

## UPPER AIRWAY SURGERY

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VISBY 8-10 APRIL 2016



## BOAS

- Stenotic nares
- Elongated soft palate
- Everted laryngeal sacculles
- Laryngeal collapse
- Tracheal hypoplasia



<http://www.vet.cam.ac.uk/boas/about-boas/recognition-diagnosis>

## ANESTHESIA

- Preoxygenate
- Tracheotube prepared
- "Crash-induction"
- Premedicate with
  - opioids
  - benzodiazepin
  - corticosteroids
  - anticholinergics
  - antacids
  - antiemetics



VASG <http://www.vasg.org/>

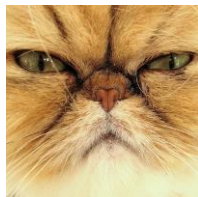
Finishing anesthesia:

- Sternal recumbency
- Extubate as late as possible
- Tracheotube if stenosis/swelling in airways
- POX- Give oxygene if hypoxia



## STENOTIC NARES

- Most common in brachycephalic breeds
- Axial deviation of dorsolateral nasal cartilage
- Significant negative pressure must be created in the lower airways to overcome resistance
- Leads to stress to the larynx and tracheal soft tissue and cartilage



## STENOTIC NARES

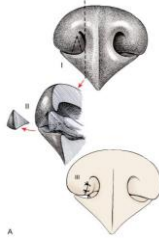
- Different techniques
- Sternal recumbency
- Scalpel blade, laser or electrosurgery



### ALAPLASTIK – "VERTICAL WEDGE"

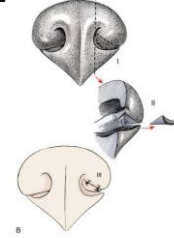
No 11 blade

- Two incisions deep into alar cartilages
- The base of the pyramid is how much wider it gets
- Bleeds, but after suturing it stops quickly
- Use monofilament, non-resorbable sutures and a cutting needle



### ALAPLASTIK- HORIZONTAL WEDGE

- Two horizontal incisions from medial to lateral
- Cut deep enough into the cartilage
- Keep the small flap
- Use monofilament, non-resorbable sutures and a cutting needle



### SURGERY OF STENOTIC NARES – OTHER TECHNIQUES

- ALAPLASTIK – Punch resection
- Same principle as vertical wedge
  - Good results



- ALAPEXI
- More difficult

- AMPUTATION – Trader's technique
- Immature Shi Tzu's



### ELONGATED SOFT PALATE

- Sternal recumbency
- Evaluate before intubation
- The soft palate should not pass the tip of the epiglottis.
- Do not pull the tongue. Just press the tongue down to evaluate the length of the soft palate

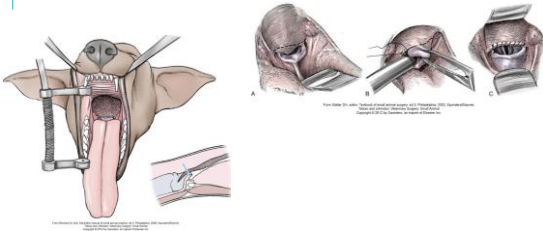


### ELONGATED SOFT PALATE

#### Staphylectomy

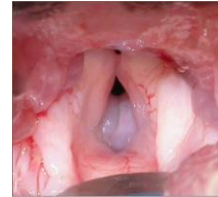
- Resect as much as you have decided at faringeal examination
- Staysutures laterally
- Grasp carefully with Allis forceps
- Resect with Metzenbaum
- Suture continous, absorbable, monofil suture

### ELONGATED SOFT PALATE



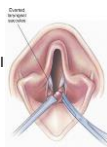
### EVERTED LARYNGEAL SACCULES

- Secondary to other findings
- Use stiff scope to inspect
- Between vestibular fold and vocal cord
- White-pink and shiny
- Sternal recumbency



### EVERTED LARYNGEAL SACCULES

- Grasp carefully with Allisforceps
- Use Metzenbaumscissors and cut at the base
- Bleeds some, but just press for a short time and it will
- Remove at time of diagnosis
- Do other corrections (soft palate, nose)
- Risk of Laryngeal webbing



### RAT AND CAT

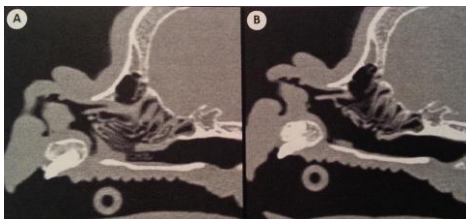
- More focus on what's happening inside the nose
  - We're just doing something about a part of the problem
  - New approach with Laser-Assisted Turbinectomy (LATE)
- Oechtering Vet. Surgery 2/2016

### DO SURGERY EARLY!!!

Good prognosis: < 2 years and correction is done

Questionable: If older dog >2 years and already secondary changes  
English Bulldog

Bad prognosis: If larynxcollapse already has developed



## LARYNGEAL COLLAPSE

- Endstage of chronic obstruction in upper airways.
- Not the same as Laryngeal paralysis
- Correct primary disease (nares, soft palate, saccules)
- Weightloss
- Treat gastric problems
- Laryngeal tieback?
- Permanent tracheostomi??

## TRACHEOSTOMI

Indications

- Upper airway obstruction
- Surgery in larynx or mouth/teeth



## TRACHEOSTOMI

Positioning

- Patient on it's back
- Throat upwards
- Pillow under the neck
- Straight!



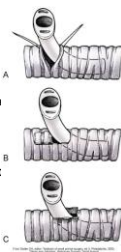
## TRACHEOSTOMI

- Incision in midline
- Separation of M. sternohyoideus
- Aviod N.recurrrens, N. laryngeus, A. carotis, A et V thyroideus and esophagus

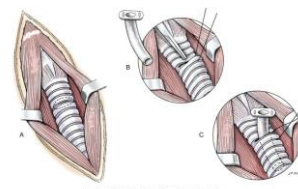


## TRACHEOSTOMI

- Transversal cut between cartilage ring 3-4 or 4-5
- Do not extend more than 50% of diameter of trach
- Place stay suture around cartilagerings
- Put in the tracheotube
- Tracheal flap tracheostomi more for permanent stc



## TRACHEOSTOMI



## TRACHEOSTOMY

### Considerations

- Important with hygien and environment
- Partial obstruction and irritation => mu
- Clean 1-2 times a day by suction
- Moisturing of air
- Filter
- No swimming..



## TRACHEOSTOMY

### Complications:

- Plugging
- Coughing
- Vomiting
- S.c emphysema
- Pneumomediastinum
- Pneumothorax
- Infection
- Stenosis



## TRACHEOSTOMY

### Removal of tracheotube

- As soon as upper airways can handle normal airflow
- Cover the tube opening to test
- Most of the cases 24-48 h
- Healing by second intention in 7-10 days

## LARYNGEAL PARALYSIS

- Surgery is indicated in animals with moderate to severe clinical signs

### Many methods for surgery

- Uni- (or bilateral) arytenoid cartilage lateralization
- Partial arytenoidectomy
- Partial laryngectomy
- Unilateral ventriculochordectomy
- Castellated laryngofissure
- Laser

## LARYNGEAL PARALYSIS

### Unilateral Arytenoid Cartilage Lateralization

- Standard technique
- Unilateral sufficient for resolving clinical sig
- Called Tieback



## LARYNGEAL PARALYSIS

### Unilateral Arytenoid Cartilage Lateralization

- Lateral incision on left side of the larynx
- Only one side even if bilateral disease
- M. thyropharyngeus incision
- Exarticulation of cricothyroid cartilage
- Muscular attachment on arytenoid cartilage resection wit scissors or scalpel
- Two sutures between ary- and cricothyroidcartilage

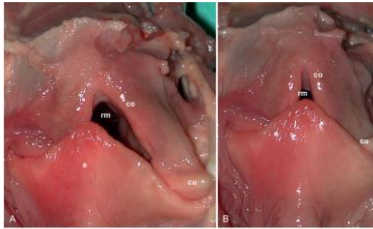


Figure 10-100. Tracheal collapse. (A) Normal trachea. (B) Tracheal collapse. Copyright © 2012 by Saunders, an imprint of Elsevier Inc.

## TRACHEAL COLLAPSE



### Treatment

- Palliative
- Combination of medical and surgical treatment for best result
- Surgery in grade II-IV
- Degeneration of cartilage will go on
- Progressive disease – probably underdiagnosed

## TRACHEAL COLLAPSE

### Acute treatment

- Oxygene
- Cooling
- Sedation
  - Butorphanol (Turbogesic, Dolorex) bolus 0,2–0,4 mg/kg iv then CRI 0,2–0,4 mg/kg/h

## TRACHEAL COLLAPSE

### Preop evaluation:

- Heartdisease (X-ray, sonography, EKG)
- Airways: Pharyngoscopy, bronchoscopy; exclusion/correction of other obstructions
- Blood analysis
- Sampling/cytologi of airways
- Medical treatment of concurrent inflammation/edema



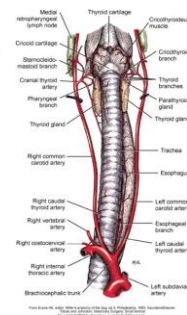
## TRACHEAL COLLAPSE

### Surgery

- External support with extraluminal rings
  - cervical trachea until thoracic inlet
- Internal support with stent
  - thoracic part of trachea

## TRACHEA - ANATOMY

- Bloodsupply from the cranial ad caudal thyroid arteries
- Carotis, vagosympathic cord, N. recurrens
- Dissect very carefully and close to trachea
- The size of the trachea is not always proportional to dog size.

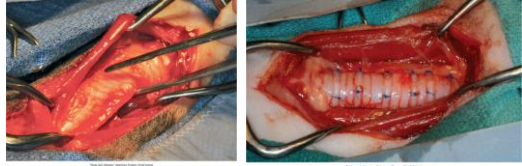


## TRACHEAL COLLAPSE

Extraluminal rings

- Ventral midline incision
- Protes every 3-4 tracheal ring
- All the way cervical, not thoracal
- Suture the rings close to trachea, put sutures around cartilage

## TRACHEAL COLLAPSE – EXTRALUMINAL RINGS



## TRACHEAL COLLAPSE - STENT



## TRACHEAL COLLAPSE

Complications extraluminal rings:

- Dissection around trachea
  - ischemic necrosis
  - damage on recurrent nerve → larynxpares
- Pneumomediastinum/ pneumothorax
- Remaining symptoms

## TRACHEAL COLLAPSE

Complications Stent

- Breakage
- Migration
- Granulation
- Infection
- Study by Duran et al <(Vet Surg 2012) showed complications in 50%.  
(22% breakage, 60% residual cough needing medication)

## TRACHEAL COLLAPSE

Prognosis

- 33 dogs with endstage tracheal collapse operated with extraluminal rings
- 33% had cervical, intrathoracal and bronchial collapse
- Extraluminal rings in cervical trachea
- Not any difference in survival if intrathoracal collapse
- 21% operated for larynxpares directly post op
- Mortality 10% intraop
- 88% survived > 6 months
- Median survival time 4,6 years

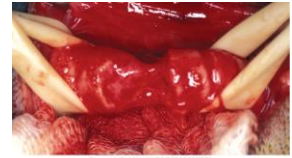
Becker et al Vet Surg 2012

## TRACHEAL COLLAPSE

- 23 dogs operated with extraluminal rings
  - Rings in cervical trachea
  - 30% cervical and thoracic collapse
  - < 4% periop mortality
  - 17% larynx paresis post op
  - 65% without medication 2 weeks post op
  - Ca 10% progression of disease
- Chisnell et al, Vet Surg 2015

## TRACHEAL RUPTURE

- If small lesion, no surgery needed
- Surgery if
  - worsening dyspnoea
  - lack of response to O<sub>2</sub>
  - worsening emphysema
- Do endoscopy to identify rupture
- Open up a midline incision and suture with fine absorbable suture material in a continuous



## TRACHEAL RUPTURE



## TRACHEAL RUPTURE



TACK!

