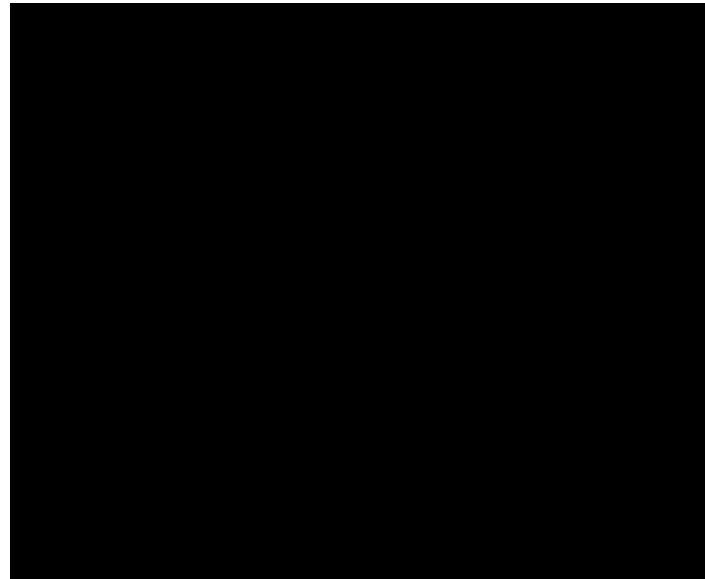


Endoscopic Surgery in the Paediatric Airway



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History of paediatric stenosis

- 60's Premature infants survive
 - Acquired Subglottic Stenosis
 - Tracheostomy
- 70's Open laryngeal surgery, Rib graft repair
- 80's Cricoid split to deal with early cases
- 90's Single stage laryngeal reconstruction
 - Partial cricotracheal resection
- 2000+ Endoscopic techniques



Why endoscopic rather than open?

•Concerns with existing techniques

- Tracheostomy
- Poor vocal outcome
- LASER

•Initially encouraging results

- Convergent thinking: not alone
- Concepts fit with my animal work

•New techniques available

- Sharp division
- Radial dilatation
- 12+ Bar without shearing
- Microdebrider
- Mitomycin
- Steroids
- Stents
- Lateralisation sutures

Minimally invasive techniques in the literature

- Surgeons using advanced endoscopic techniques in the airway
 - Rutter
 - Froehlich
 - Rothera
- Endoscopic balloon dilatation of subglottic stenosis
 - Rothera, M.P. J.Laryngol.Otol.1995
- Endoscopic posterior cricoid split and rib grafting in 10 children
 - Inglis and Manning
Laryngoscope 2003

Basic Endoscopic Techniques

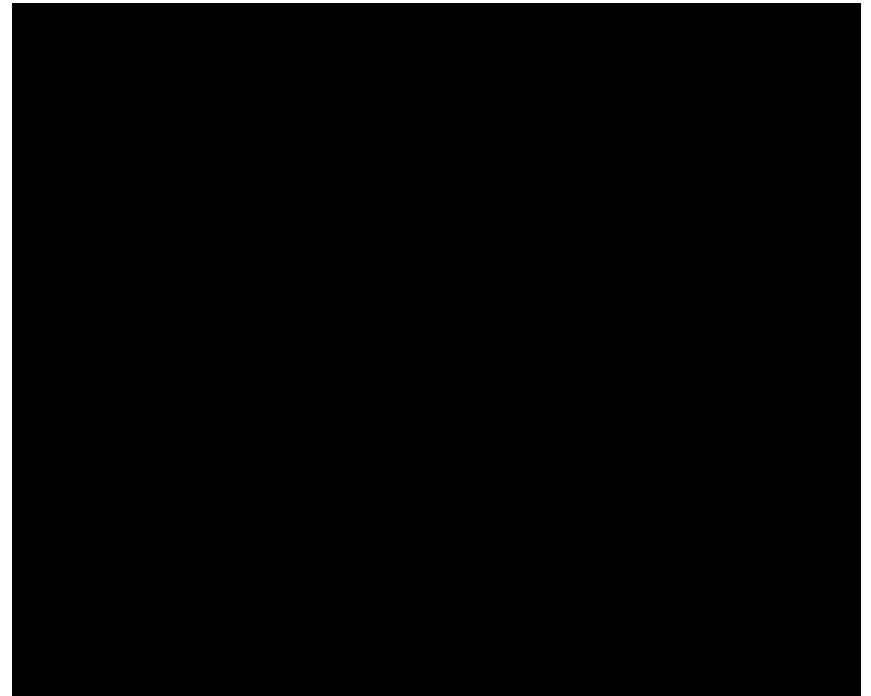
- Anaesthesia
- Adrenaline
- FESS style 2 handed surgery

•Initial Techniques

- Cut/divide/shave
- Balloon
- Injection

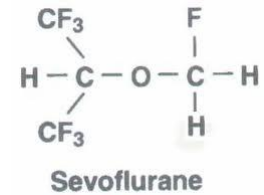
•Later Techniques

- Stent
- Suture
- Graft



Anaesthesia

- Spontaneous respiration
 - Halothane/Sevoflurane
- Topical anaesthesia
 - Intramuscular Atropine
- Topical Epinephrine



• OR

- Total Intravenous anaesthesia

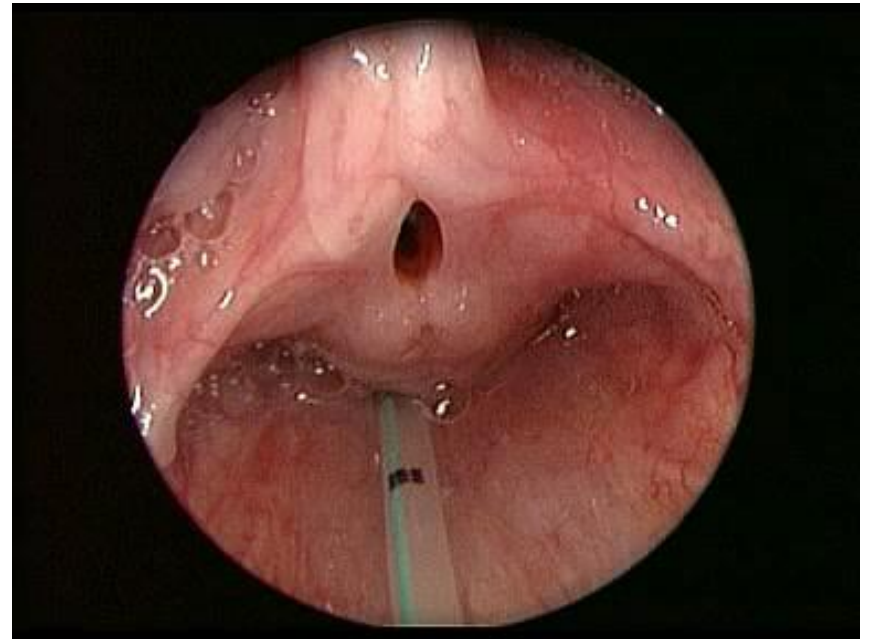




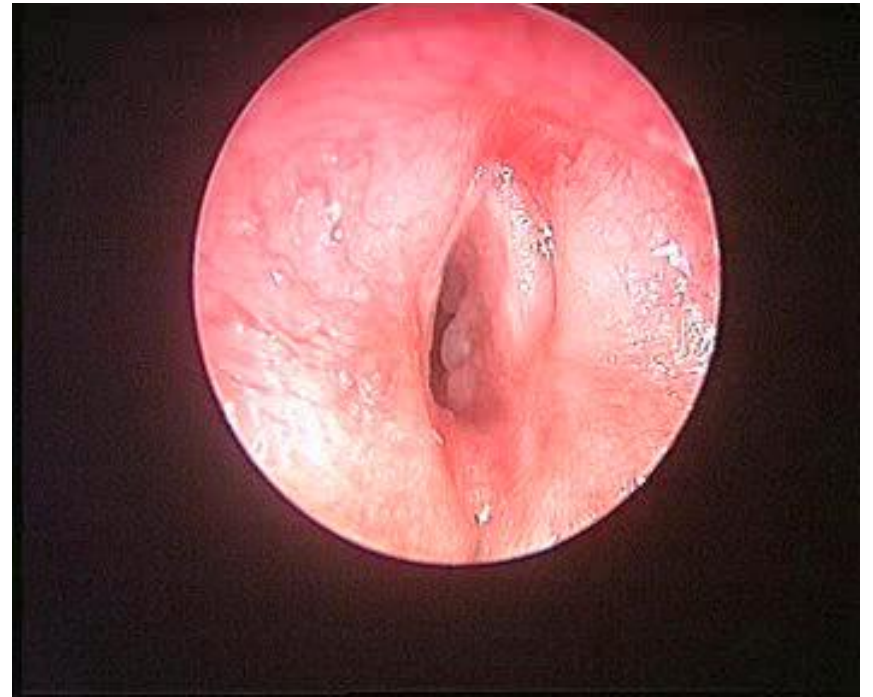
Initial Techniques

- Sharp division in stenosis or even laryngomalacia
- Sharp removal granulations and cysts
- Sharp division of stenosis and webs
- Radial balloon dilatation
- Microdebrider
- Inject steroids
- Apply Mitomycin

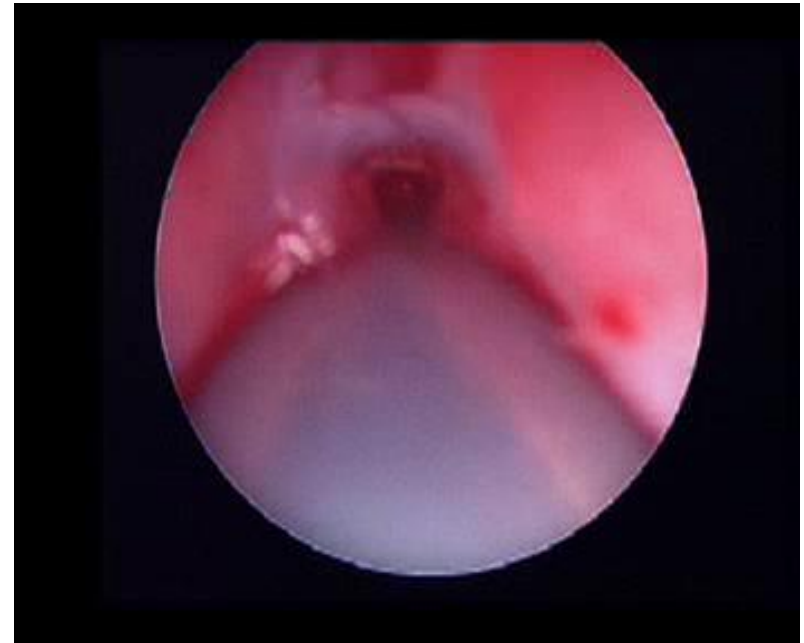
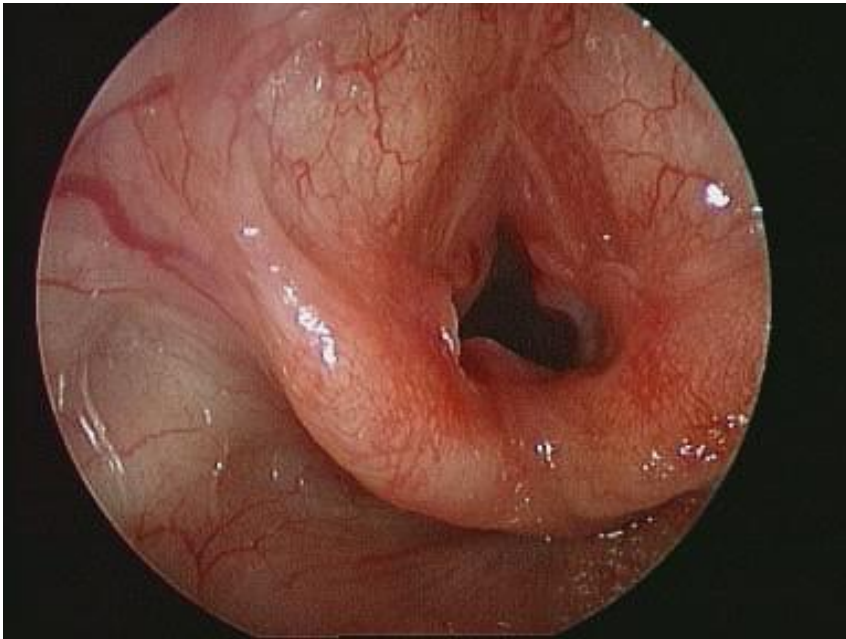
Laryngomalacia



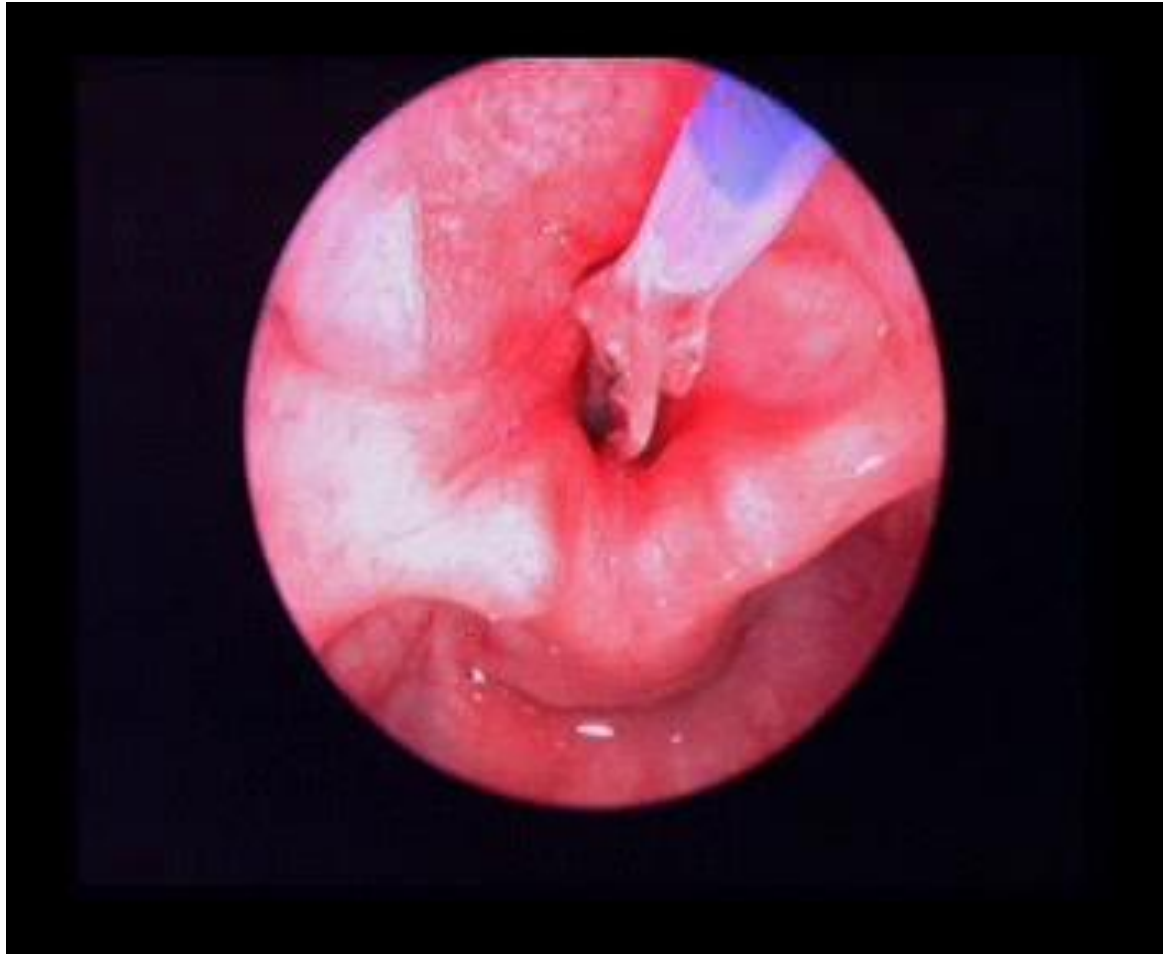
Sharp Removal Of Cysts



Endoscopic Decompression Of Edematous Larynx



Balloon radial dilatation

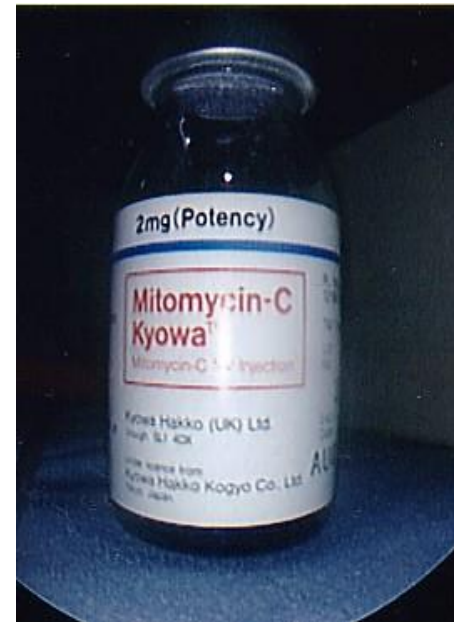


Microdebrider



Mitomycin C

- *Antineoplastic antibiotic - acts as an alkylating agent by inhibiting DNA and protein synthesis*
- *Dose 0.4 to 4 mg/ml*
- *2 mg/ml*



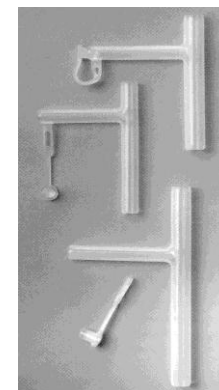
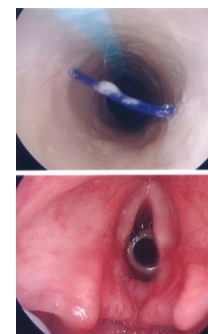
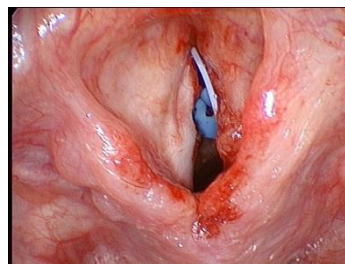
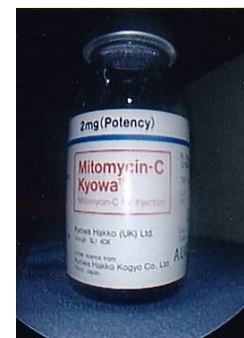
Triamcinolone Injection

- *40 mg in 1 ml*



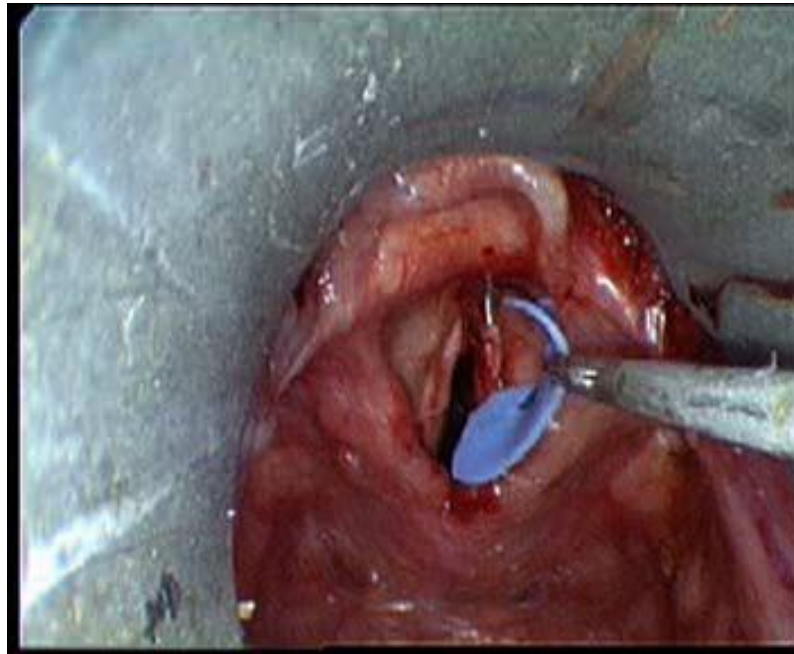
Later Techniques

- Repeat radial dilatation
- Mitomycin/Steroids
- Lateralisation sutures
- Montgomery T-Tube
- silastic keels
- tube stents
- Wedge resection
- Endoscopic grafts

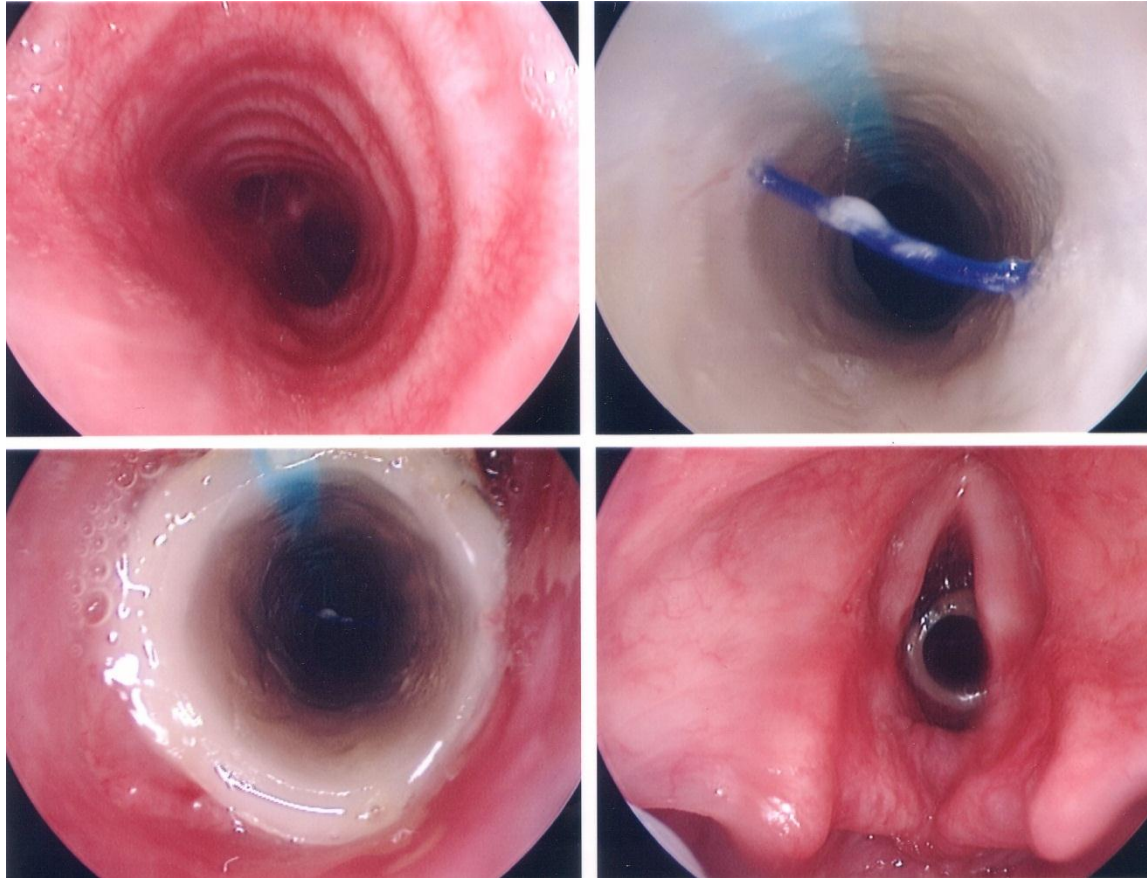


AZ: 8 years, anterior web following laser for papilloma

- Division with insertion of silastic stent



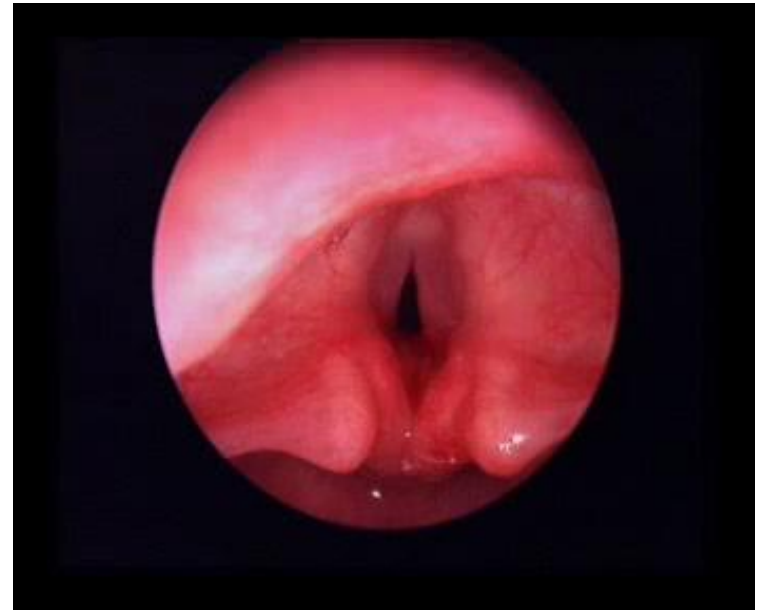
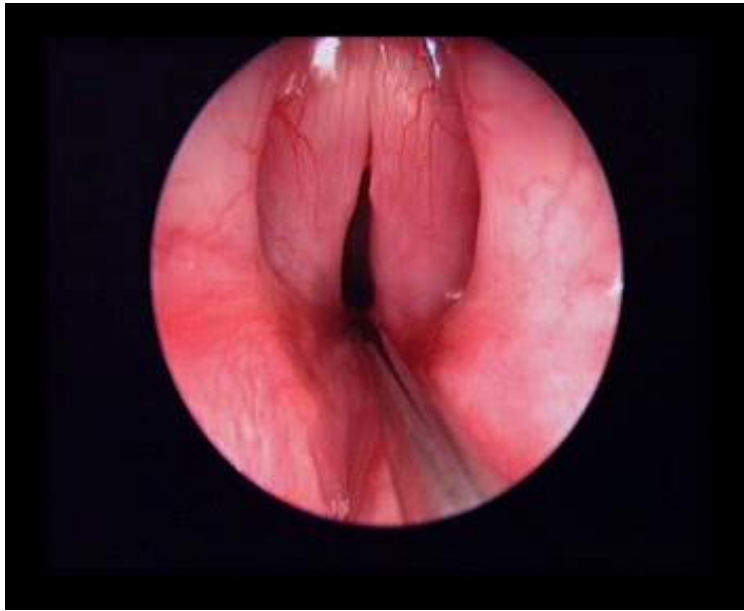
CW 12 years- Endoscopic Insertion of Endolaryngeal Stent



EJ: 12 years old, failed laser division of web stenosis

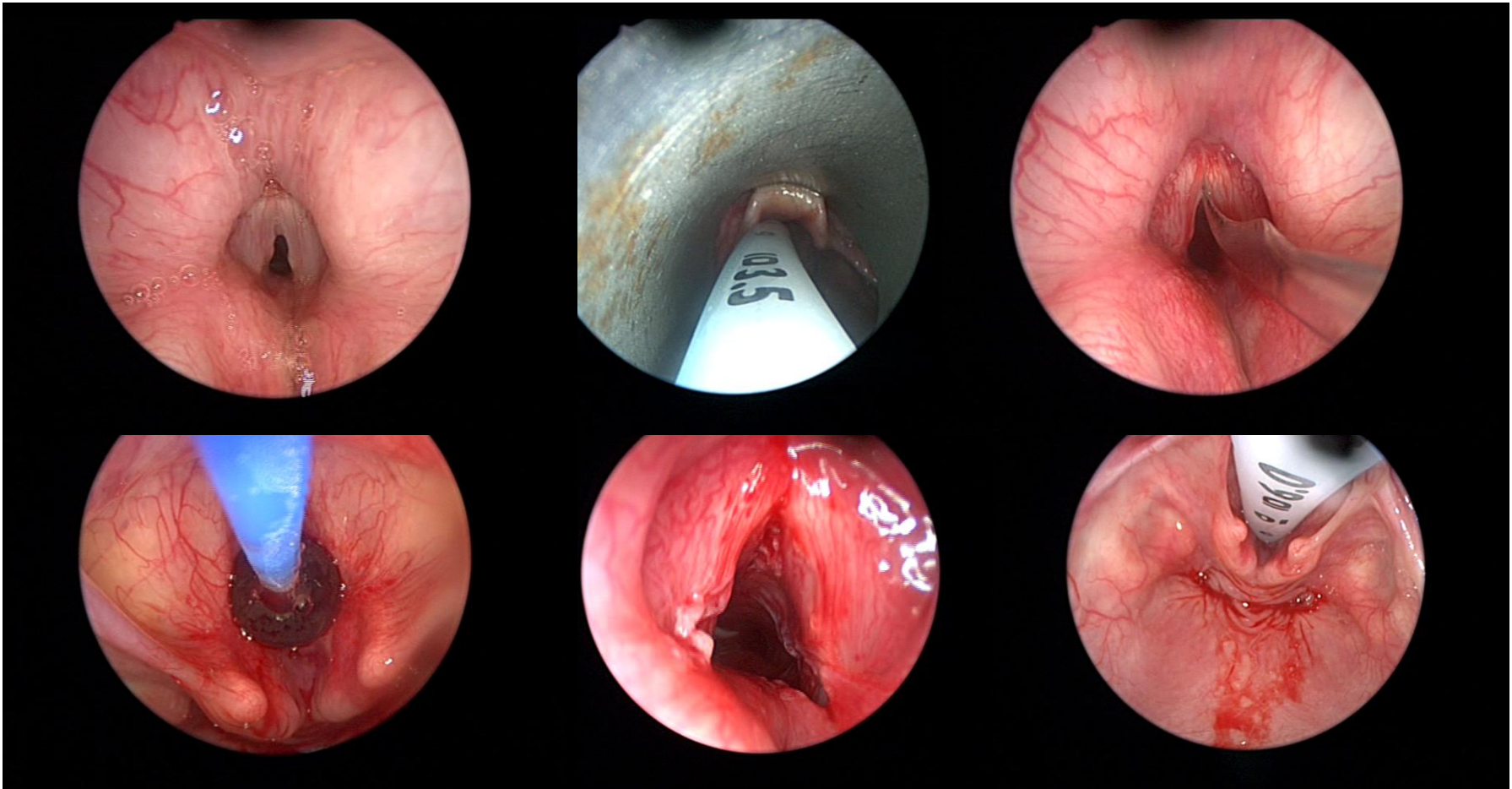


RC: 12 years skiing accident



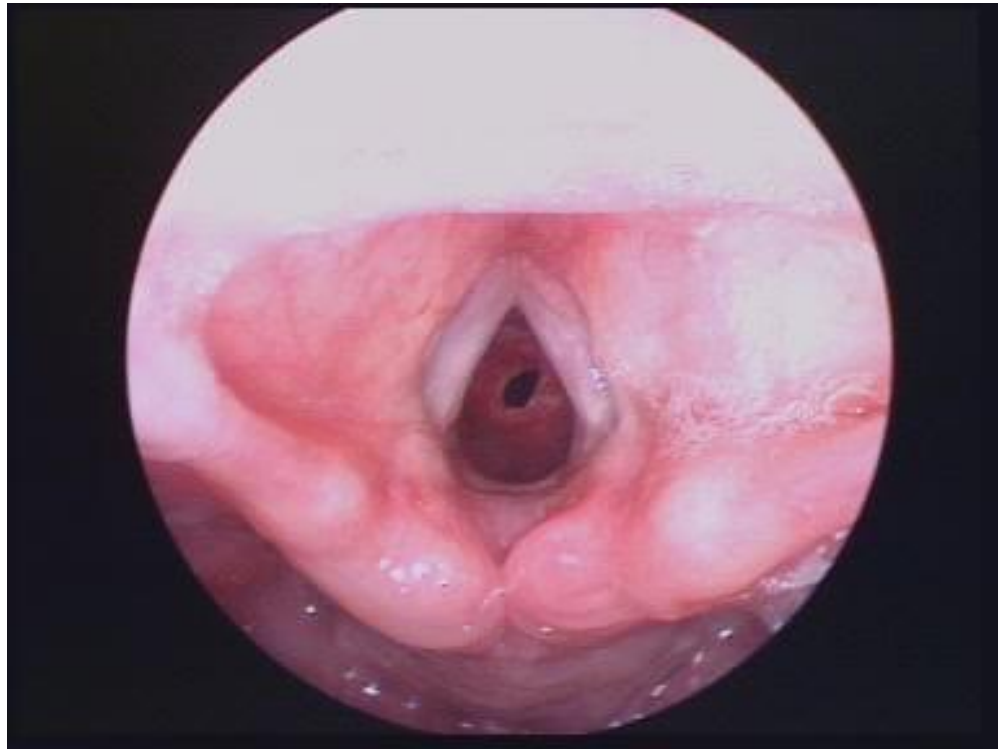
CN: 10 years RTA

- Division of interarytenoid scar, anterior web and subglottic stenosis



MK: Downs, microtrachea

- Cricotracheal resection
- multiple stents
- Thin stenosis

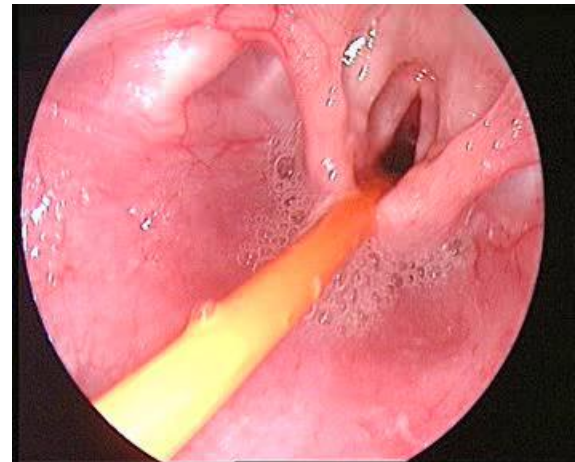
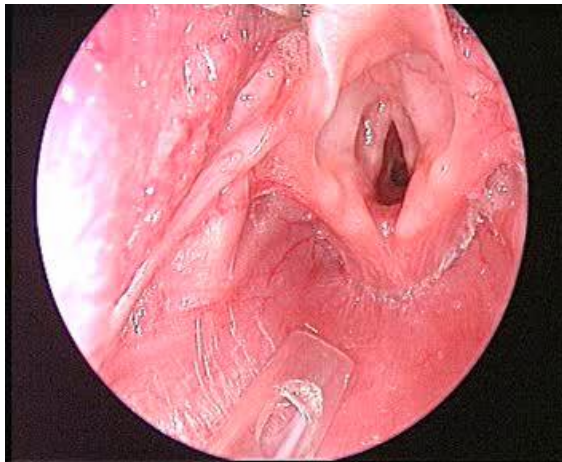
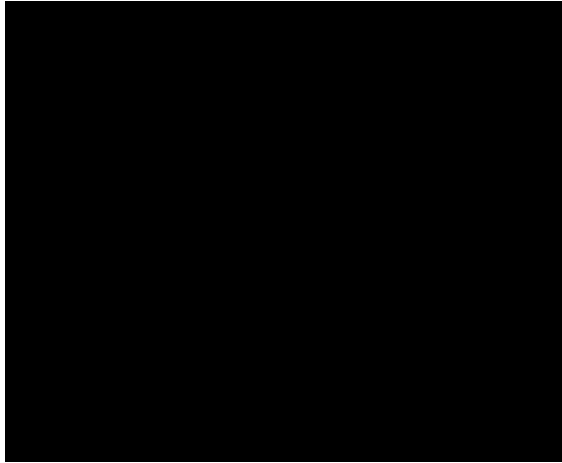


MK: Downs, microtrachea

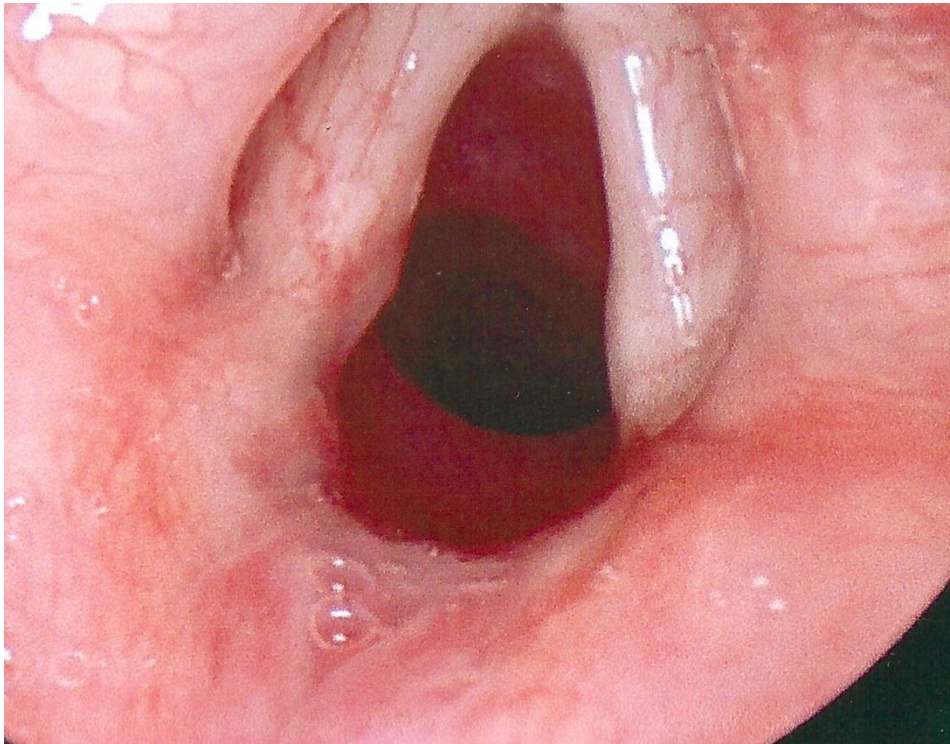
- Repeated:
- Sharp division
- Balloon
- Steroid injection



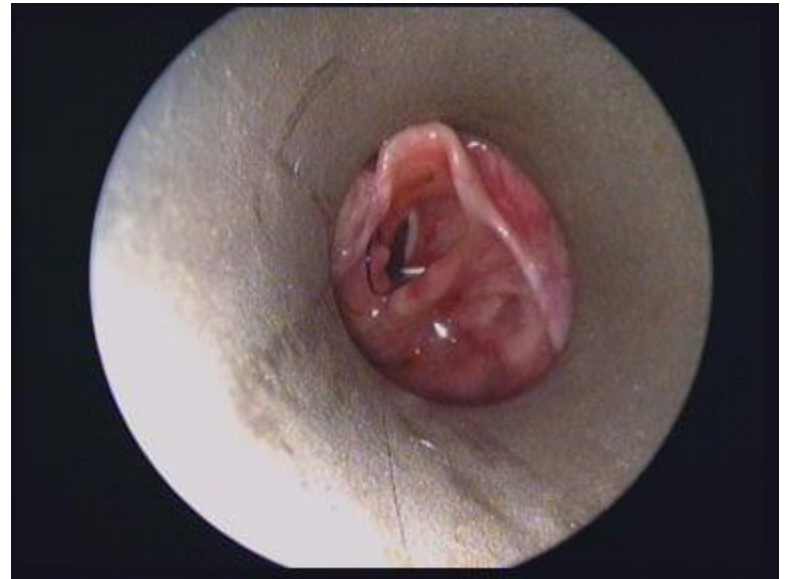
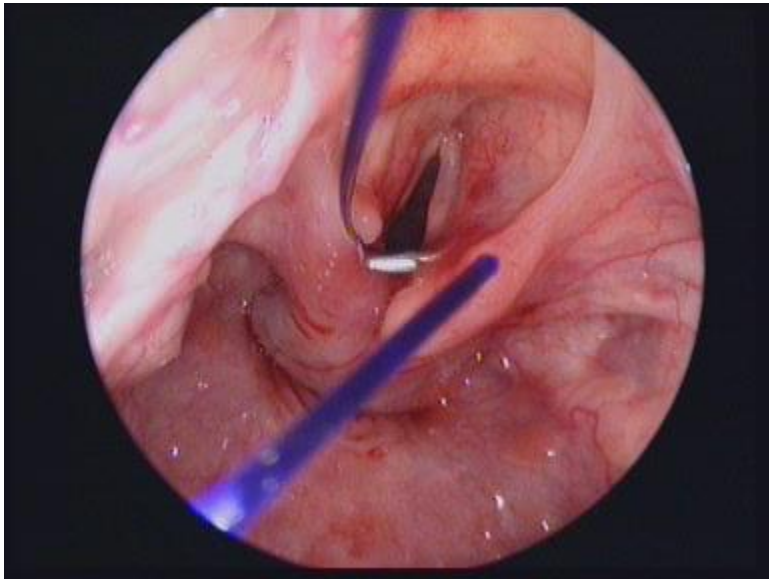
EB: ex prem with stridor



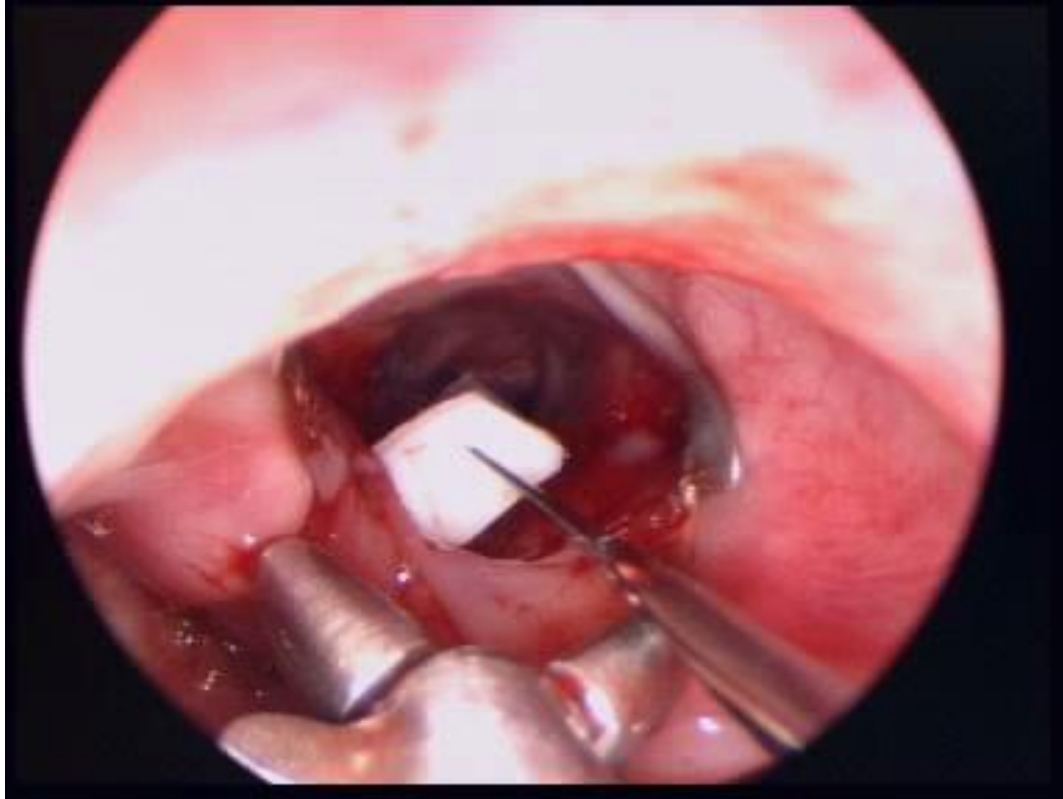
ES 8, years, Larsens syndrome
T tube to prevent restenosis



N.A 6 years, vocal cord palsy
Lateralisation suture



BB, 12 years, posterior scar
Endoscopic posterior graft



Summary

- Advanced endoscopic procedures may reduce the need for open surgery.
- The indications, risks and benefits need to be determined
- My experience has been mostly positive
 - No major complications
 - A few notable success stories
 - Time and cost a consideration