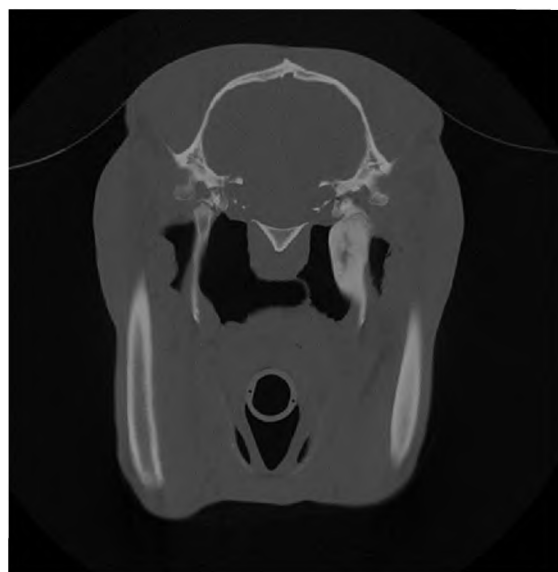
CUHA imaging experts performed computed tomography for surgical planning purposes, revealing a mid-shaft fracture of the left stylohyoid bone as well as a fracture of the left

temporal bone and external auditory meatus. Additionally, there was gas in close proximity to the trigeminal canal. "Gas in this area may indicate that there was inflammation or injury to the trigeminal nerve," says Ludwick. "This could attribute to her clinical signs of trigeminal dysfunction."

Mare on the mend

To address the THO, the surgical team performed a left-sided ceratohyoidectomy. Ceratohyoidectomy is a procedure to surgically remove the ceratohyoid bone which is adjacent and attached to the stylohyoid bone, thereby relieving all mechanical stresses on the temporohyoid joint. "Ceratohyoidectomy is now considered the standard of care for surgical treatment of THO," explains Ludwick.

Seven months after discharge from CUHA, Ruby is doing well. Her owners report that her corneal ulcer healed nicely and vision in the eye appears good. She has markedly improved eyelid tone and her ear and lip droop are resolved, all indicating marked improvement in her facial nerve function. Additionally, her jaw deviation is reduced down to approximately 0.5-incisor widths, whereas it was about 3 incisor-widths at the time of presentation to CUHA. This indicates her trigeminal nerve deficits are also resolving.



A skull CT showing the marked difference between the thickness of the right and left stylohyoid bone

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Small Animal Case Study: bear mauling leads to trauma and sepsis in dog

In the summer of 2016, Lily, a Staffordshire terrier mix, was mauled by a bear, suffering multiple lacerations and punctures, primarily to the thoracic region. The primary care veterinarian performed chest X-rays which showed a mild pneumothorax. They surgically explored the wounds, placed three drains, and treated Lily with intravenous fluids, antibiotics, and pain medication. After several days of hospitalization, she was discharged to the care of her owners with enrofloxacin, amoxicillin, and tramadol.

She was doing well until after two of her three drains were removed. After drain removal, Lily became progressively lethargic and purulent fluid began to exude from her wounds. Given this complication, she was referred to the Cornell University Hospital for Animals for further care.

Lily was admitted and treated by Dr. Jessica Wallis, an Emergency and Critical Care resident and the attending Emergency Service Chief, Dr. Julie Menard. The significant problems identified at admission were sepsis with infected wounds that communicated with the pleural space, anemia with a packed cell volume of 24% and a total protein of 5.8 g/dL, suppurative pleural effusion, mild pneumothorax, and subcutaneous emphysema. That evening her wounds were cleaned and bandaged, wound cultures were obtained and submitted for aerobic and anaerobic culture and sensitivity, a nasogastric tube was passed to provide enteral nutrition, and intravenous fluids, antibiotics, and analgesic therapies were administered. The following morning, she was transferred to the Critical Care Service.

Dr. Pia Martiny, an Emergency and Critical Care resident and the Attending Critical Care Service Chief, Dr.



A dorsal view of the patient's thorax illustrating the pneumothorax.

Gretchen Lee Schoeffler, took over Lily's care the following morning. They sedated Lily and a computed tomographic (CT) scan of her thorax was performed. Radiology Resident Dr. Ian Porter and Radiology Service Chief Dr. Karine Gendron interpreted the images, concluding that there was likely extensive infection in the subcutaneous tissues of her chest wall, presence of air in the chest cavity, presence of fluid in the chest cavity, a region of focal consolidation of the caudal lung, and fracture of the spine of the right scapula.

Though it was not overtly determined from the CT scan, it was suspected that the wounds had penetrated Lily's chest cavity and a surgical exploration of the wounds was indicated. "There was a lot of soft tissue swelling around the majority of the thorax," says Schoeffler. "There appeared to be tracks of fluid with pus and infection down through the muscles to the bone—it was really, really bad."

The following day, Lily was put under general anesthesia by Anesthesia Resident Dr. Kathryn Zatrock, and the attending Anesthesia Service Chief Dr. Jordyn Boesch. Surgery Resident Dr. Blake Travis and the attending Soft Tissue Surgery Service Chief, Dr. Julia Sumner, performed an exploratory thoracotomy and re-explored and debrided Lily's extensive soft tissue

wounds.

During the thoracotomy they discovered the right caudal lung lobe exiting the chest cavity. Given that the herniated lung lobe was no longer healthy or functional, it was removed and the thoracic body wall hernia repaired. They also debrided and lavaged the infected soft tissue wounds which extended down to the level of the dorsal aspect of the thoracic vertebral bodies.

Post-operatively, Lily was hospitalized in the Intensive Care Unit. She was treated with intravenous fluids, and antibiotic, antiemetic, and analgesic medications. In addition to routine post-operative care, the technical staff also administered a packed red blood cell transfusion and provided continuous enteral nutrition via the nasogastric tube until Lily was eating adequately on her own. The wound cultures grew resistant bacterial and yeast organisms, which prompted adjustment in her antimicrobial therapy. "It turned out she was resistant to some of the antibiotics she was previously on," Schoeffler says. "Also having a yeast infection is bad news—luckily the antifungal worked."

Three days after her surgery, Lily had recovered well enough to be discharged to her owner's care, with instructions to administer the antibiotic, antifungal, and pain medications for several days after.

"This case was not very common," says Schoeffler. "Most dogs don't survive a bear attack and most don't survive such a severe soft tissue yeast infection. It was quite surprising that she survived."

A month after discharge, the CUHA team checked in on Lily's recovery, and found she was doing well.

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The annual Cornell University Hospital for Animals (CUHA) Outstanding Clinical Service Award recognizes a CUHA clinician who has provided outstanding service and consultation both within our hospital and to our referring veterinary population.

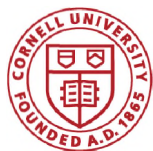
Nominations are solicited from CUHA clinicians and referring veterinarians via this survey and must be submitted no later than July 15, 2017. Please send one paragraph outlining evidence of the candidate's outstanding clinical service and consultation.

The winner receives \$1000 into their discretionary account, will be acknowledged during the annual Fall New York State Veterinary Conference banquet, and his/her name will be added to a perpetual plaque displayed in the hospital. The recipient will not be eligible again for 5 years.

The previous recipients of the Outstanding Clinical Service Award are: Dr. Ned Dykes, Dr. Thomas Divers and Dr. John Randolph

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Ducharme named next Chief Medical Officer at Cornell Ruffian Equine Specialists after Nixon completes term

🐾 Wednesday, April 19, 2017 - 12:59pm

On May 1st, Dr. Norm Ducharme, James Law Professor of Large Animal Surgery at the Cornell University College of Veterinary Medicine, will be taking over as Chief Medical Officer (CMO) at Cornell Ruffian Equine Specialists (CRES).

He will succeed Dr. Alan Nixon, professor of large animal surgery, who completed his three-year term as CMO. As CRES' founding chief medical officer (CMO), Nixon was pivotal in the launch and building of this new practice. "I am pleased to see CRES mature into an established specialty practice serving the downstate horse population, including their owners, trainers, and dedicated veterinarians," says Nixon. "This could not have been accomplished without strong support from all facets of the College who worked tirelessly to ensure a successful launch. We owe the growth of the practice to the insight of the College administration, the CRES faculty, and wonderful staff."


Nixon will continue to oversee the establishment of a new state-of-the-art robotics-controlled imaging system. Dr. Nixon will be ending his current appointment May 1st, but will continue as a rotating surgeon in both Elmont and Ithaca.

Norm Ducharme has agreed to serve as the next CMO at CRES, reporting to and working closely with Dr. Meg Thompson, Assistant Dean of Hospital Operations, and Ms. Jill Nordberg practice manager. Drs. Nixon and Ducharme have been surgical colleagues and worked shoulder to shoulder for many years and the transition should be very smooth.

"It's a great honor and responsibility to take up the reins at CRES," says Ducharme, "I look forward to working in close collaboration with the clinicians and staff there to deliver the best possible care to our equine patients in collaboration with the clients' veterinarian."

Ducharme is a board certified large animal surgeon at Cornell University Hospital for Animals (CUHA) and CRES, has dedicated much of his clinical and research effort to understanding the equine upper airway. His research has focused on methods of identifying and quantifying dynamic upper airway obstructions, defining the anatomical structures and their function, and developing surgical and other methods for treating equine upper airway diseases. He graduated from veterinary college at the University of Montreal in 1979 and completed his internship and residency at Cornell University's College of Veterinary Medicine in 1982. He received his Master of Science degree from the University of Guelph and became a Diplomate of the American College of Veterinary Surgeons (ACVS) in 1985. Ducharme was medical director at CUHA from 1990 to 2014. Ducharme served as president and chair of the board of the ACVS from 2005 to 2007 and was inducted in the University of Kentucky Hall of Fame for Equine research in 2016.

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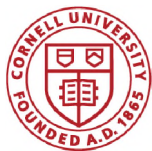
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Open veterinary clinical trials are currently recruiting

The Cornell University Hospital for Animals is actively engaged in clinical studies that work towards applicable treatments and cures for our patients. Please consider informing owners of eligible patients about relevant studies, and help us move the research forward!

Featured Trial: Pain treatment for canine cancer patients

- **BACKGROUND:** Some dogs with cancer, especially end-stage cancer patients or patients with dermatitis secondary to radiation therapy, experience pain that cannot be adequately controlled with oral medications given by their owners at home. Depending on the site of pain, an epidural injection can provide pain relief superior to oral medications, sometimes with fewer side effects. The duration of pain relief is variable but may last several weeks. Repeating the injection requires heavy sedation or general anesthesia each time, and this puts the dog at risk for anesthetic complications, is time consuming, and can be prohibitively expensive.
- **METHODS:** The Anesthesiology and Pain Medicine Service at the Cornell University Hospital for Animals (CUHA) is currently investigating a prototype device that consists of an epidural catheter placed under fluoroscopic guidance and connected to an access port that is implanted under the skin over a dog's back under brief general anesthesia. Analgesic drugs can then be injected through the port and catheter into the epidural space as frequently as necessary to provide pain relief without the need for anesthesia and its risks and costs, and the device can be removed if it is no longer needed.
- **ELIGIBILITY:** Any dog suffering from pain due to cancer that is not adequately controlled using oral medications administered at home may be eligible. Dogs that are currently hospitalized at CUHA for cancer treatment may also be eligible. Other patients with pathologies causing chronic pain may be considered on a case-by-case basis.
- **COMPENSATION:** Owners are responsible for all of the costs associated with the device including its implantation and follow-up visits. The first three owners will have part of the costs covered through funding from the International Veterinary Academy of Pain Management's Research and Scholarship Foundation. For participation, all owners will receive a discount on certain items on their bill for the charges associated with the device and follow-up visits.
- **OWNER RESPONSIBILITIES:** The owner will be asked to fill out a simple, brief online questionnaire about their dog's pain before the device is implanted, when the first dose of drugs is given, and at regular intervals thereafter. Owners can return to CUHA for additional injections as often as necessary to control their dog's pain. If the dog is hospitalized at CUHA, the oncologist referring the case and/or Dr. Boesch will determine how often the drugs should be given.
- **PRINCIPAL INVESTIGATOR:** Jordyn Boesch, DVM, DACVAA
- **CONTACT INFORMATION:** (607)253-3060; vet-research@cornell.edu

Other active trials include:

[Using Platelet Rich Plasma to treat Dogs suffering with Arthritis and Lameness in One Knee](#)

[Lymphoma: Banking Lymph Nodes](#)

[Using Healthy Senior Cats as Controls for Genetic Mapping](#)

[Treatment for Cats with Non-Responsive Stomatitis](#)

[Studying Feline Sepsis in Emergency Situations](#)

Visit the [CUHA Clinical Trials website](#) for more information.

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