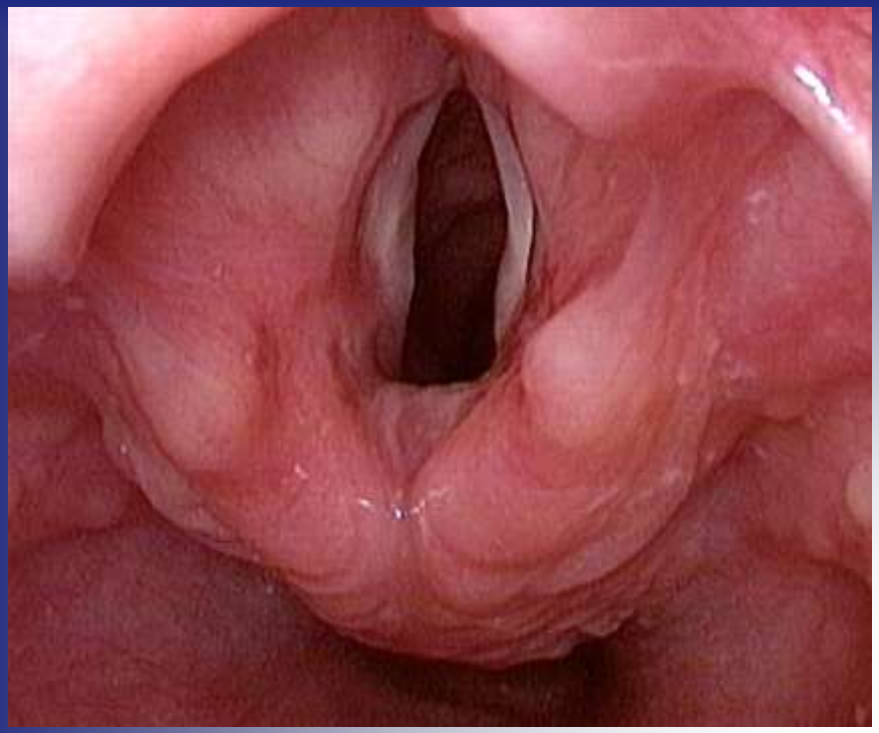
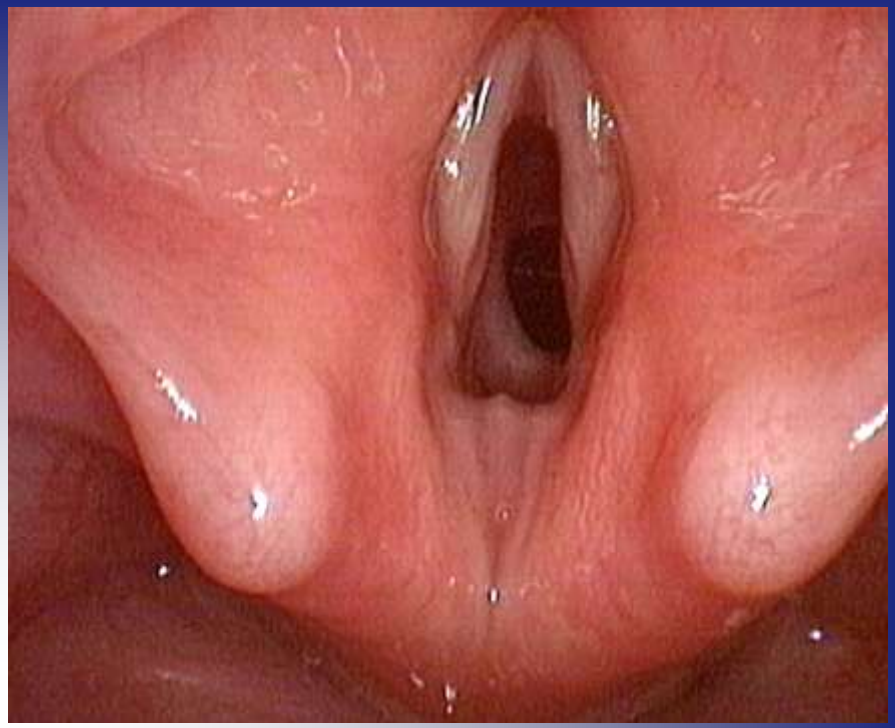
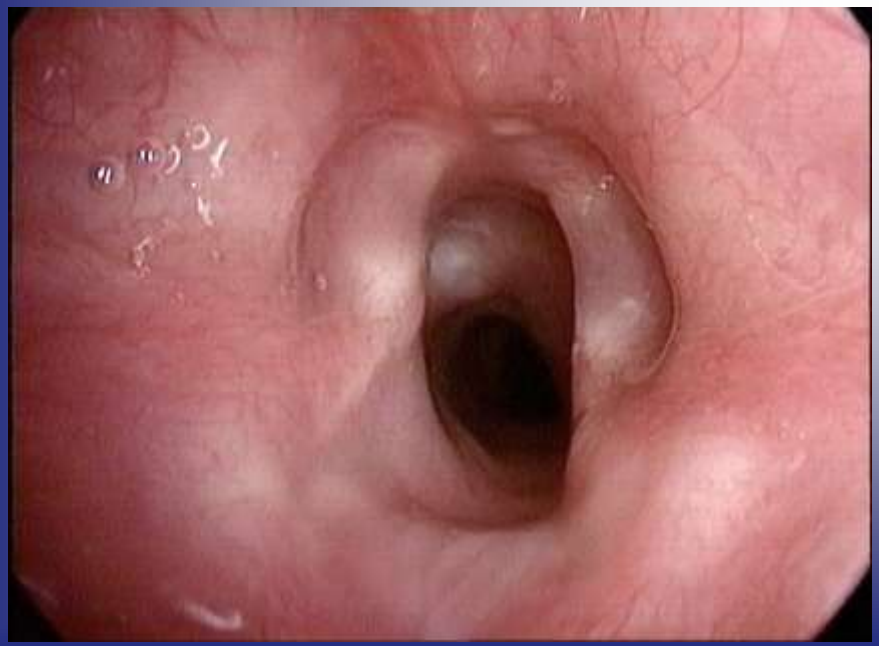
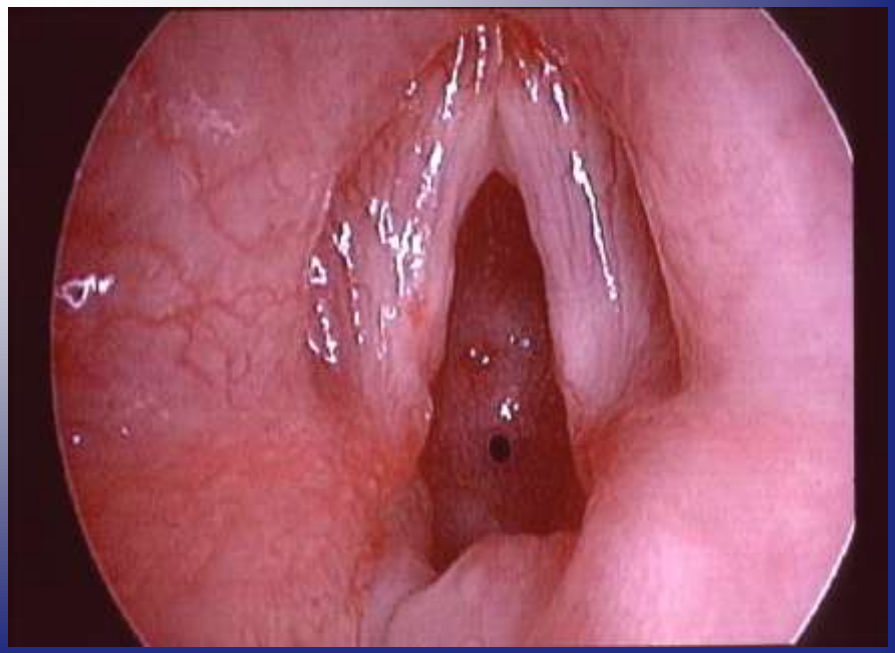





Aetiology

- Poor tube management
  - Size of tube (leak)
  - Duration of intubation
- Small cricoid (acquired on congenital)
- Reflux
- Poor general status

Prevention

- Laryngeal Rest
- Medical
- Tubes
- Cricoid split

Developing stenosis: Laryngeal rest

- Avoid reintubation and elect to leave child intubated for 2 weeks

Developing stenosis: Medical management

- Steroids
- Anti-reflux treatment
- Antibiotics?

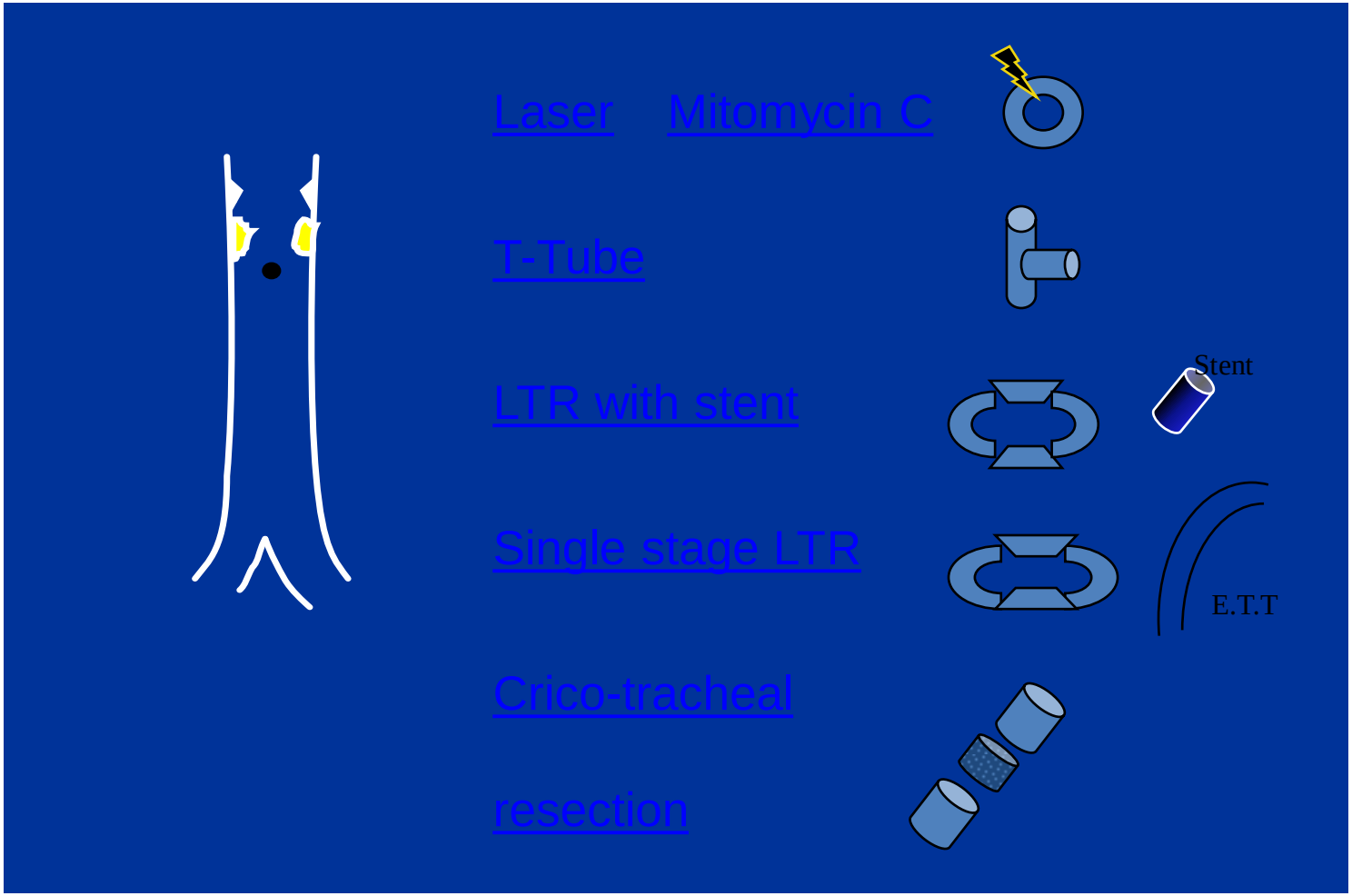
Change to a straight well fixed tube

- Shouldered/straight
- Oral/nasal

Developing stenosis: Cricoid Split

- Decompression operation
  - Allows oedema to disperse
  - Includes a period of laryngeal rest
  - Includes steroids and other measures to facilitate extubation

Basic Options for Established Disease



Established disease - Laser

BEWARE

Established disease - Mitomycin C

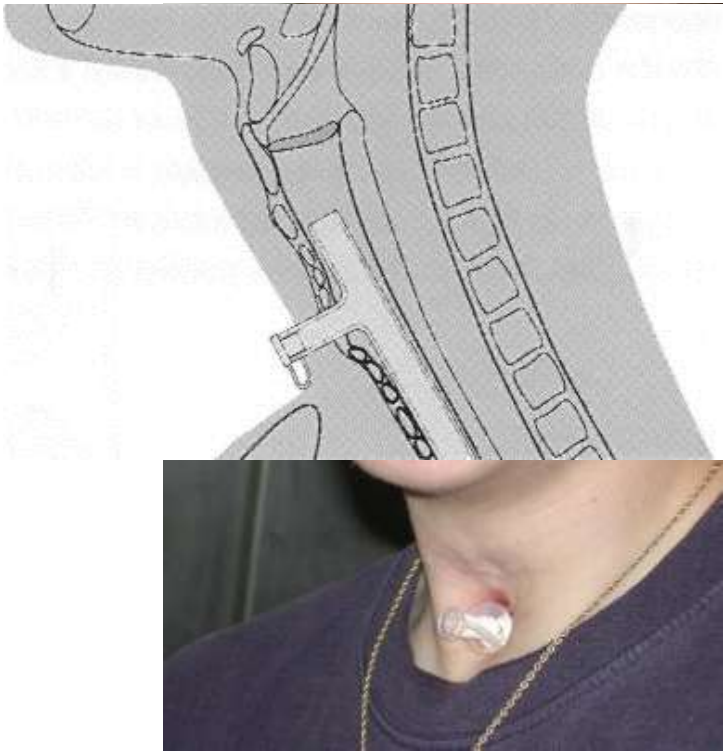
Mitomycin:

Antineoplastic antibiotic - acts as an alkylating agent by inhibiting DNA and protein synthesis

Useful to prevent restenosis

Established disease: T-Tube

- Acts as combined laryngeal stent and tracheostomy tube
- Ideally blocked
- May block



Established disease - Conventional LTR

- Reconstruction is covered by a tracheostomy
  - ?stent above trachostomy
- Usually a rib cartilage augmentation

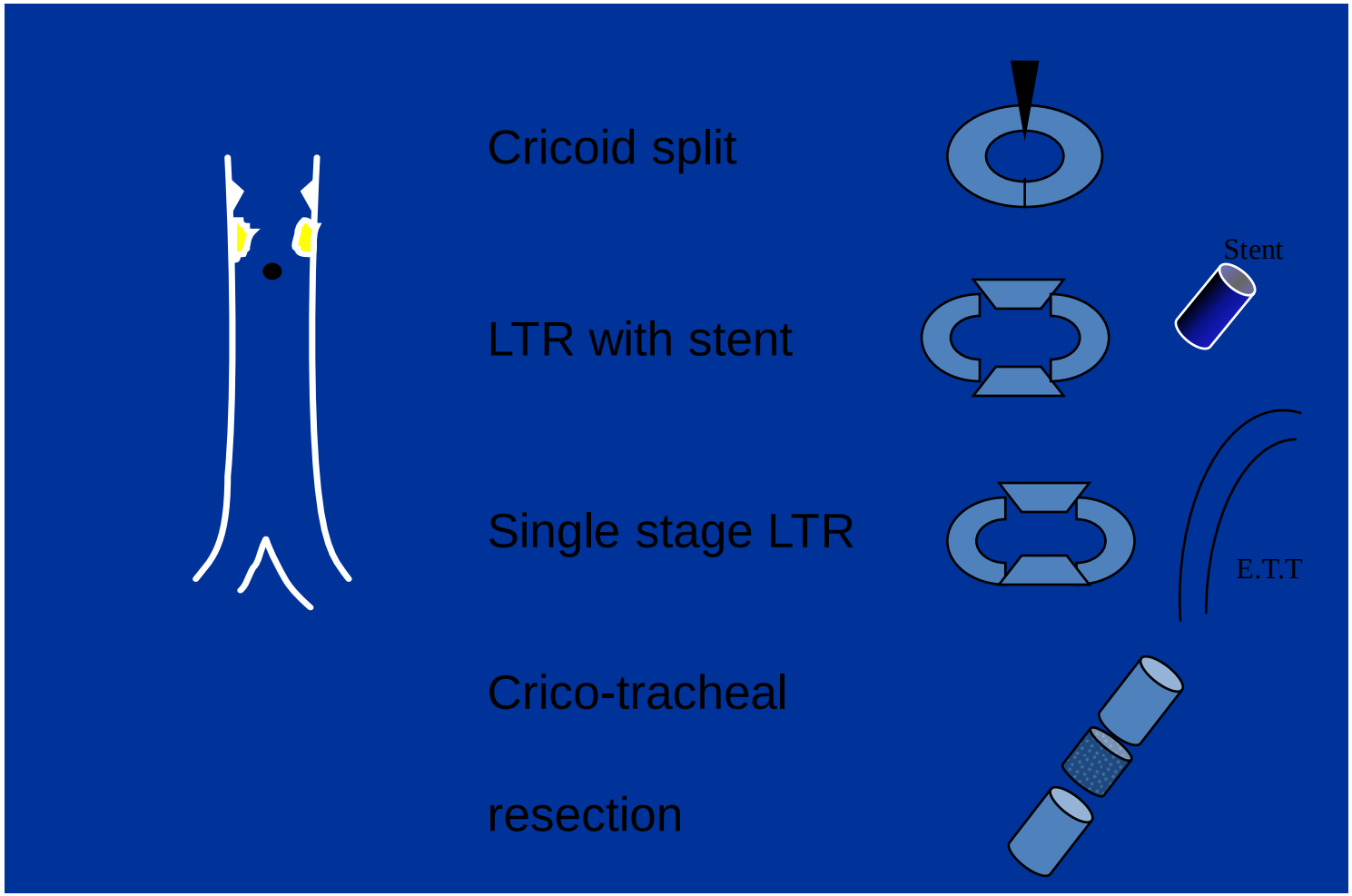
Established disease - Single stage

- Reconstruction covered by a period of intubation
- Any existing tracheostomy is closed

Established disease - Cricotracheal resection

- Technique for severe stenosis that resects a segment of upper trachea and anterior cricoid but retains the cricoid plate

Operative details



Cricoid Split

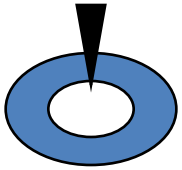
Premature infant fails extubation because of laryngotracheal stenosis

↓

Cricoid Split

↓ 50-70% success

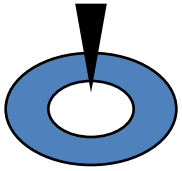
Extubation



Cricoid Split - Indications

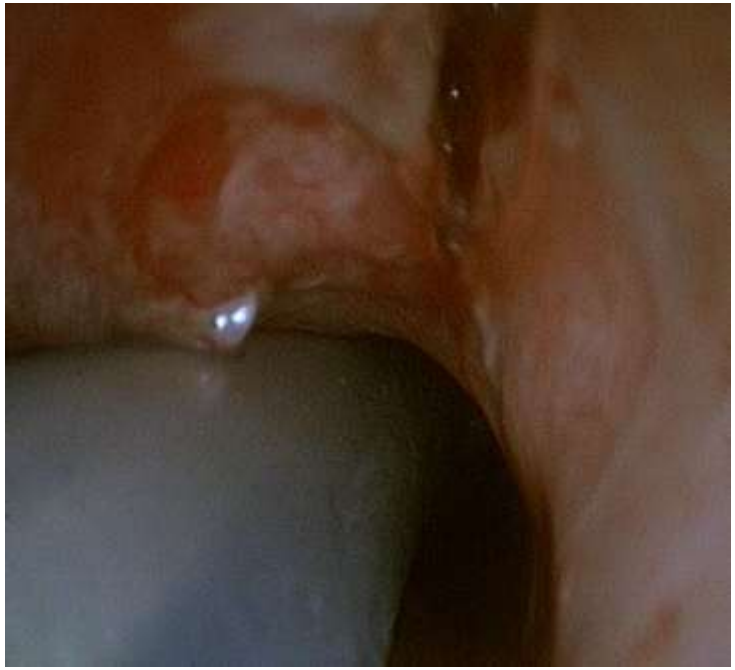
Mild soft subglottic stenosis/edema (Grade I-II)

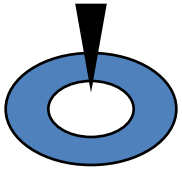
- Over 1.5 kg
- No cardio-respiratory compromise
- No significant reflux
- No other complicating factors
  - Micrognathia
  - Sepsis
  - Tracheobronchomalacia
  - etc.



Cricoid Split

“Decompression”





Cricoid Split - Procedure

Initially intubated with a small tube

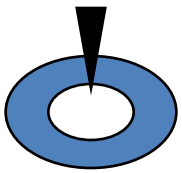
Anterior split: 1° tracheal ring, cricoid and 🗁 thyroid

? Posterior split

Reintubated with age appropriate tube:

check length

Drain to prevent surgical emphysema



Cricoid Split - Postoperative care

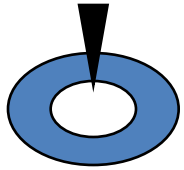
Intubated for 5-7 days. Not paralysed or ventilated

Antibiotics

Exubate under steroid cover

Dexamethasone 0.25mg/kg then 0.1mg/kg QDS

Reintubate with care if needed **



Critical factors in choice of procedure for ESTABLISHED stenosis

Endoscopy findings

Degree of stenosis (Grade I-IV) - *staging*

Other details of stenosis

Distance from tracheotomy/glottis - espec for CTR
Length
Anterior/posterior
Inter-arytenoid scar, cricoarytenoid fixation
Supra stomal collapse
Glottic webs

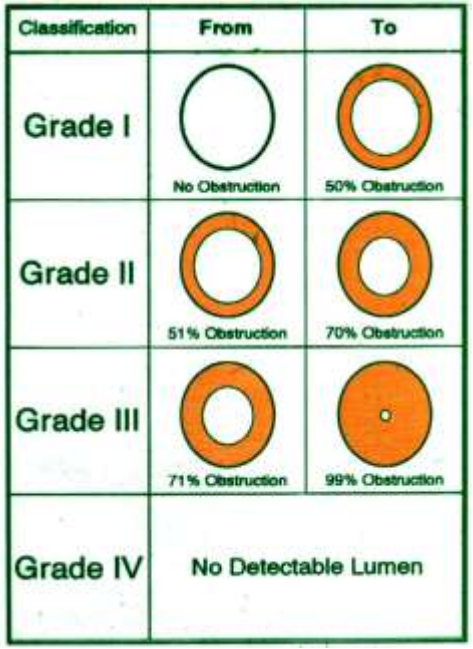
General health

Weight

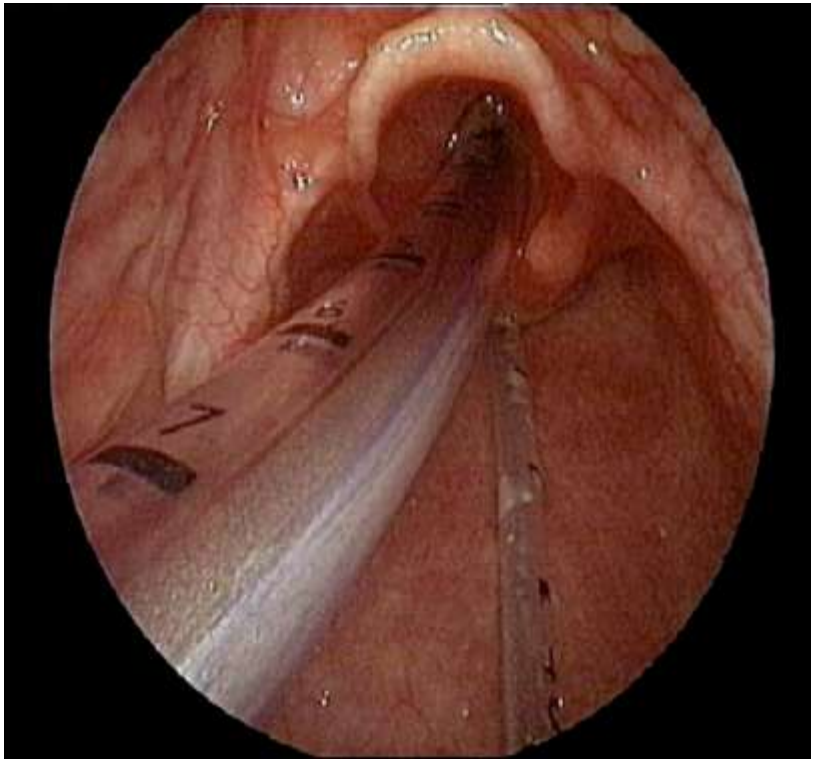
Presence of tracheostomy

Staging

Grade I	0 - 50%
Grade II	50 - 70%
Grade III	70 - 99%
Grade IV	100%



Staging-Sizing using ET tube



Conventional LTR with stent

Premature infant fails extubation because of laryngotracheal stenosis

↓

Tracheostomy

↓

Serial endoscopies

↓

LTR with stent

↓

Remove stent + further endoscopies

↓

Decannulation

50-80% success, depending on grade of stenosis

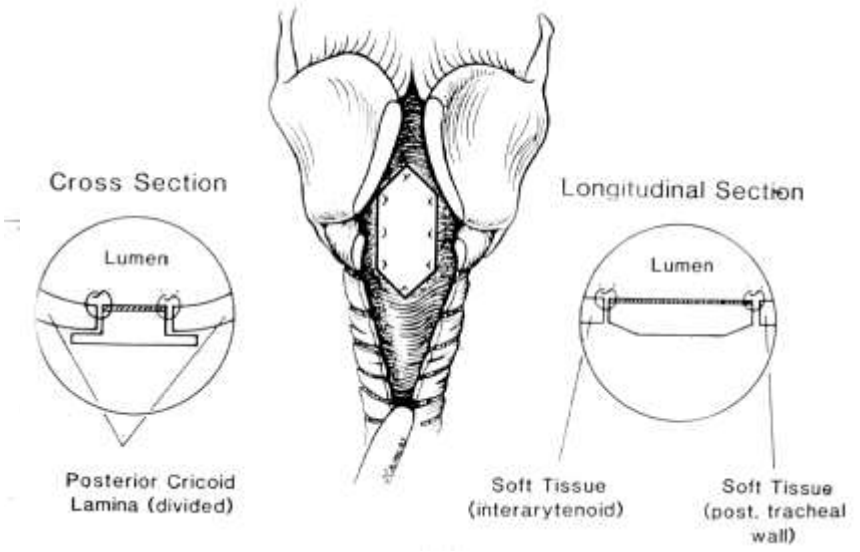
LTR with stent - Indications

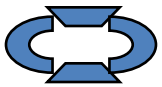
Severe stenosis grade III-IV

- Complicating medical conditions
- Child/parent not keen on ITU

Still need to optimise medical conditions especially reflux

“Augmentation”





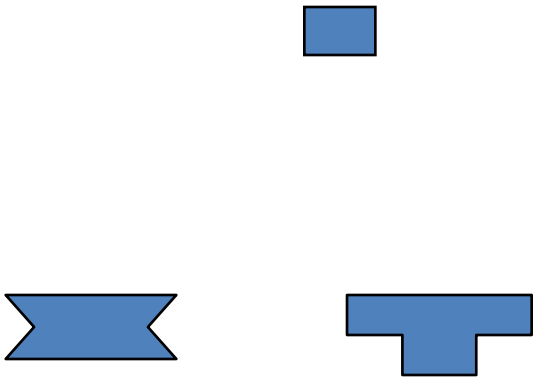
LTR - Procedure

Laryngofissure exposing the whole length of the stenosis, opening stoma if necessary

Posterior split until cricoid plates separate

Posterior graft: square

Anterior graft: grooved or as a “T”



Conventional LTR - Post operative care

Removal of stent via larynx

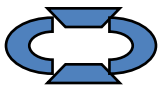
Rescope ? Laser

KTP to stomal granulation, careful check for collapse

Conventional LTR - Post operative care

Decannulation

- ward
- surgical
- cartilage support to stoma (single stage)
- TCF excision



Single stage LTR

Premature infant fails extubation because of laryngotracheal stenosis

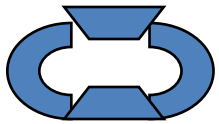
↓

Single stage laryngeal reconstruction

↓

70-90% success

Extubation



Single stage LTR - Indications

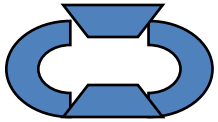
Failed extubation

- >2 kg
- “Healthy” as for cricoid split

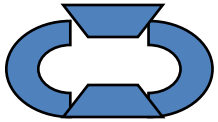
Recurrent croup

Progressive stridor

Patients with tracheostomy



“Augmentation in favourable patients”



Techniques - with an existing tracheotomy

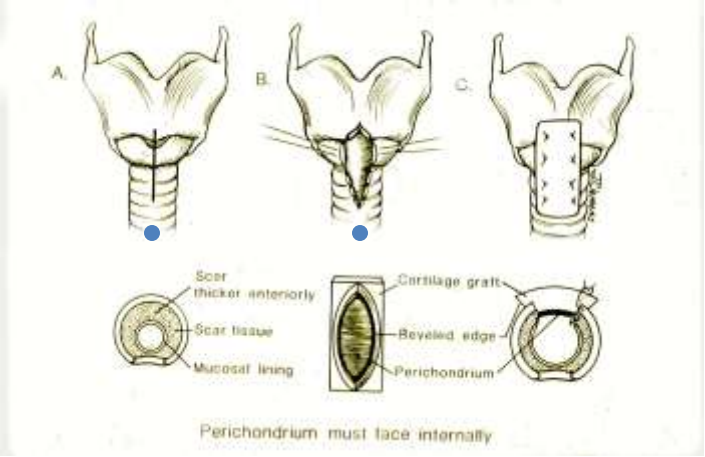
Laryngofissure

Position posterior graft if required

Tracheotomy tube removed

Endotracheal tube inserted

Anterior graft(s) for stenosis and to close/support tracheotomy stoma



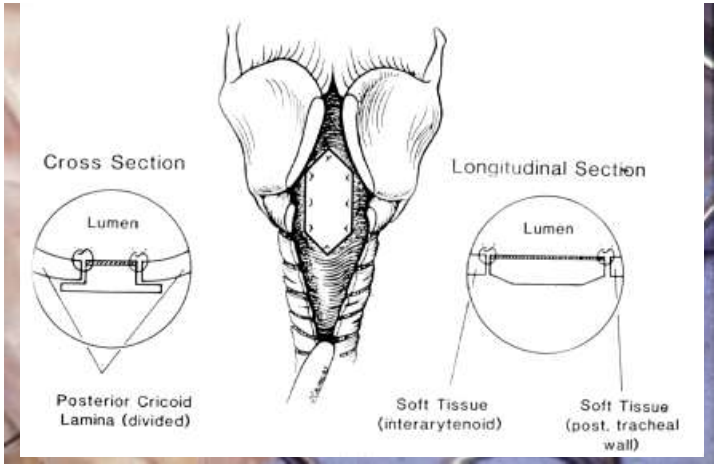
Techniques - without an existing tracheotomy

(extended) Laryngofissure

Position posterior graft if required

Correct size endotracheal tube inserted

Anterior graft



Single stage technique - post op

Check tube length

Leave intubated 7- 10 days

Minimal paralysis

Check for airleak

Any reintubation needs to be very gentle

Rescope, reintubate and downsize at ?1/52

Cricotracheal resection

Grade III-IV

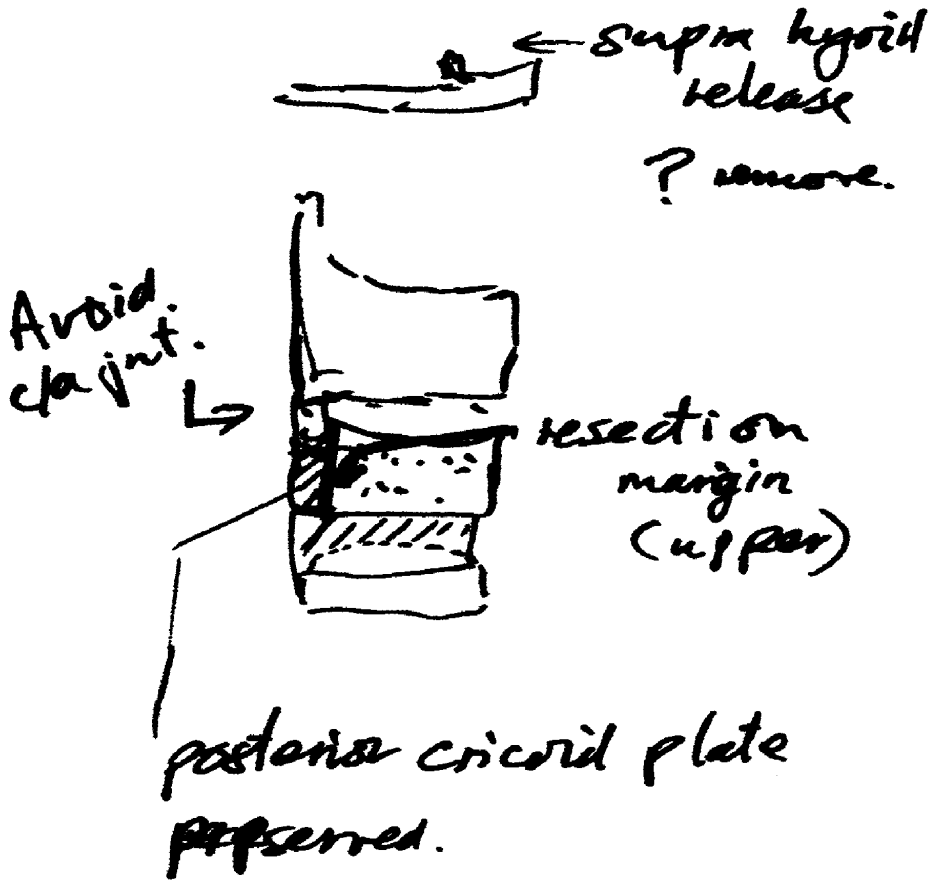
Usually as a single stage

Upper excision below cords

- preserve posterior cricoid
- cricoid plate drilled to reduce stenosis

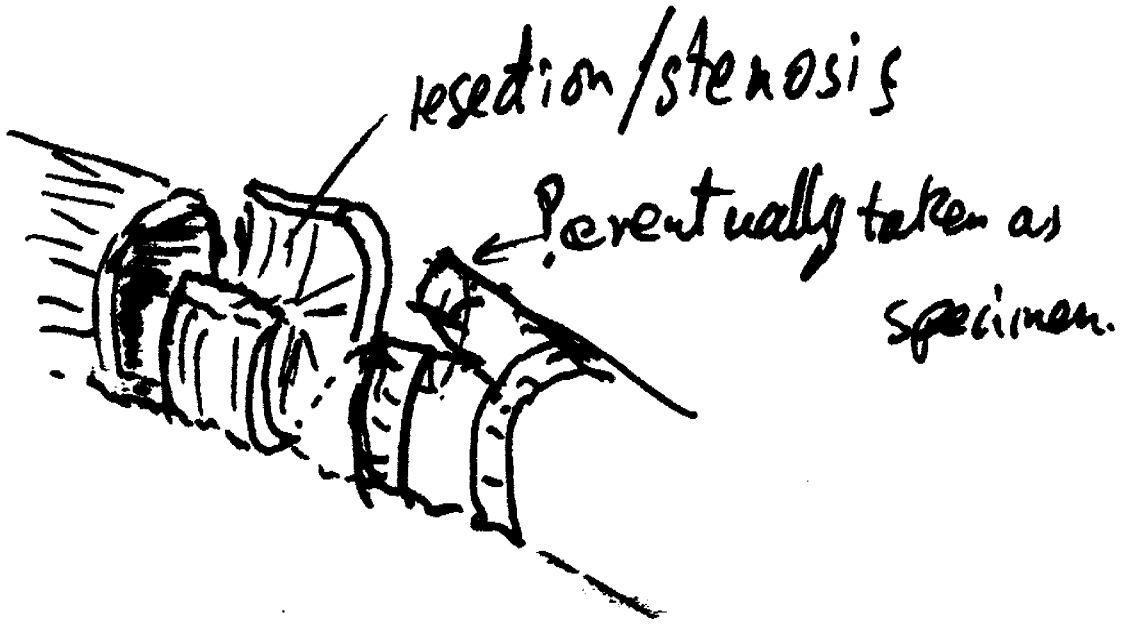
Lower excision sloping up

Cricotracheal resection

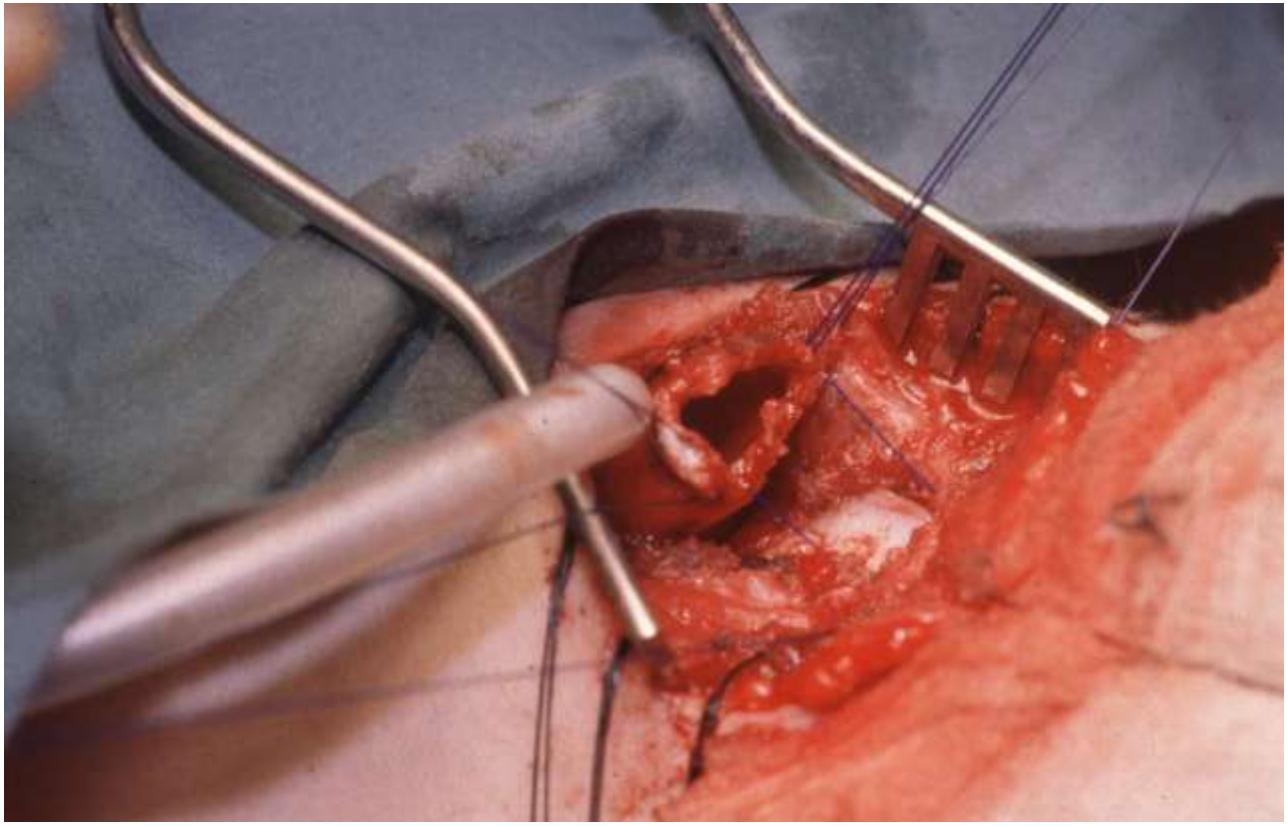


Cricotracheal resection

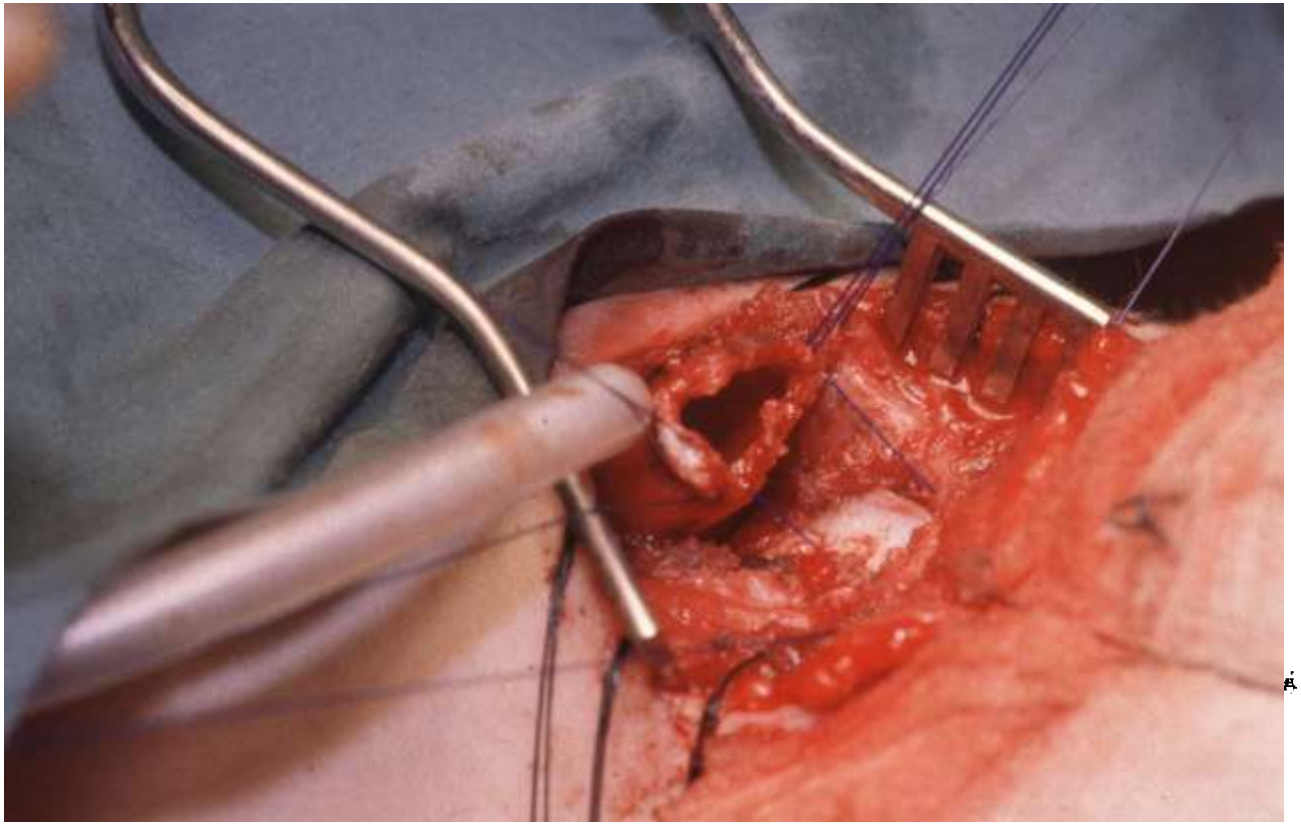
Cricotracheal resection



Cricotracheal resection



Cricotracheal resection



Cricotracheal resection

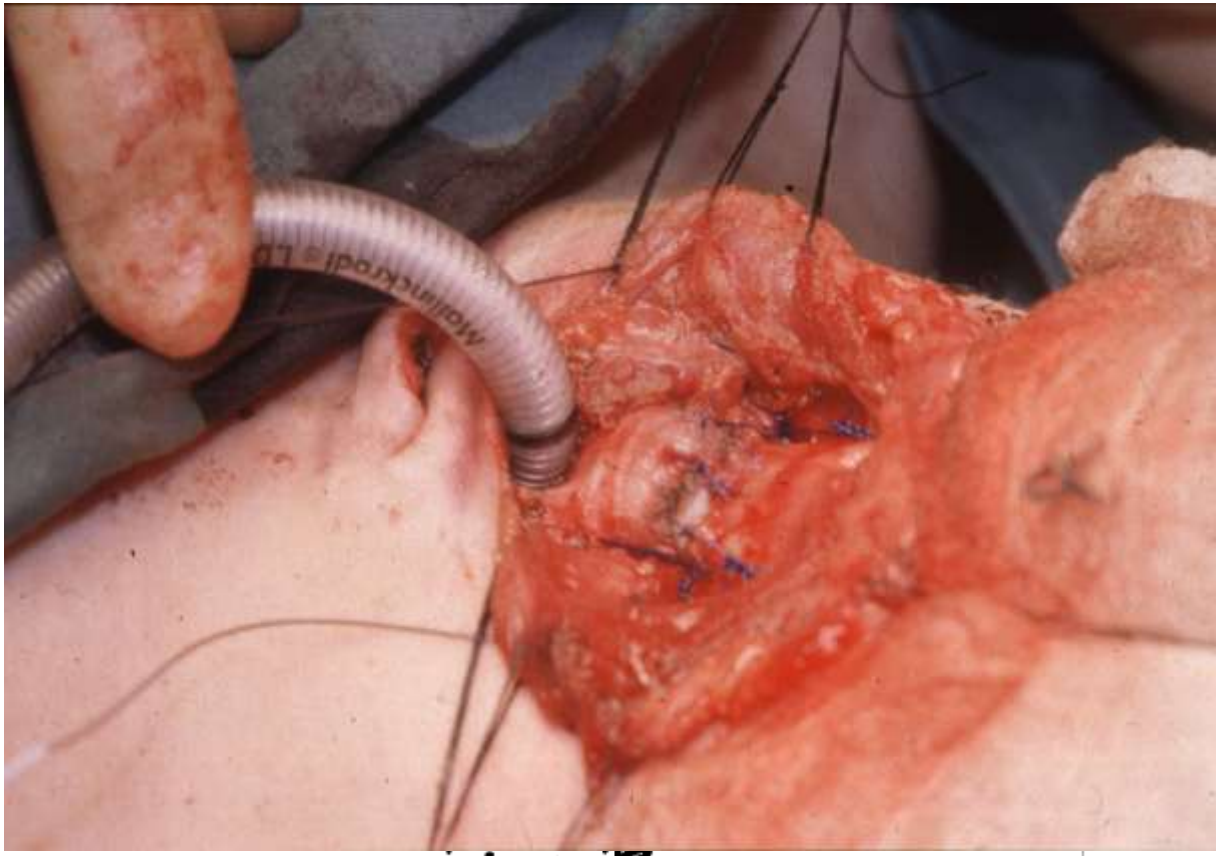
Tension sutures laterally to protect anastamosis

Chin sutures to prevent extension

Intubate for 7-10 days

Scope prior to extubation and downsize

Cricotracheal resection



LTR and CTR- Summary

Avoid tracheotomy if safe to do so

- refer before tracheotomy

Single stage is more demanding but if successful has a number of advantages

Not all patients suitable for single stage

Cricotracheal resection