VETERINARY MEDICINE

# Surgical Management of Interesting Equine Upper Respiratory Cases

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# Case 1

## 18-Year-old Quarter Horse gelding

- Owner has had for 10+ years
- Has made some URT noise for quite some time but has been able to perform well as a rope horse
- April 2023 came home from being out of town to horse making URT noise at rest and in respiratory distress
- Transported to home DVM where temporary trach placed out of necessity
- Horse scoped subsequently
- Diagnosed with laryngeal hemiplegia

# Case 1

## 18-Year-old Quarter Horse gelding

- DVM recommended arytenoidectomy based on high rate of failure of prosthetic laryngoplasty
- Bilateral arytenoidectomy performed by home DVM under GA
- Temporary trach left in place throughout healing

# Case 1

## Prosthetic Laryngoplasty

- Post-Operative Complications:
  - Loss of Abduction
    - One of most common post-operative problems
    - 76% of horses lost at least 1 grade in first 6 weeks (Barnett et al. 2013)
  - Prosthesis failure
    - Up to 15% of cases
    - Treatment is either immediate surgical revision or arytenoidectomy

BEVA AAEP Equine Veterinary Education

Review Article | Full Access

**A review of recent developments in the clinical application of prosthetic laryngoplasty for recurrent laryngeal neuropathy: Indications, complications and outcome**

S. Biasutti, A. J. Dart, L. B. Jeffcott

First published: 02 February 2016 | https://doi.org/10.1111/eve.12553 | Citations: 8

**TABLE 1: Retrospective studies on laryngoplasty indicating criteria for success and reported success rates**

| Author | Population | No. horses | Criteria for success | Success rate, % |
|---|---|---|---|---|
| Goulden and Anderson (1982) | Mixed population | 81 | Return to racing | 92 |
| | | | Improvement in performance | 44 |
| | | | Percent won races | 38 |
| Hawkins *et al.* (1997) | Thoroughbred and Standardbred racehorses | 230 | Return to racing | 77 |
| | | | Improved performance (subjective assessment) | 69 |
| | | | Improved performance (objective, performance index) | 56 |
| Strand *et al.* (2000) | Thoroughbred racehorses | 52 | Return to racing | 94 |
| | | | Improvement in performance (ran personal best time) | 45 |
| | | | Percent won races | 60 |
| Dixon *et al.* (2003a) | Mixed population | 200 | Return to intended use | 91 |
| | | | Improved performance (subjective assessment) | 72 |
| Barakzai *et al.* (2009a) | National Hunt Thoroughbreds | 71 | Return to racing | 78 |
| | | | Improved performance (total earnings in 5 races post operatively compared with 5 races preoperatively) | 47 |

# Case 1

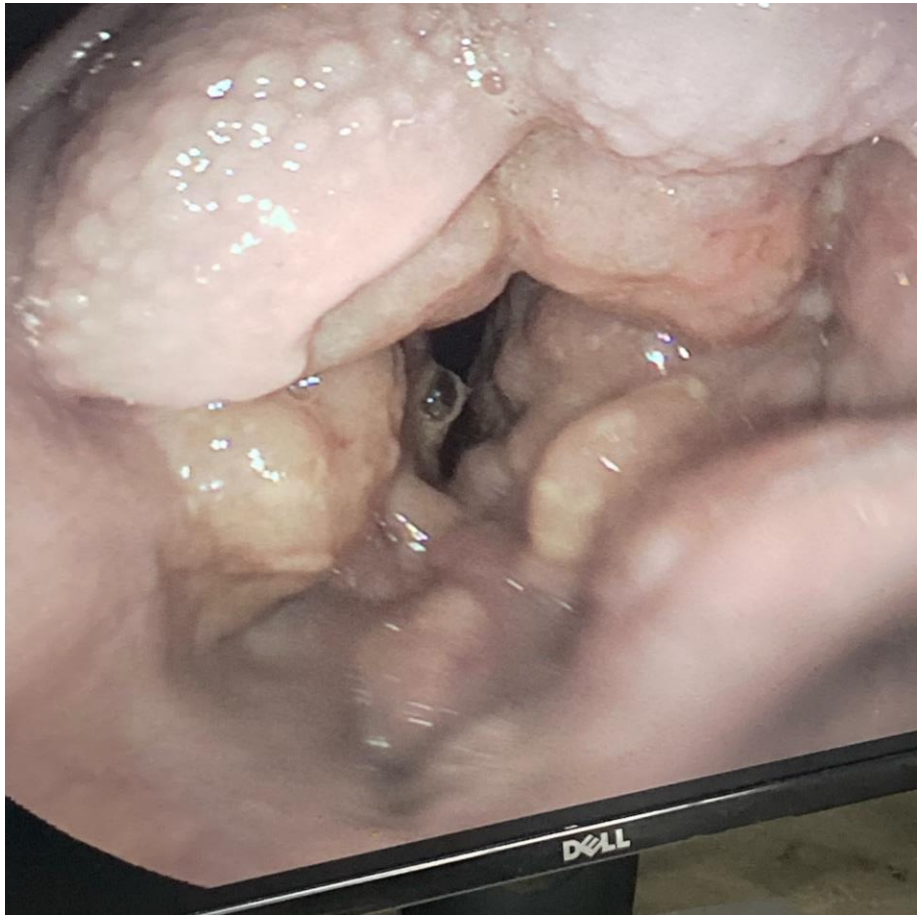
## Was laryngeal hemiplegia the correct diagnosis?

- Horse has had URT noise in work for as long as the client can recall
- Why sudden onset of respiratory distress?
- Other differentials:
  - Arytenoid chondropathy
  - Laryngeal edema
    - Not evident on endoscopy
  - Lower respiratory tract?
    - Unlikely given resolution of distress with temporary trach

# Case 1

## 18-Year-old Quarter Horse gelding

- Owner contacted OSU to ask about possible treatment options about 1 month post-operatively




2 weeks post-op endoscopy

# Case 1

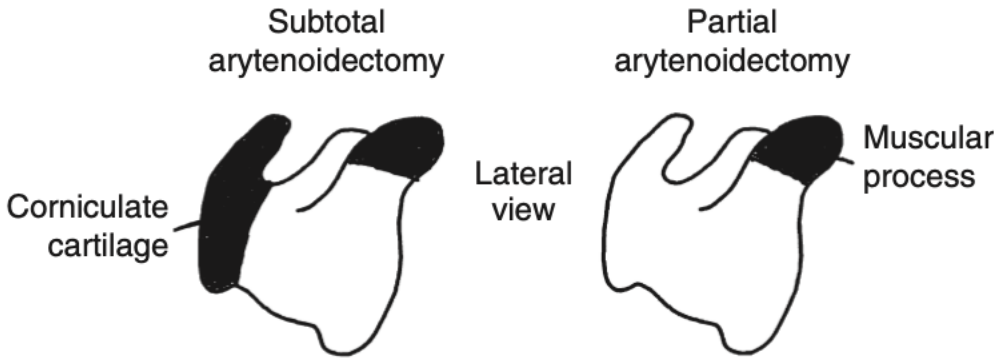
## 18-Year-old Quarter Horse gelding

- Presentation to OSU 5/31/23
  - Horse is BAR
  - Temporary trach still in place
  - Horse has lost weight, overall condition in the past month

# Case 1

## Arytenoidectomy

- **Partial arytenoidectomy**
  - Only muscular process left intact
  - 1995 Study, Lumsden, Derksen, Stick, EVJ
    - Evaluated via endoscopy in exercising horses with surgically induced LLH
    - Improved upper airway function, superior to subtotal
- Subtotal arytenoidectomy
  - Muscular process and rim of corniculate process left intact
  - 1990 study, Belknap, Derksen, Nickels, AJVR
    - Failed to improve upper airway function on high-speed treadmill exam in horses with surgically induced LLH




Ducharme and Rossignol, Equine Surgery, 5th Edition

# Case 1

- Options?

# Indications for and short- and long-term outcome of permanent tracheostomy performed in standing horses: 82 cases (1995–2005)

A. Berkley Chesen, DVM, and Peter C. Rakestraw, VMD, DACVS


- JAVMA 2008
- 82 horses
- Permanent tracheostomy with standing sedation
- Indications:
  - Nasopharyngeal cicatrix, arytenoid chondropathy, laryngeal hemiplegia, multiple/other upper airway abnormalities
- Disadvantages:
  - Maintenance of cleaning stoma
- Potential complications:
  - Partial dehiscence
  - Fever
  - Excessive swelling
  - Skin inversion
  - Stenosis requiring revision
- This study:
  - 89% returned to previous use
  - 98% of owners very satisfied with results
  - 97% 1-year survival rate
  - Mean estimated failure free period 9.7 years

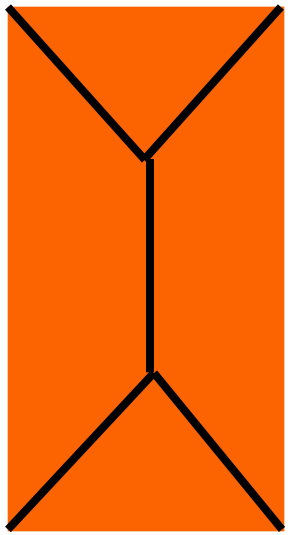
# Case 1

Temporary tracheostomy left in place through surgery with plans to remove several days post-operatively

# Case 1

## Permanent Tracheostomy, Surgical Technique

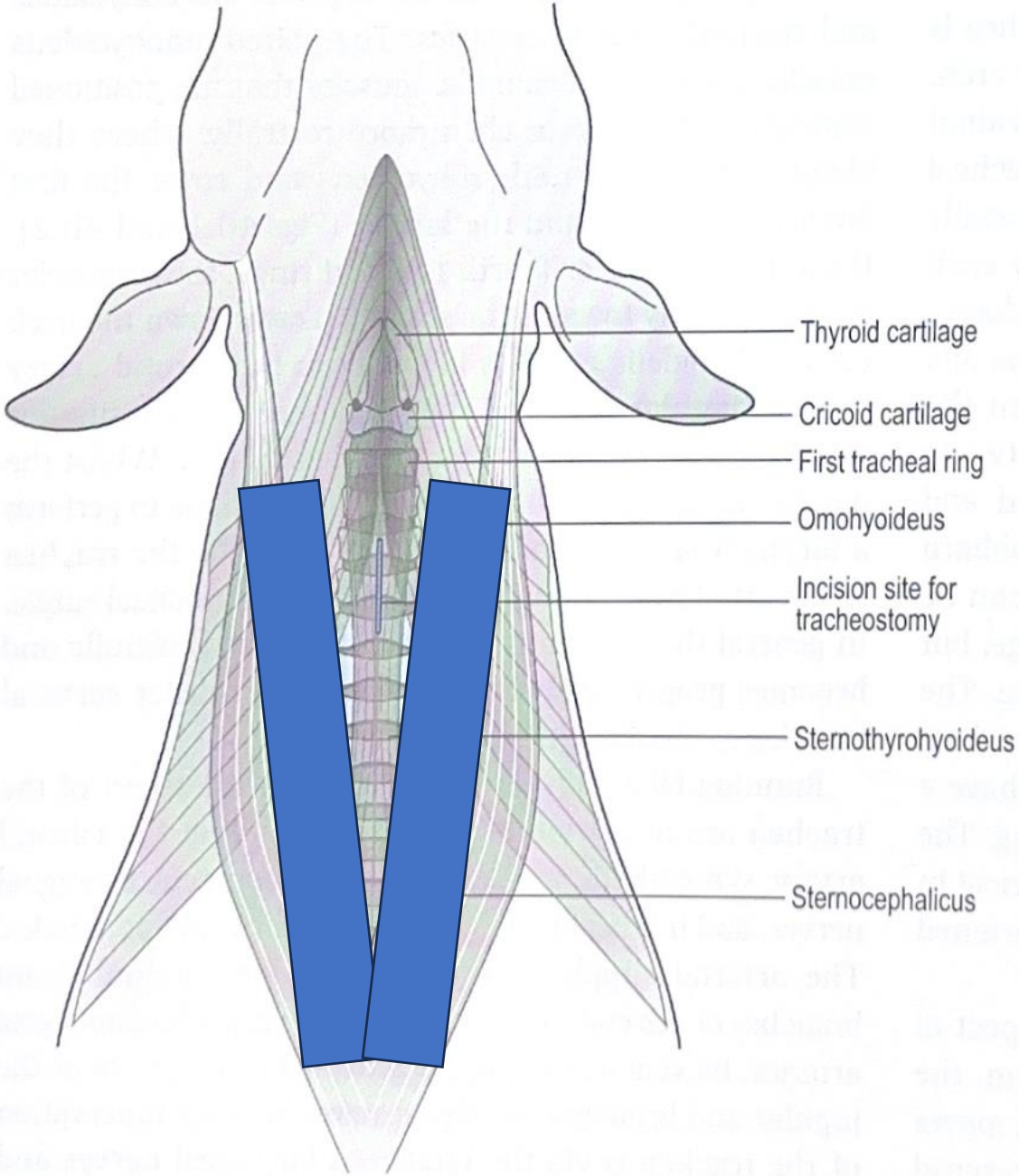
- Restrain in stocks, sedated with head and neck extended
- 10 cm ventral midline incision through skin, subQ, cutaneous colli just caudal to larynx
- Separate paired sternothyrohyoideus muscles and retract laterally
  - Separate, crush, transect 3 cm wide band of muscle on each side
- Expose 4-5 tracheal rings
- Remove ventral 1/3 of 2$^{nd}$ through 5$^{th}$ or 6$^{th}$ tracheal rings
  - Better cosmesis
  - Potential complications removing first ring
- Incise tracheal mucosa and suture to skin

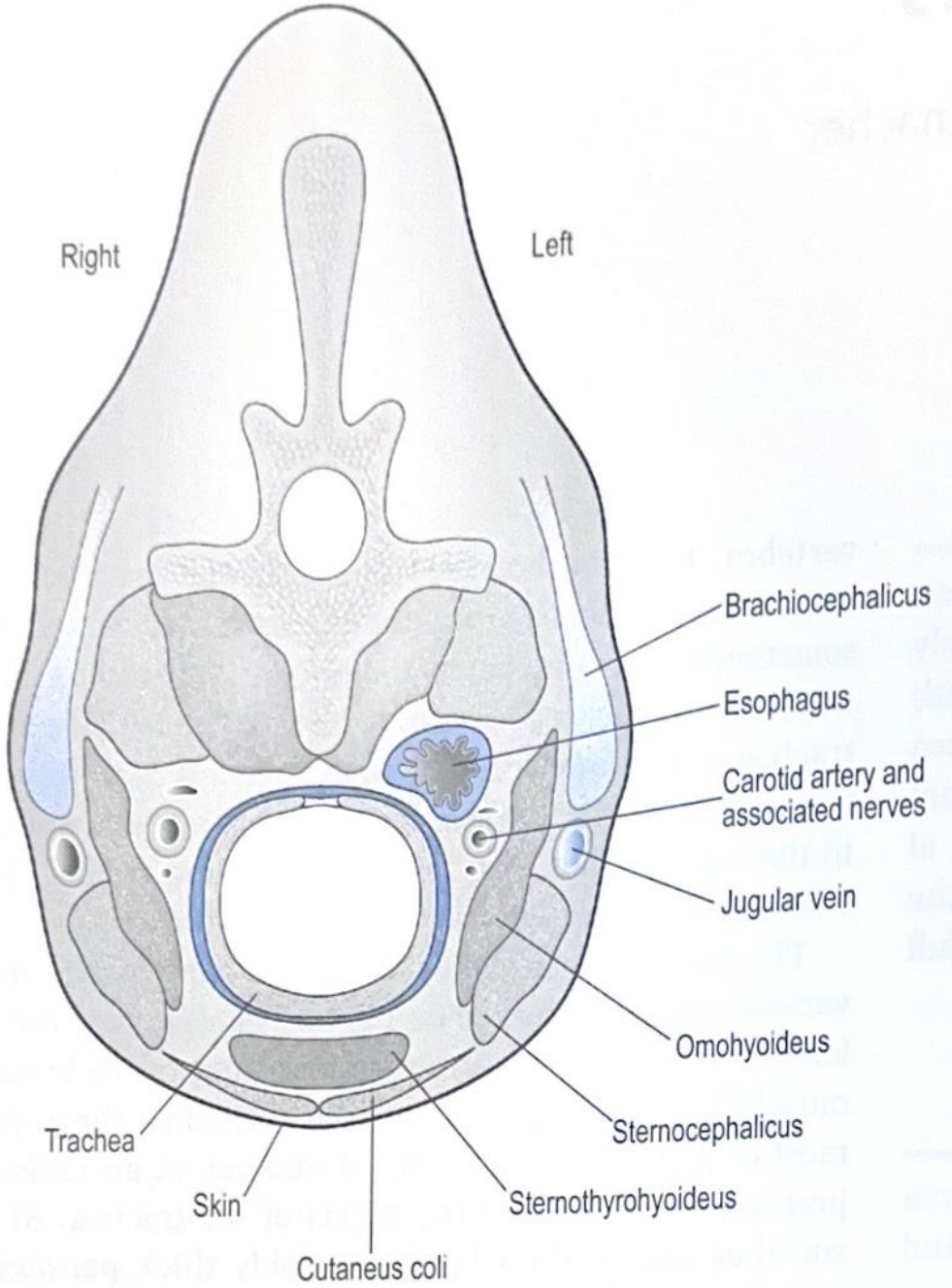


# Case 1

## Intraoperative Complications

- Traditional approach made as described
- Discovered abnormal defects in cricoid cartilage, first tracheal ring with abnormal palpation of second tracheal ring
- Revised incision to perform permanent tracheostomy more distally
- Removed ventral segments of rings 4 through 7




Dixon, Schumacher, Collins, Equine Respiratory Medicine and Surgery, 2007


Energizer

# Case 1

## Post-Operative Instructions

- Equisul peri- and post-operatively for a total of 12 days
- Flunixin peri- and post-operatively
  - BID for 3 days, SID 3 days
- Suture removal in 14 days
- Confine to stall until surgical site healed with daily hand walking
- Remove temporary trach once initial surgical swelling stabilized or subsided
- Monitor for excessive swelling, discharge, dehiscence

# Case 1

## Post-Operatively

- 8 days out

- 9 days out

# Case 1

## Day 11

- Owner turned horse out in small paddock with temporary trach still in place

# Case 2

## 8-Year-old Belgian gelding

- Tie-back surgery for LLH performed 1 year prior to presentation
- Re-check endoscopy post surgery indicated significant loss of abduction
- Horse has been in reduced work the past year but continues to make significant URT noise when exercising

# Case 2

## 8-Year-old Belgian gelding

- Presentation to OSU
  - BAR
  - PE WNL
  - URT Endoscopy

# Case 2

## Treatment Options

- Ideally horse will go back to work as a pulling horse
- Treatment options for failed laryngoplasty:
  - Repeat tie-back
  - Left Partial Arytenoidectomy
  - Retirement
- **<u>2200 lbs</u>**

# Case 2

## Standing Prosthetic Laryngoplasty

- Veterinary Surgery 2015
- 71 horses
- Standing sedation, local blocks, endoscopic guidance
- Well-tolerated
- Comparable results to laryngoplasty performed under GA

**Laryngoplasty in Standing Horses**

Fabrice Rossignol[1], DVM, Dipl EVCS, Amélie Vitte[1], DVM, Josef Boening[4], DVM, Dipl ECVS, Michael Maher[2], DVM, Antoine Lechartier[3], DVM, Olivier Brandenberger[1,3], DVM, Manuel Martin-Flores[2], DVM, Dipl ACVA, Hayley Lang[2], DVM, Wade Walker[2], DVM, and Norm G. Ducharme[2], DVM, Dipl ACVS

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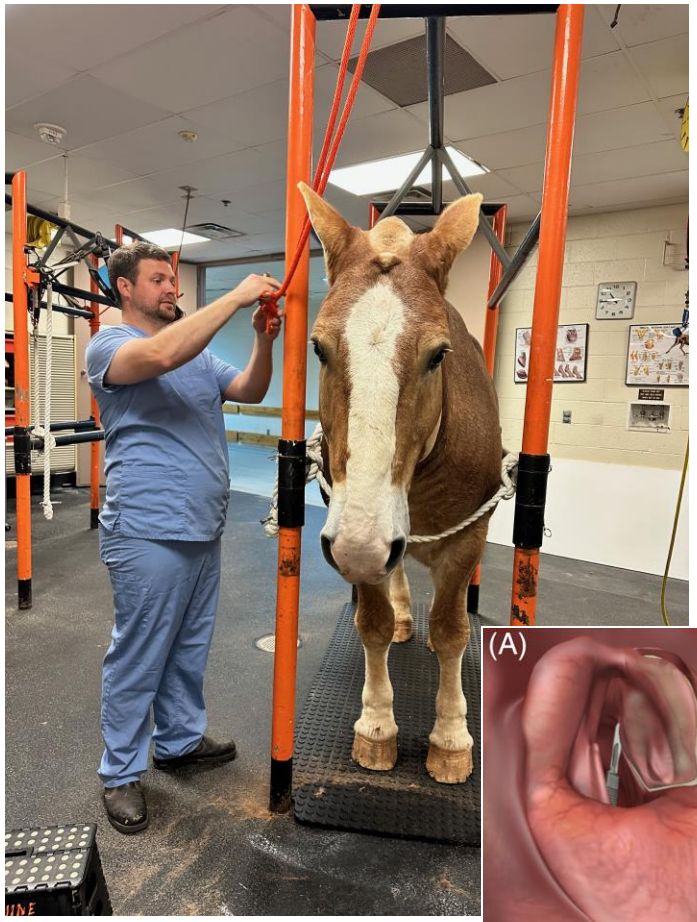
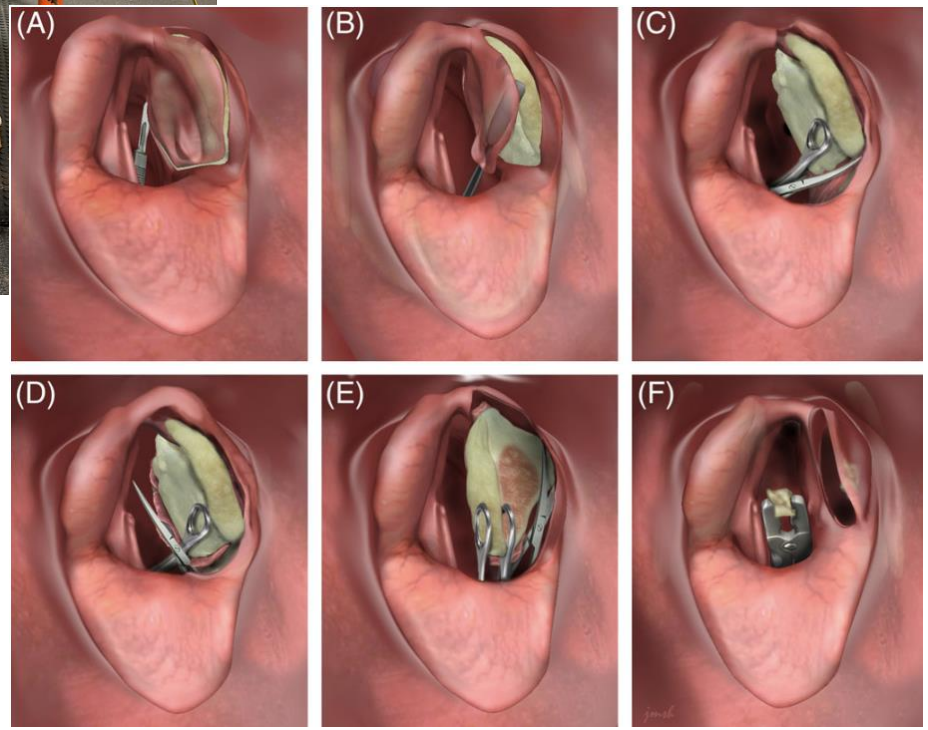





ORIGINAL ARTICLE – CLINICAL

WILEY

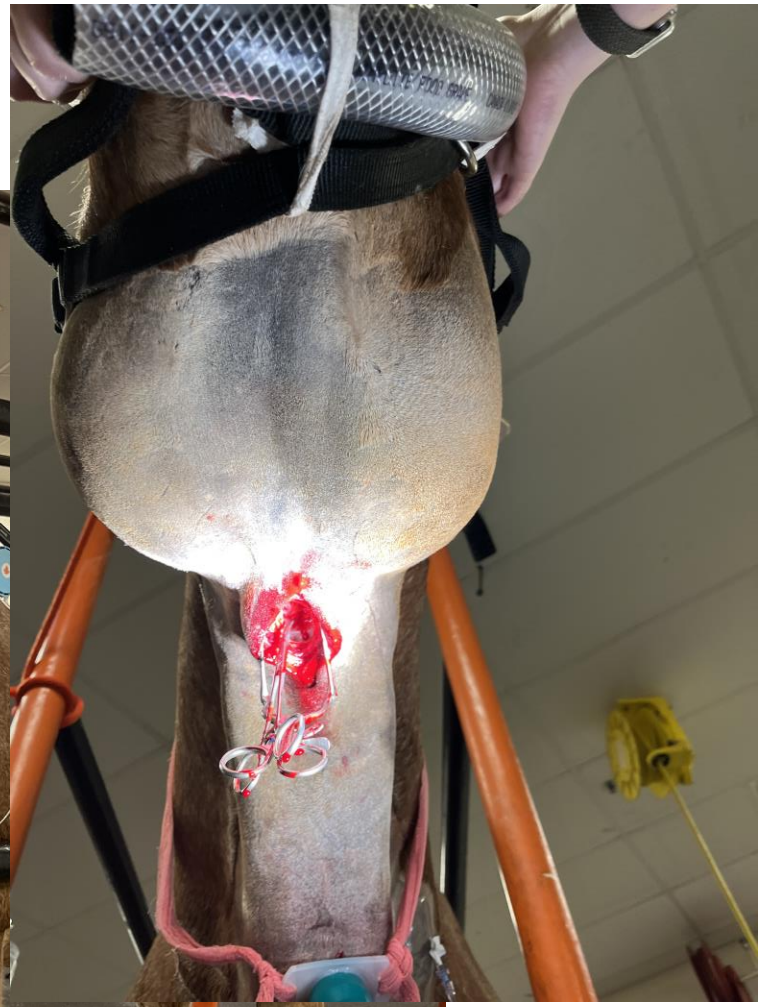
# Partial arytenoidectomy in 14 standing horses (2013–2017)

Sarah M. Gray DVM | Santiago D. Gutierrez-Nibeyro DVM, MS, DACVS-LA, DACVSMR-EQ | Erica J. Secor DVM, MS, DACVS-LA

- Veterinary Surgery 2019
  - Left partial arytenoidectomy without mucosal closure, 14 horses
  - Endoscopic guidance, sedation and local anesthesia
  - 3 horses developed granulomas
    - 2 permanent trach

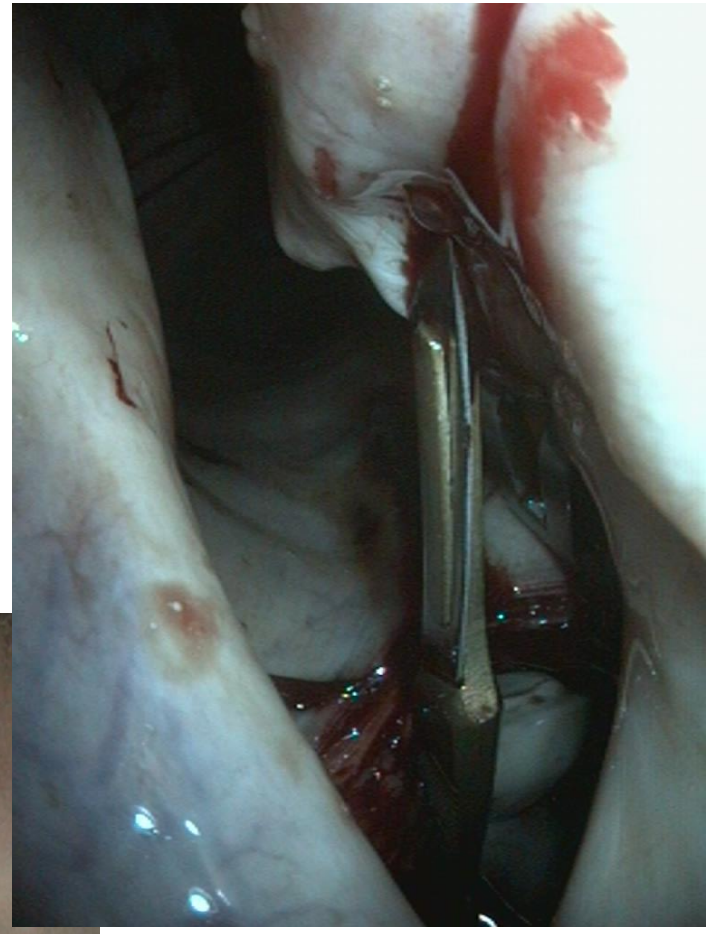
# Case 2

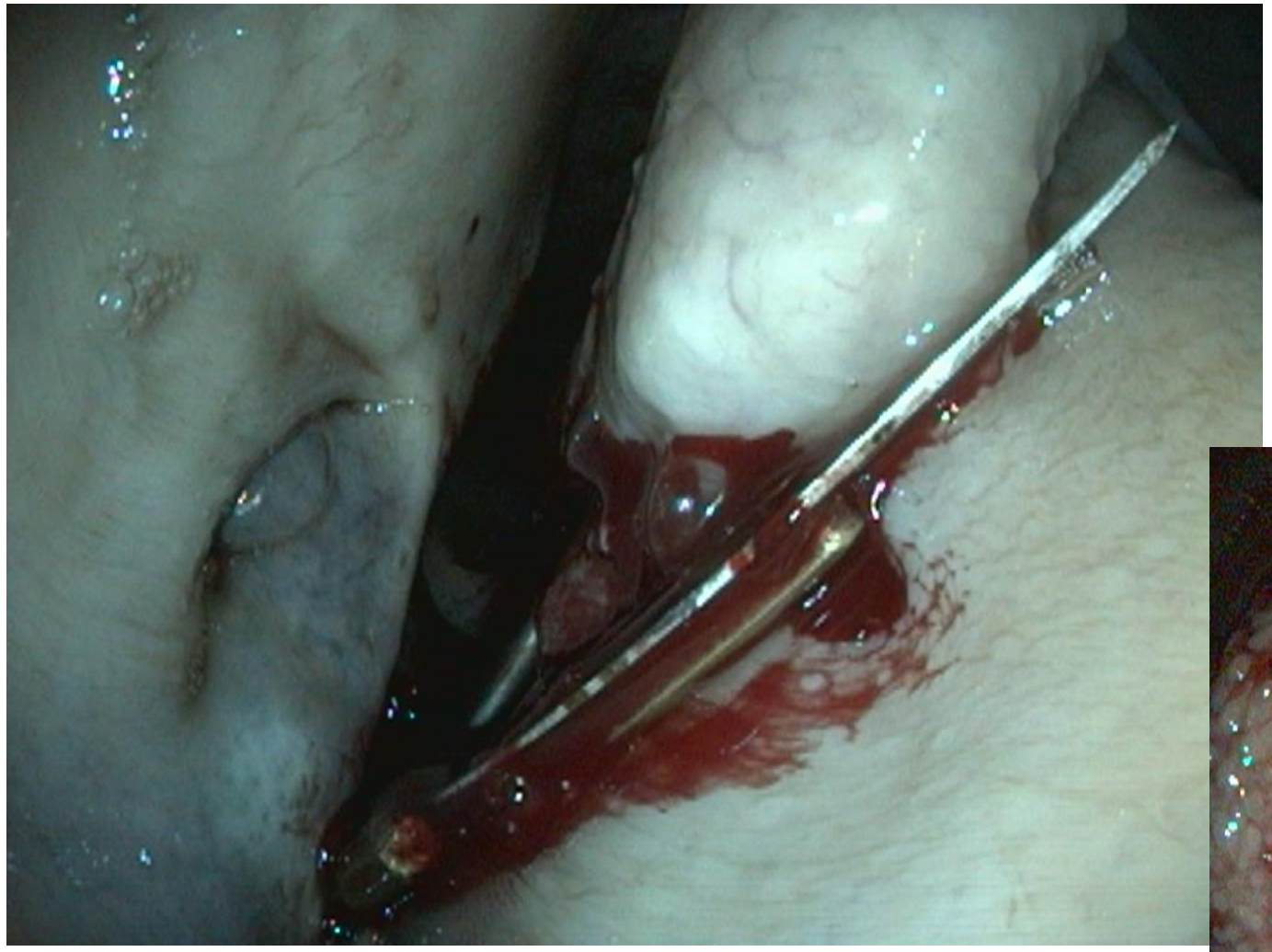
## Surgery

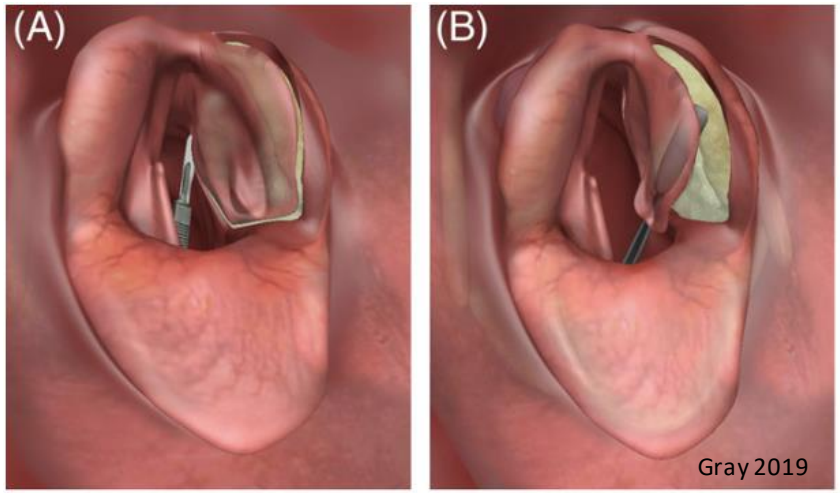


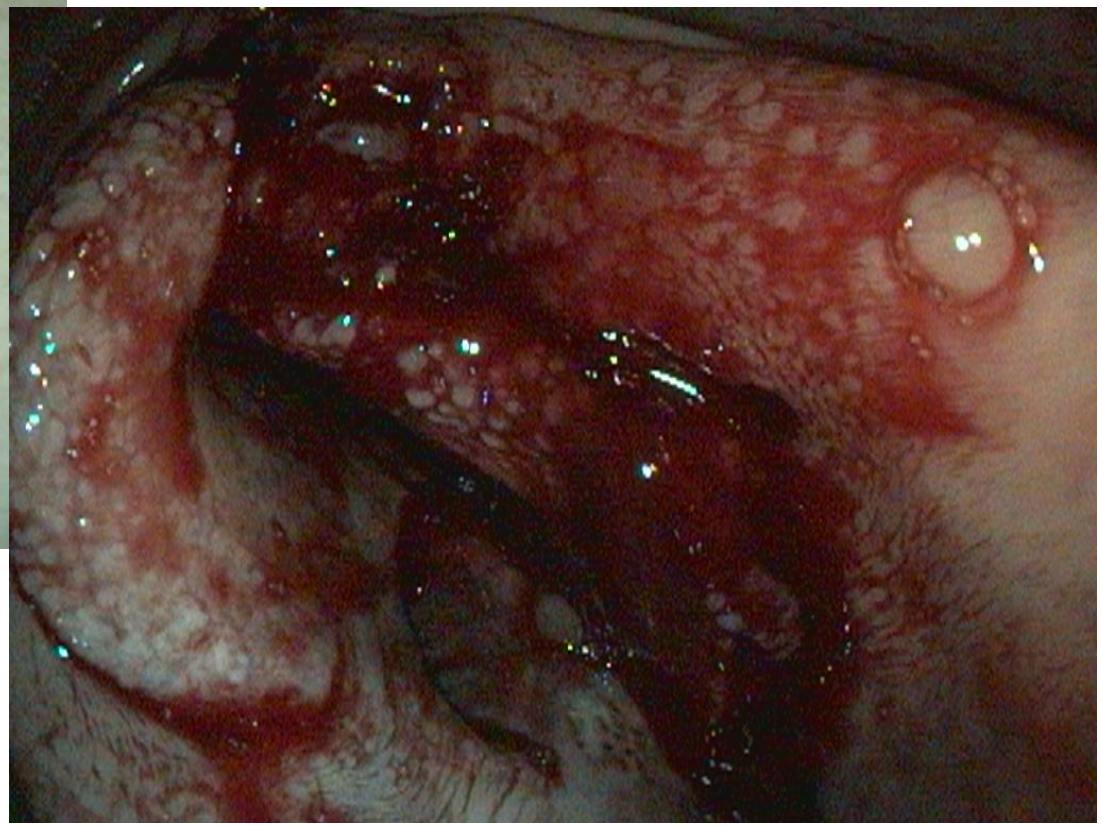
# Case 2

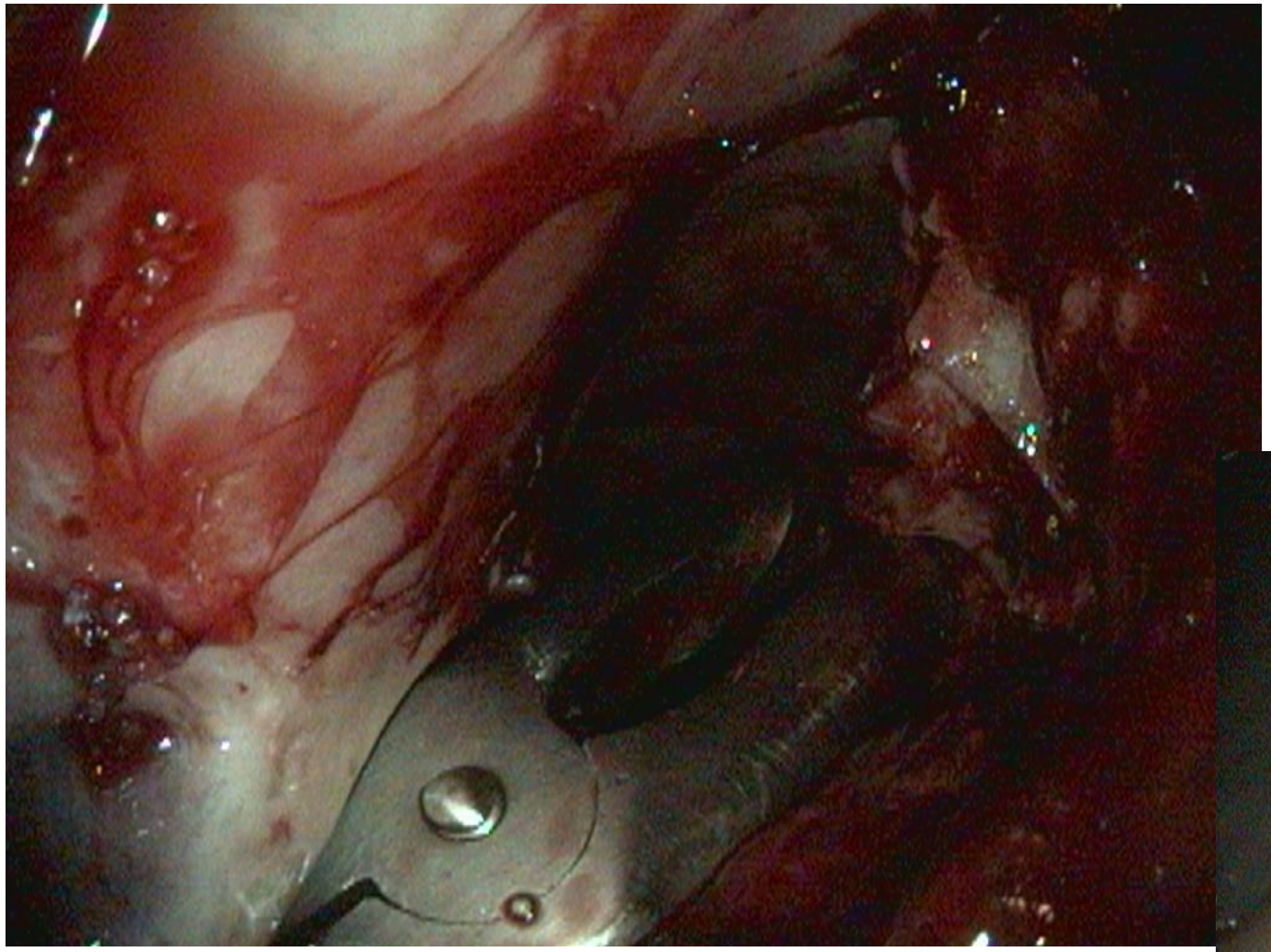
## Surgery

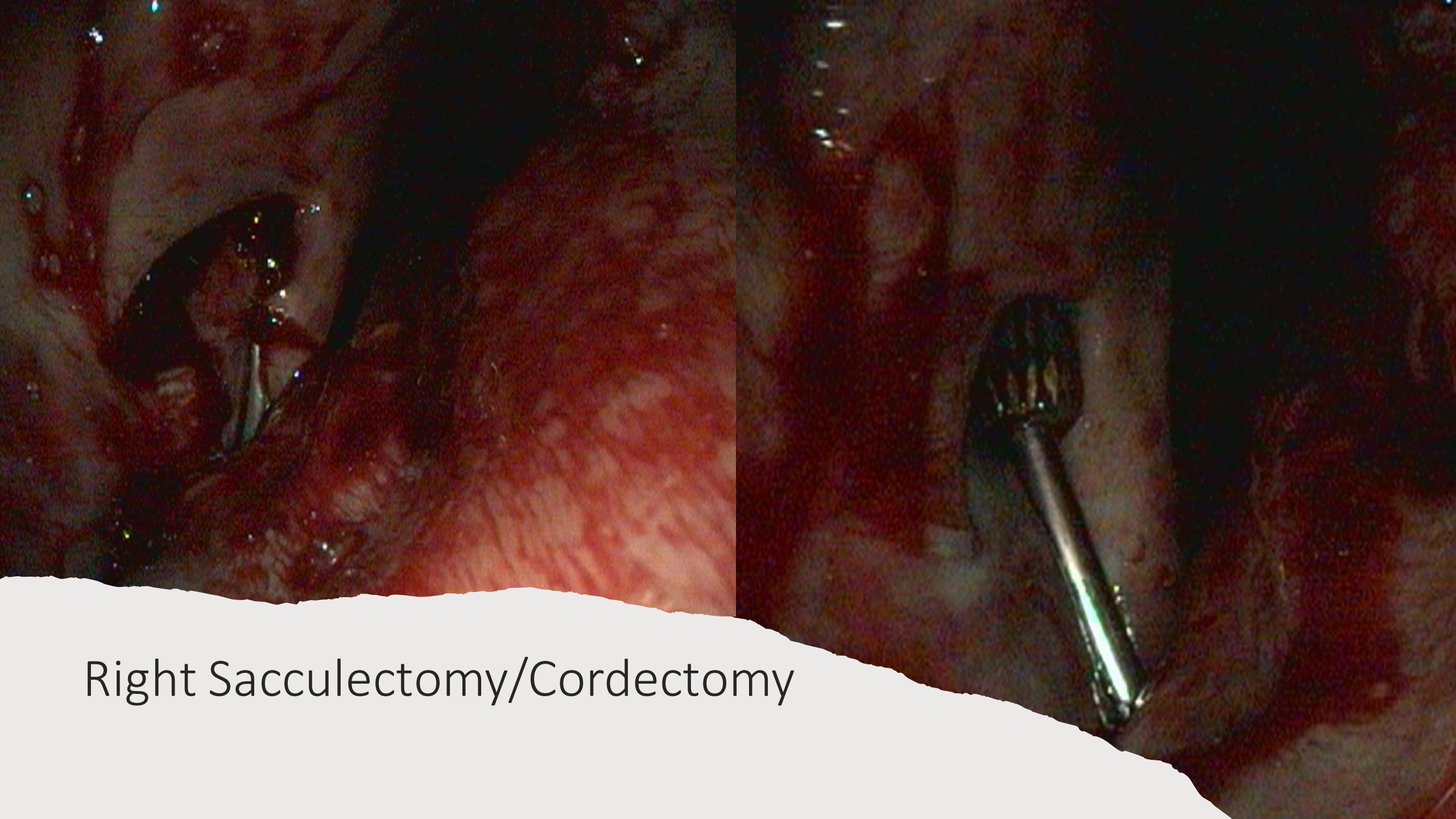





(A)
(B)
Gray 2019







Right Sacculectomy/Cordectomy

# Case 2

## 1 Day Post-Op


# Case 2

## 2 Days Post-Op

Temporary Trach Site

Laryngotomy Site

# Case 2

## Post-Operative Care

- Discharge Instructions
  - Stall rest until both incisions completely healed
  - 3-4 weeks
  - Limited small paddock turnout
  - No forced exercise minimum 60 days
  - **Recheck endoscopy at 6 weeks**
  - Feed from the ground indefinitely
  - Equisul 10 days
  - Banamine BID 2-3 days, SID additional 2-3 days

- Potential complications of arytenoidectomy
  - Granuloma formation
  - Chronic cough
  - Aspiration

# Case 3

## 15-year-old pony mare

- Acute neurologic symptoms beginning 4/23/23
  - Stumbled when walked, quickly progressed to being down in hind end with head pressed against stall wall
  - Able to stand with assistance
  - Given Banamine and Dexamethasone per rDVM for several days prior to presentation with some improvement

# Case 3

## Presentation to OSU

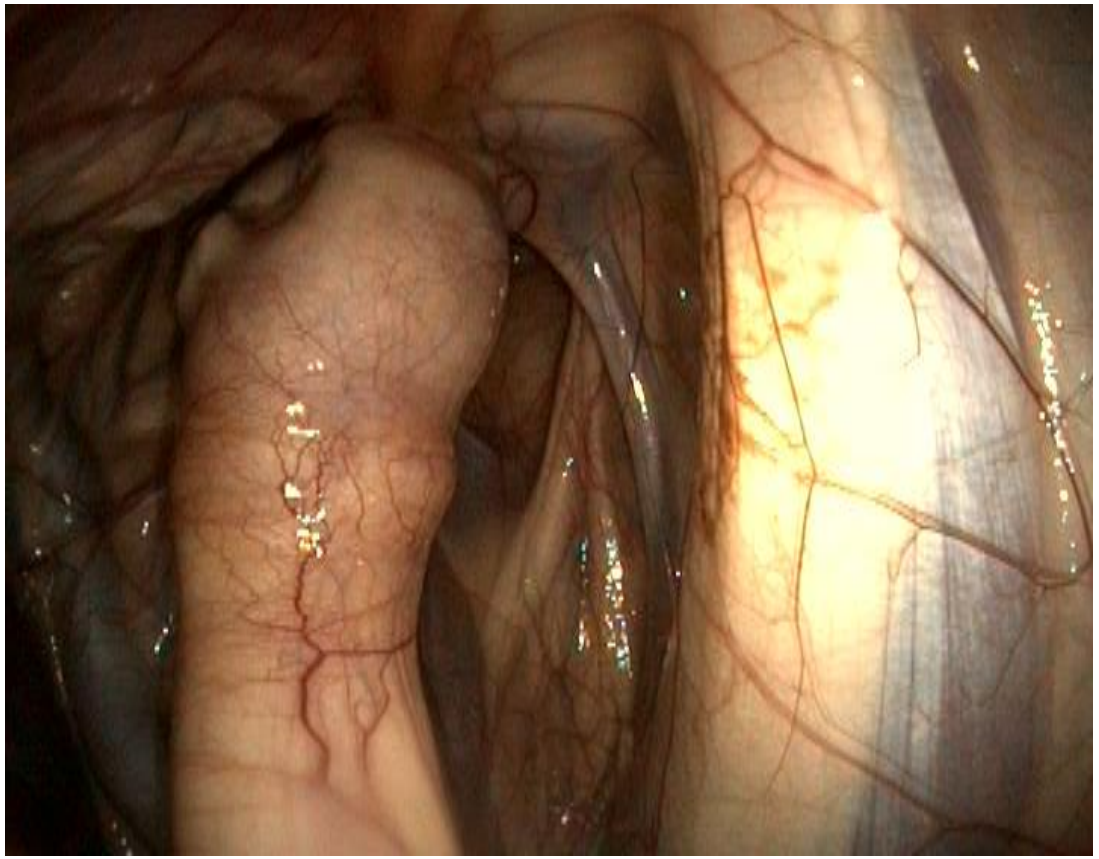
- BAR
- Vital parameters WNL
- Neurologic Exam
  - Bilateral horizontal nystagmus, slow component to the right
  - Right-sided head tilt
  - Stumbling, base-wide stance
  - 4/5 Ataxia, more severe when blindfolded
  - No weakness appreciated
  - Leans to right when ambulating
  - Right sided facial nerve paralysis

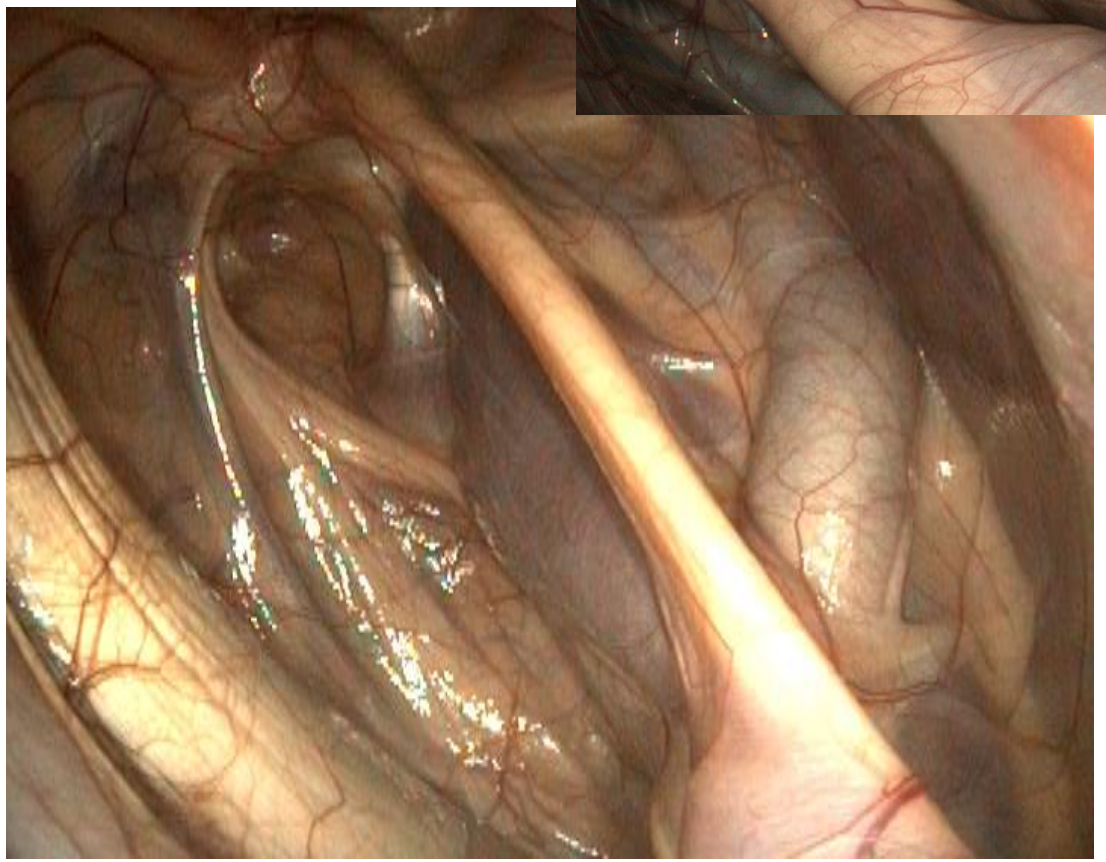
# Case 3

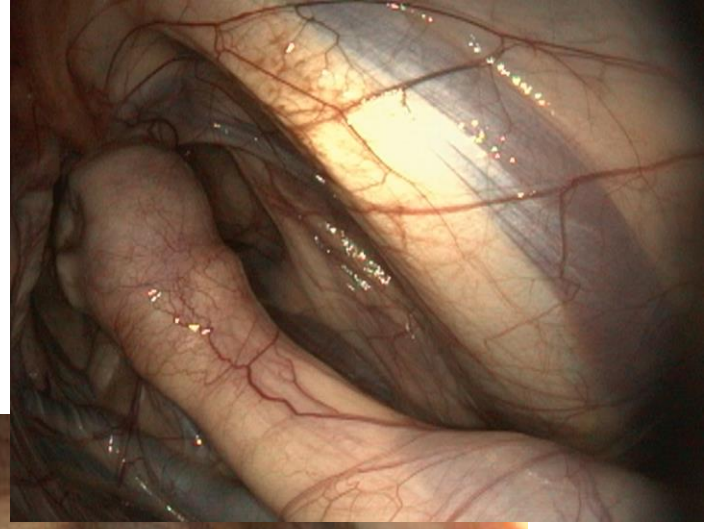
## 10-year-old pony mare

# Case 3

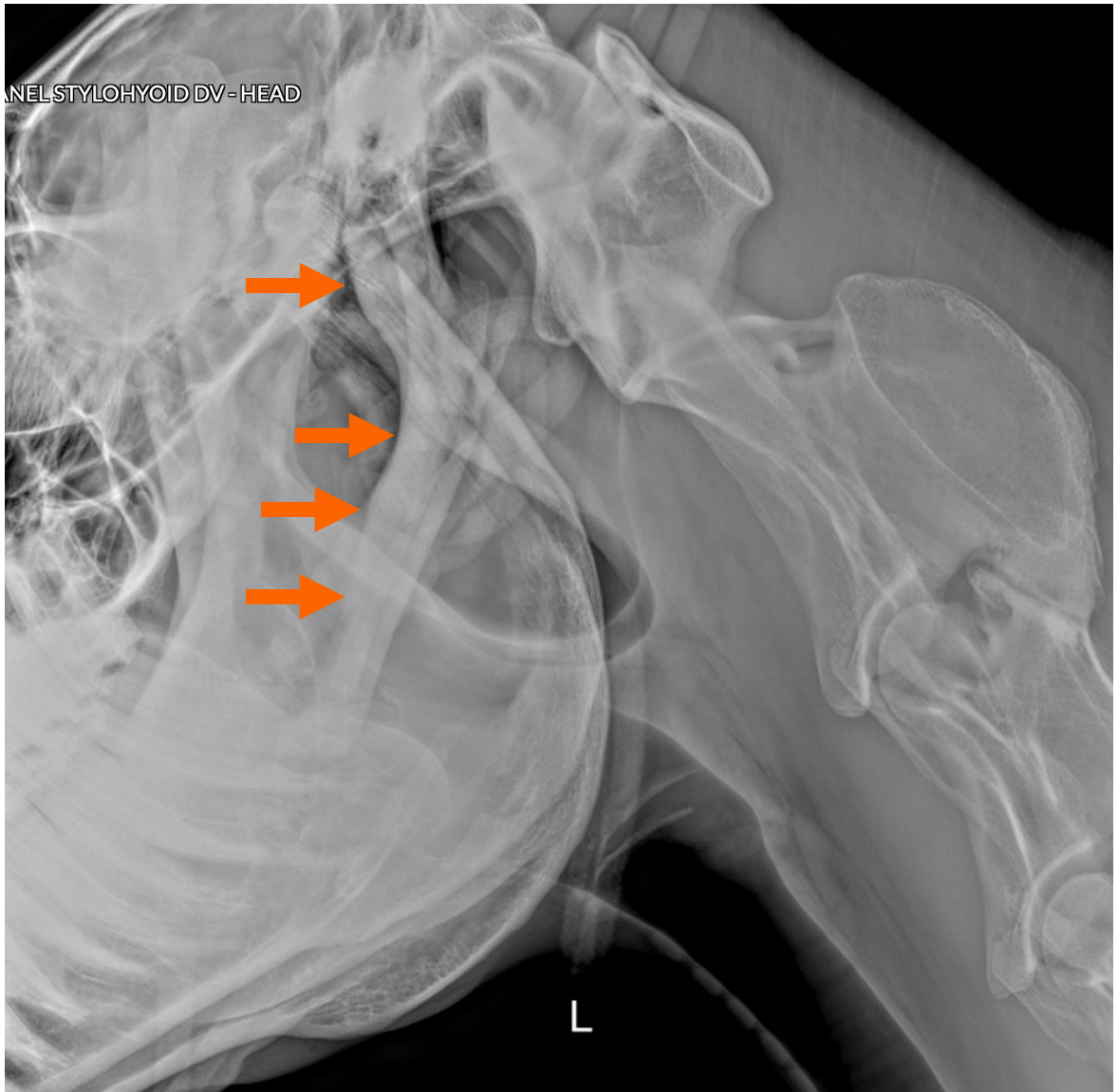
## Endoscopy

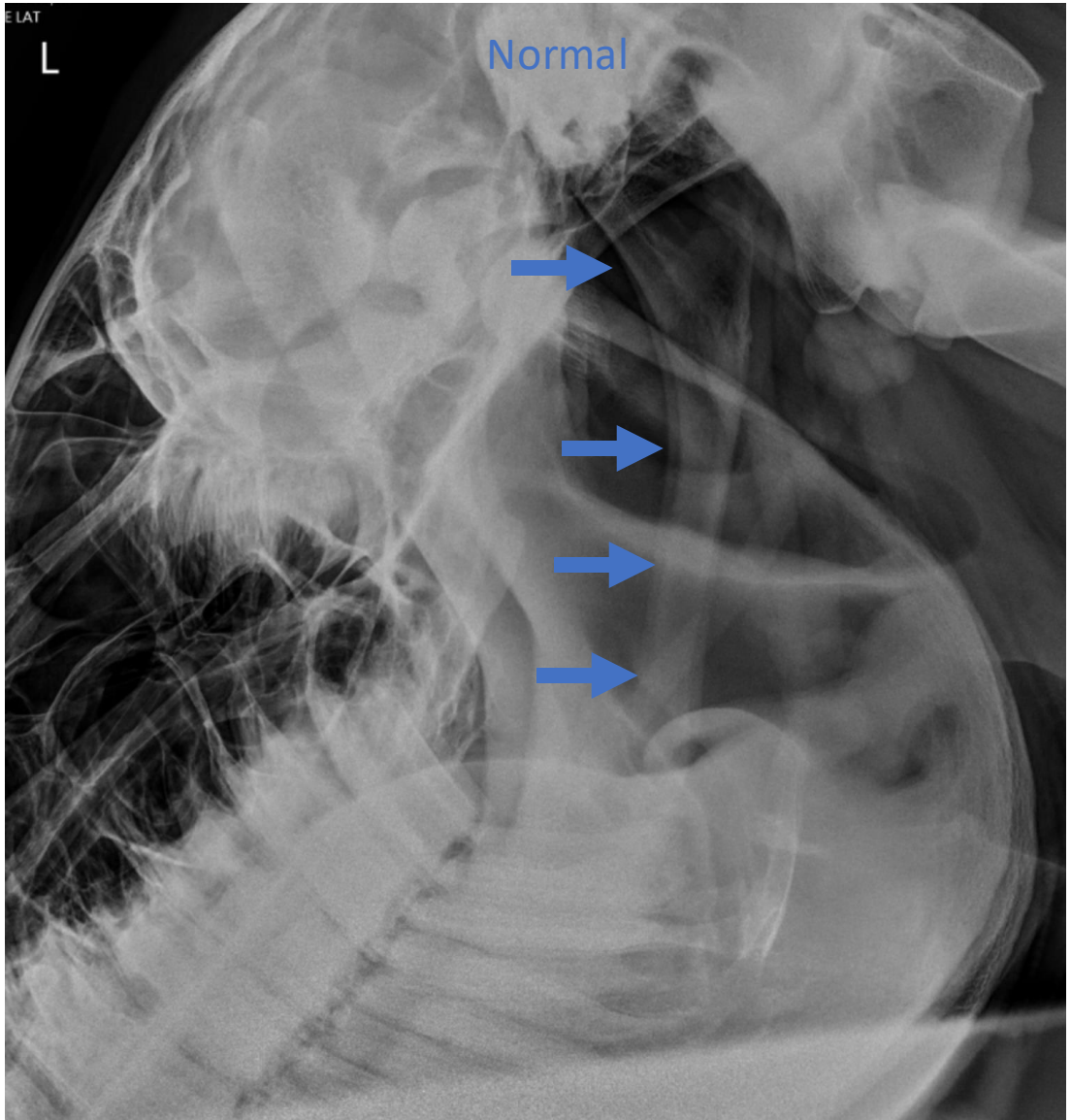






# Case 3 Radiographs



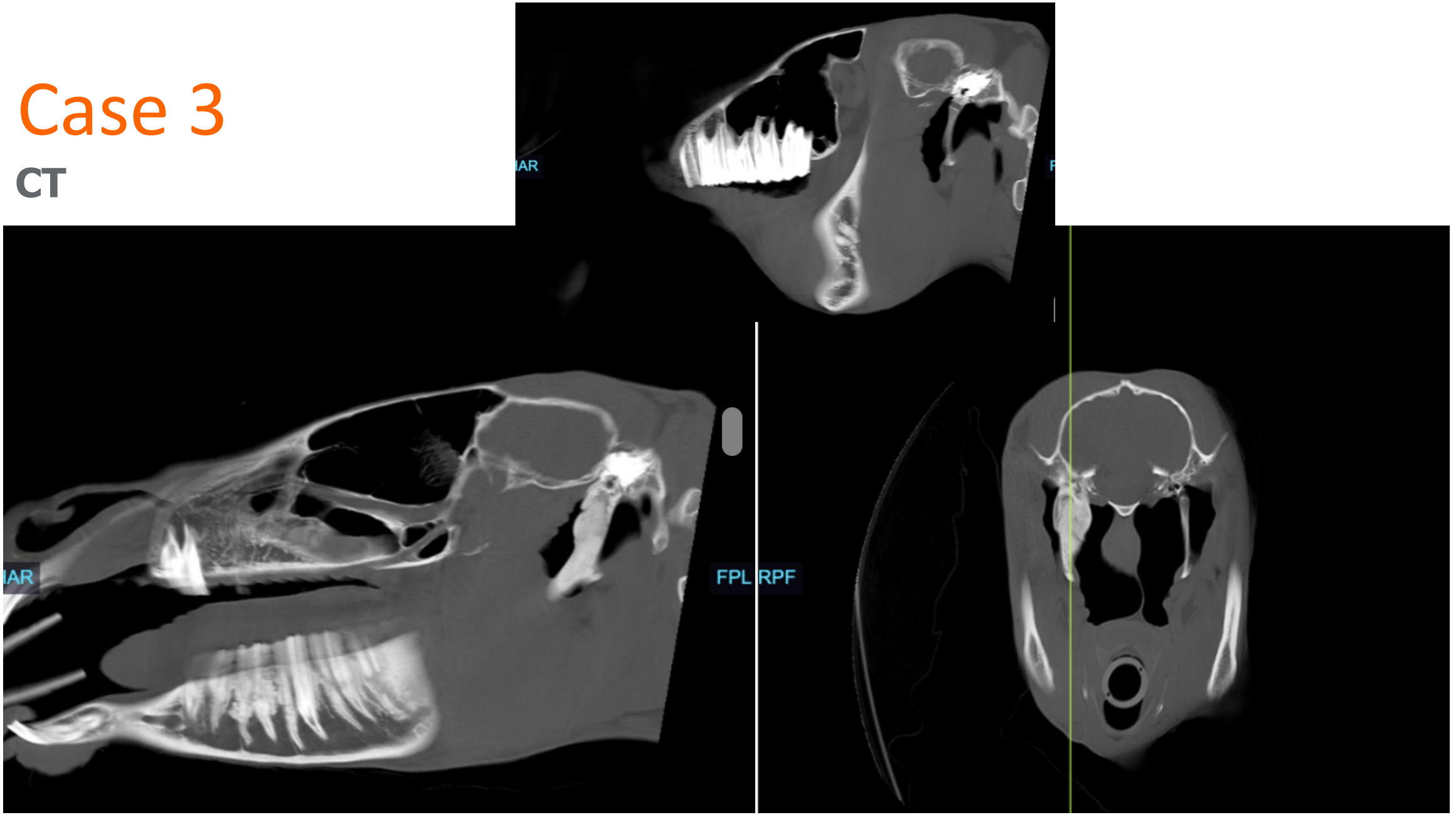
# Case 3

## Pre-Operative Management

- Medical management for 5 days prior to surgery
  - Flunixin
  - Vitamin E Supplementation
  - Lubricate right eye q4h
- Antimicrobials
  - Cefazolin
  - Gentamicin
- Ceratohyoidectomy planned following pre-operative CT

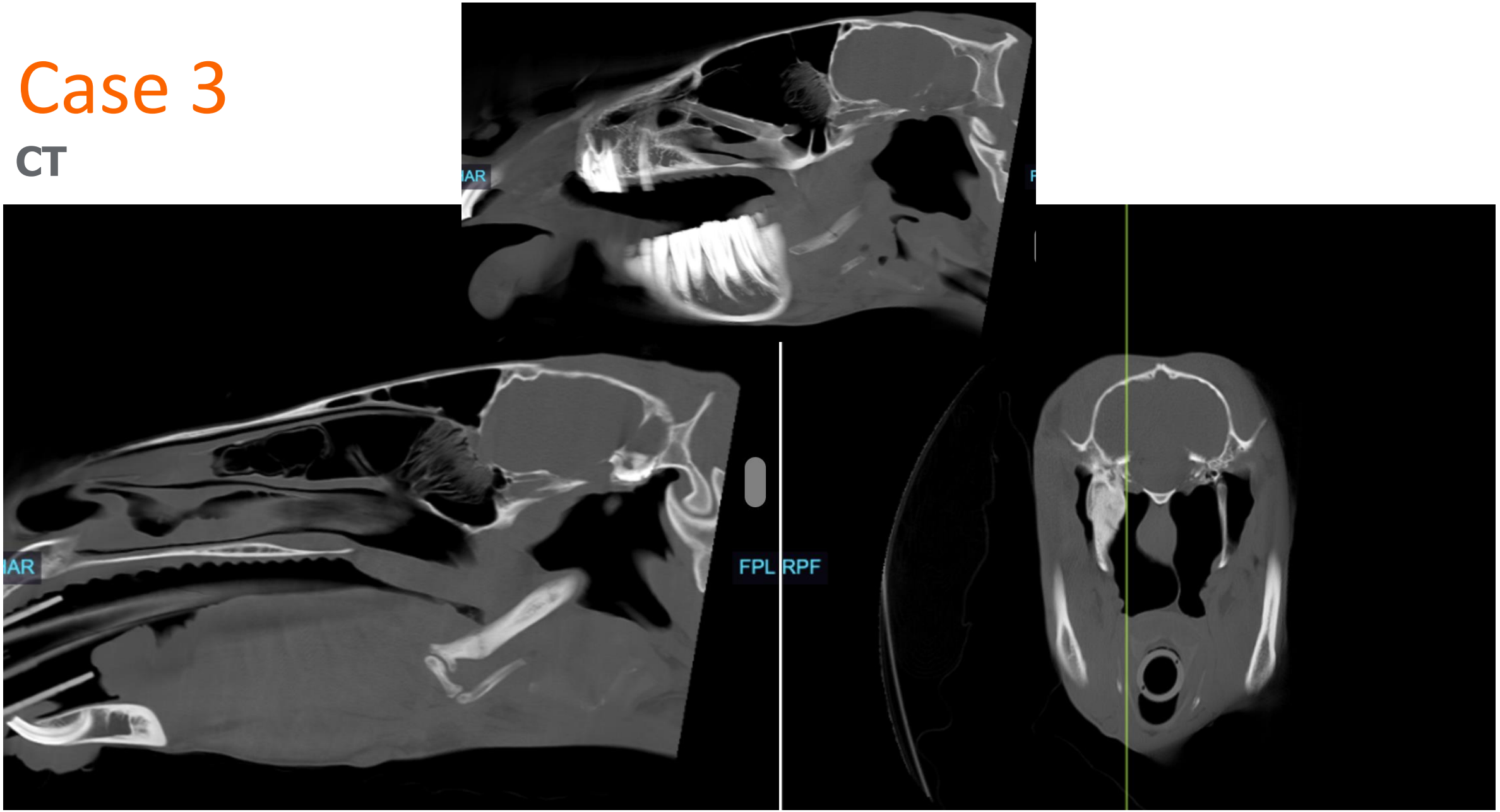
# Case 3

## CT



# Case 3

## CT



# Case 3

## CT

# Case 3

## THO

- Stylohyoid and petrous temporal bones
- Bone proliferation → fusion of temporohyoid joint → potential fracture of involved or associated bones
- Average age of onset 10.8 years
- Etiologies:
  - Inflammation
  - Middle/inner ear infection
  - Degenerative joint disease

# Case 3

## THO

- Clinical signs
  - VII and VIII nerve dysfunction
    - Facial: paresis/paralysis of ear, lip deviation, decreased tear production, inability to blink
    - Vestibulocochlear: ataxia, head tilt (poll toward affected), spontaneous nystagmus (slow phase toward affected)
- Head tossing, ear rubbing, bit avoidance
- +/- Dysphagia
  - Glossopharyngeal nerve deficits
  - Pain/mechanical limitation
- +/- Seizure-like activity

# Case 3

## THO

- Medical Management
  - Anti-inflammatories
  - Antimicrobials
- Surgical Management
  - Reduce stresses on THJ and stop progression of bony proliferation
  - Partial stylohyoid ostectomy
  - Ceratohyoidectomy

# Case 3

## THO

Equine Veterinary Journal

Equine Veterinary Journal ISSN 0425-1644
DOI: 10.1111/evj.12701

### Outcomes after medical and surgical interventions in horses with temporohyoid osteoarthropathy

P. ESPINOSA[†]*, J. E. NIETO[‡], K. E. ESTELL[§], P. H. KASS[¶] and M. ALEMAN[§]

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[¶]Department of Population Health and Reproduction, School of Veterinary Medicine, University of California Davis, Davis, California, USA.

**TABLE 2: Post-discharge status and return to use by treatment modality in horses with temporohyoid osteoarthropathy**

| Post-discharge status | Medical therapy (n = 20) | CHO (n = 25) | PSHO (n = 8) |
|---|---|---|---|
| Worsening of signs, n | 6/20 | – | 1/8 |
| No improvement, n | 5/20 | – | 1/8 |
| Mild improvement, n | 7/20 | 3/25 | 2/8 |
| Marked improvement, n | – | 10/25 | 3/8 |
| Complete recovery, n | 2/20 | 12/25 | 1/8 |
| Return to use, % | 12.5 | 65.0 | 50.0 |

CHO, ceratohyoid ostectomy; PSHO, partial stylohyoid ostectomy.

# Case 3

## THO

- Regrowth of removed segment of stylohyoid 6 months post-operatively, prompted exploration of ceratohyoidectomy as an alternative



EQUINE VETERINARY JOURNAL
*Equine vet. J.* (2004) **36** (6) 546-550

Case Report

Complication of partial stylohyoidectomy for treatment of temporohyoid osteoarthropathy and an alternative surgical technique in three cases

**A. P. PEASE, J. VAN BIERVLIET, N. L. DYKES, T. J. DIVERS** and **N. G. DUCHARME***

*Department of Clinical Sciences, College of Veterinary Medicine, Cornell University, Ithaca, New York 14853, USA.*

*Fig 6: Left cranial to right caudal oblique 3-dimensional CT reconstruction of the hyoid apparatus in a mature horse with left-sided temporohyoid osteoarthropathy. A left ceratohyoidectomy has been performed.*

# Case 3

## Ceratohyoidectomy

- Potential surgical complications
  - Hemorrhage
    - Branch of linguofacial vein
  - Dysphagia
    - Proximity of hypoglossal nerve
    - Risk higher for bilateral cases treated in same surgical procedure

# Case 3

## Surgery

- Ceratohyoidectomy under general anesthesia
- Branch of linguofacial artery damaged during last part of disarticulation of cerato/stylohyoid → significant hemorrhage
- Temporary tracheostomy placed in recovery as a precaution

# Case 3

## Post-Surgery Follow-Up

- Cefazolin/Gentamicin until day 10 post-surgery
- Flunixin
- Tapering course of dexamethasone
- Monitor/clean trach BID, removed 3 days post-surgery
- Lubricate right eye q4h
- Vitamin E Supplementation
- Doxycycline to go home

# Case 3

## Post-Surgery Follow-Up

- Steady gradual improvements in ataxia/stability and facial nerve paralysis while in hospital and after returning home
- Considerations moving forward:
  - More care with future dentals
  - Monitor for continued improvements to facial n. paralysis, ulceration of right eye
  - No riding until she can pass a blindfold test

VETERINARY SURGERY

ORIGINAL ARTICLE - CLINICAL | Full Access

# Ceratohyoidectomy in standing sedated horses

Julien Racine Dr Med Vet, FVH, DECVS, Thomas O'Brien MVB, DACVS, Bruce M. Bladon DECVS, Antonio M. Cruz DVM, MVM, MSc, PhD, DACVS, DECVS, DACVSMR ... See all authors

First published: 30 August 2019 | https://doi.org/10.1111/vsu.13319 | Citations: 7

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Antonio M. Cruz, Departamento de Medicina y Cirugía Animal, Facultad de Veterinaria Universidad Cardenal Herrera-CEU, CEU Universities, Valencia, Spain

# Treatment of temporohyoid osteoarthropathy in horses with a basihyoid-ceratohyoid disarticulation technique: 6 cases (2018–2019)

**Nicholas P. Hall** DVM
**Claude A. Ragle** DVM
**Kelly D. Farnsworth** DVM, MS
**Stacy R. Caffey** DVM
**Jorge L. Sanclemente** DVM

From the Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Washington State University, Pullman, WA 99164.

- 10 horses
  - 8 planned partial ceratohyoidectomies
  - 2 converted due to intra-op complications when trying to disarticulate from stylohyoid
    - Hemorrhage
    - Airway obstruction
- Neurologic symptoms improved in all 10 horses, 2 completely resolved
- Follow up radiographs for 9/10 +/- CT
  - Identified space b/w ceratohyoid and basihyoid in all cases
- Median follow up time 14 months for all but one case (bilateral case, follow up 7 months post second sx)
- No intra-operative complications for those with planned partial ceratohyoidectomy

JAVMA AVMA

**Partial ceratohyoidectomy as surgical treatment for horses with temporohyoid osteoarthropathy: 10 cases (2010–2021)**

Alyson D. Booth, DVM[1*]; Felipe Lara Hidalgo, DVM[2]; Fausto Bellezzo, DVM, DACVS[1]; Jenna M. Young, DVM, DACVS[1]; Alex W. Bianco, DVM, MS, DACVIM[1]; Lauren E. Hughes, DVM[1]; Mike Maher, DVM, DACVS[3]; Troy N. Trumble, DVM, PhD, DACVS[1]; Nicolas Ernst, DVM, MS, DACVS[1,2]

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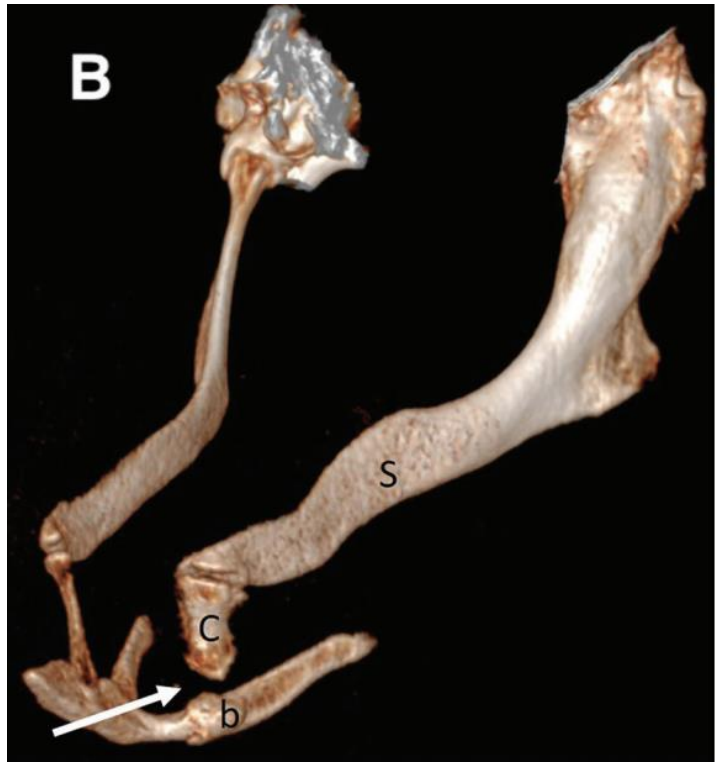

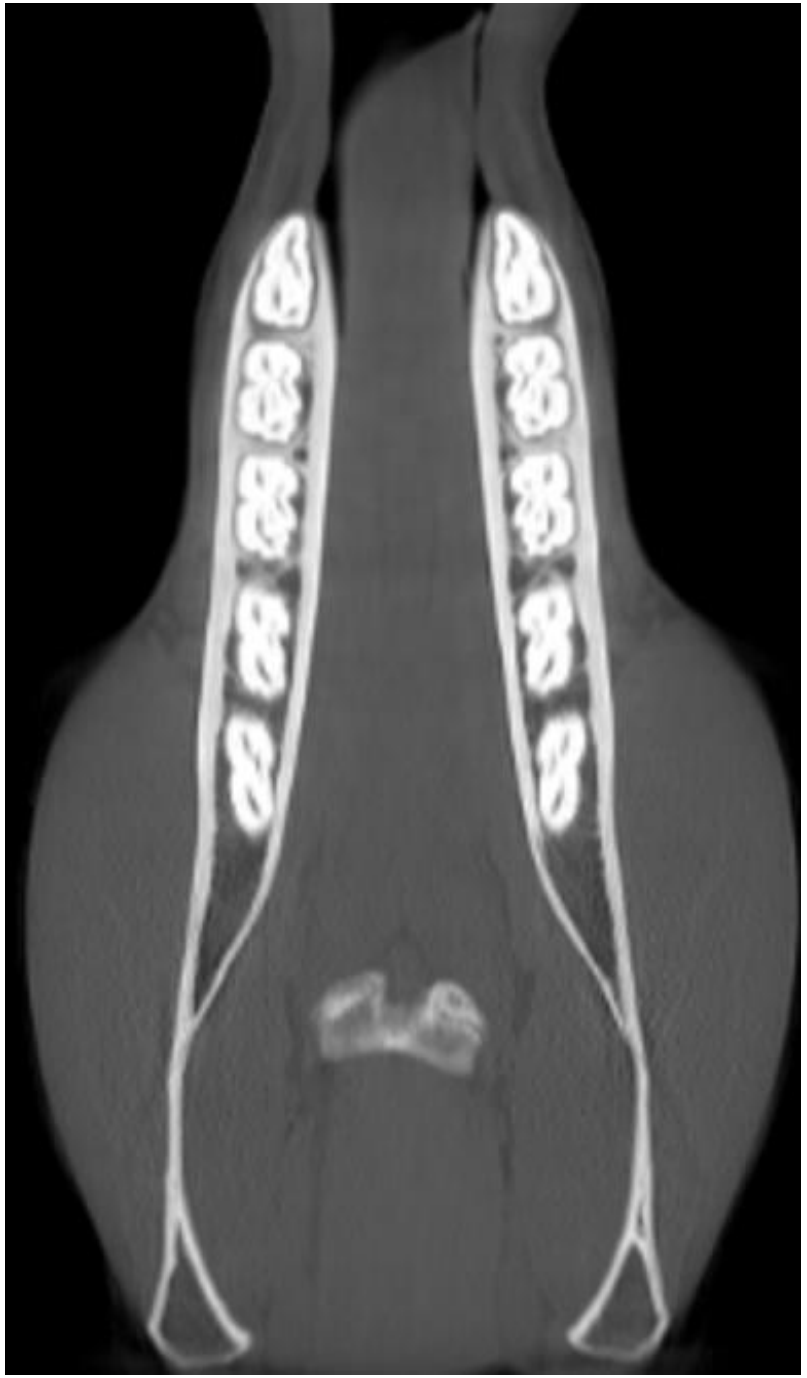

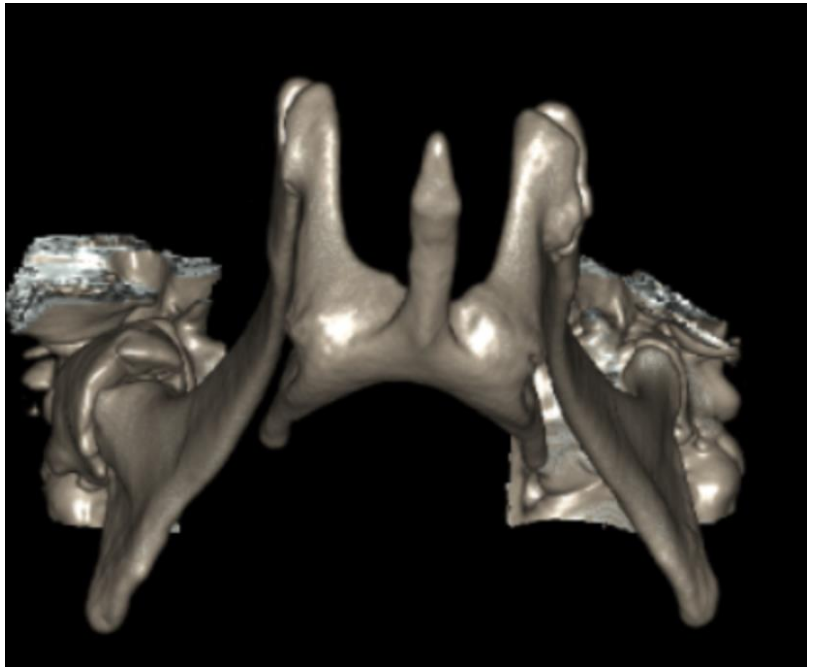

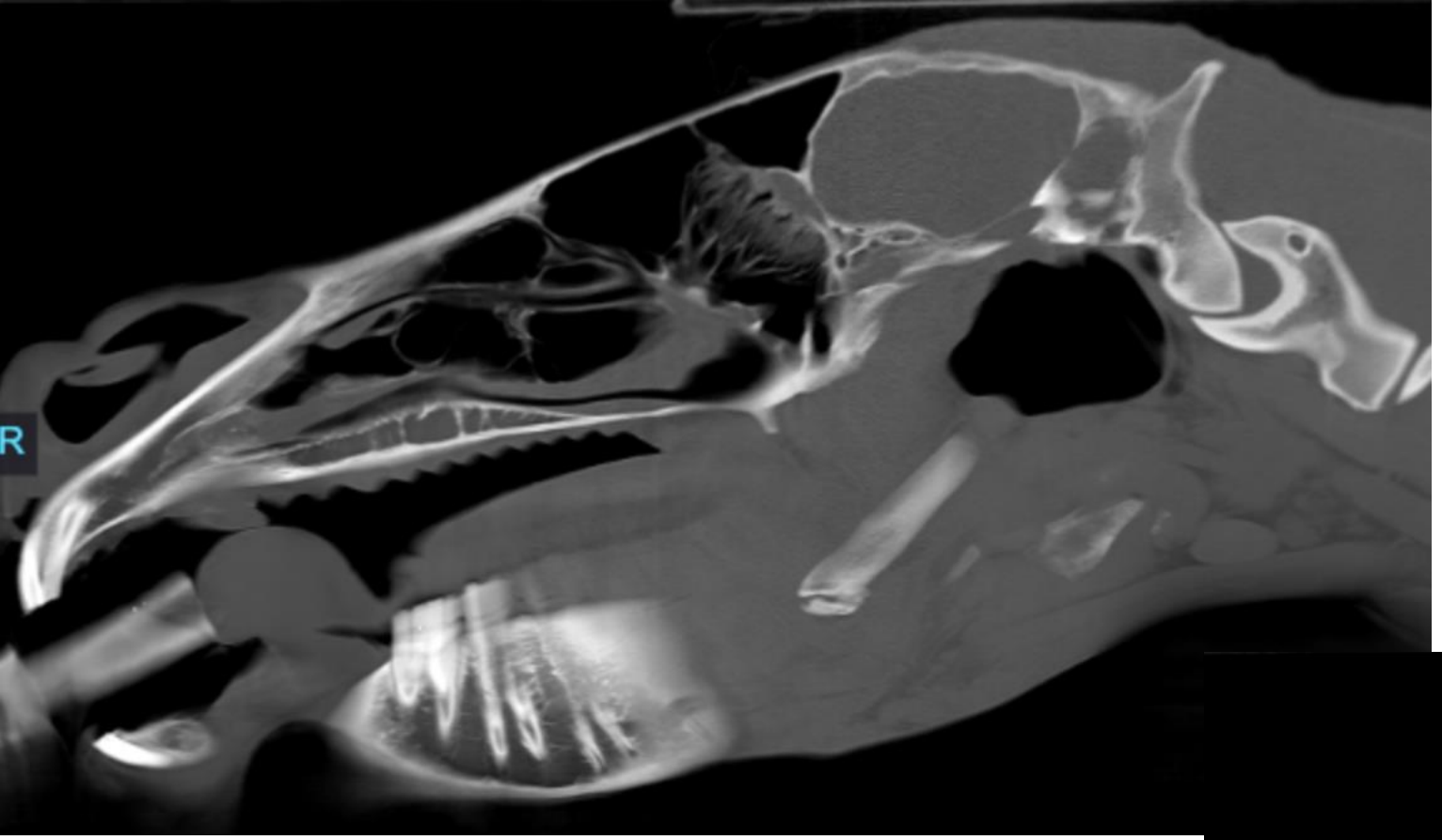
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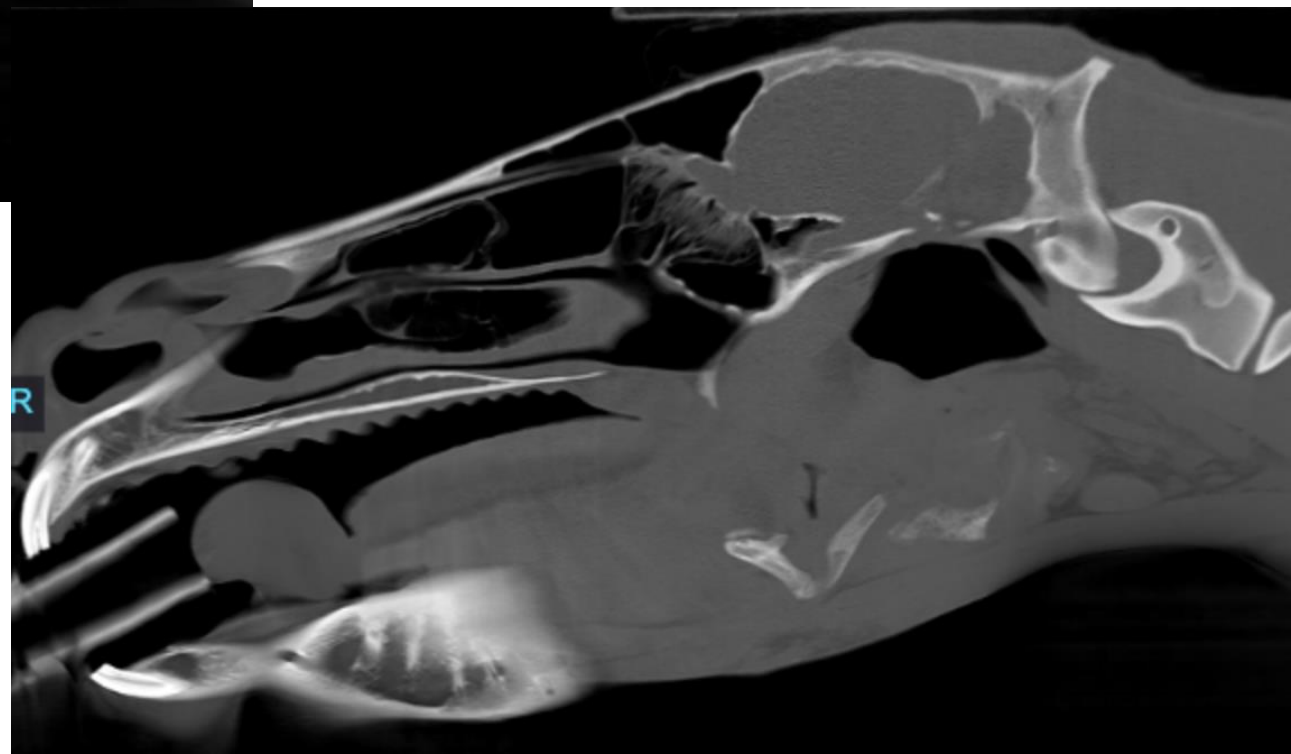
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# Questions?

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# Williams - Surgical Management of Interesting Equine Upper Respiratory Cases

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