SUPRAGLOTTIC LARYNGECTOMY

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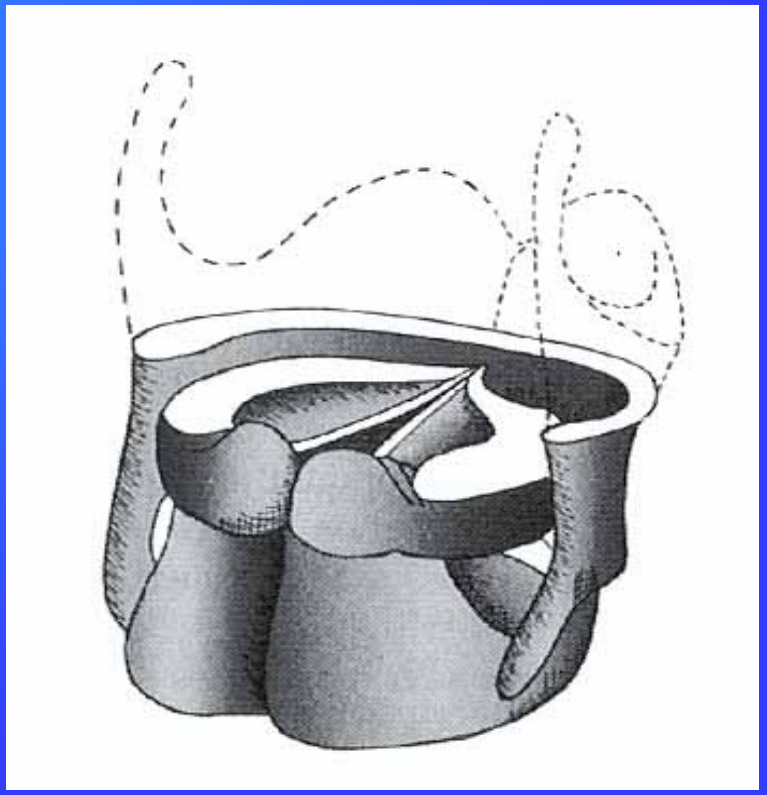
11/22/00



Supraglottic Laryngectomy

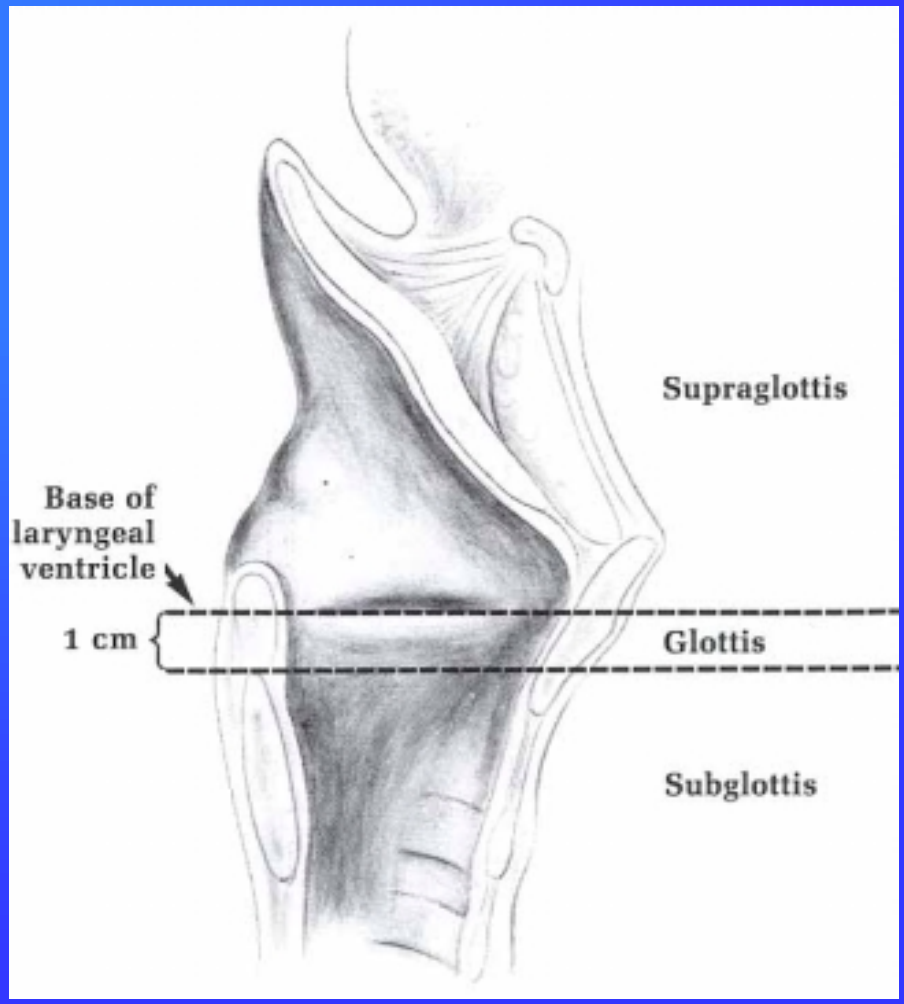
- A laryngeal conservation procedure designed to eliminate cancer that originates from the epiglottis, aryepiglottic folds and false vocal cords while minimizing morbidity and maintaining the three functions of the larynx—airway protection, respiration and phonation.

History

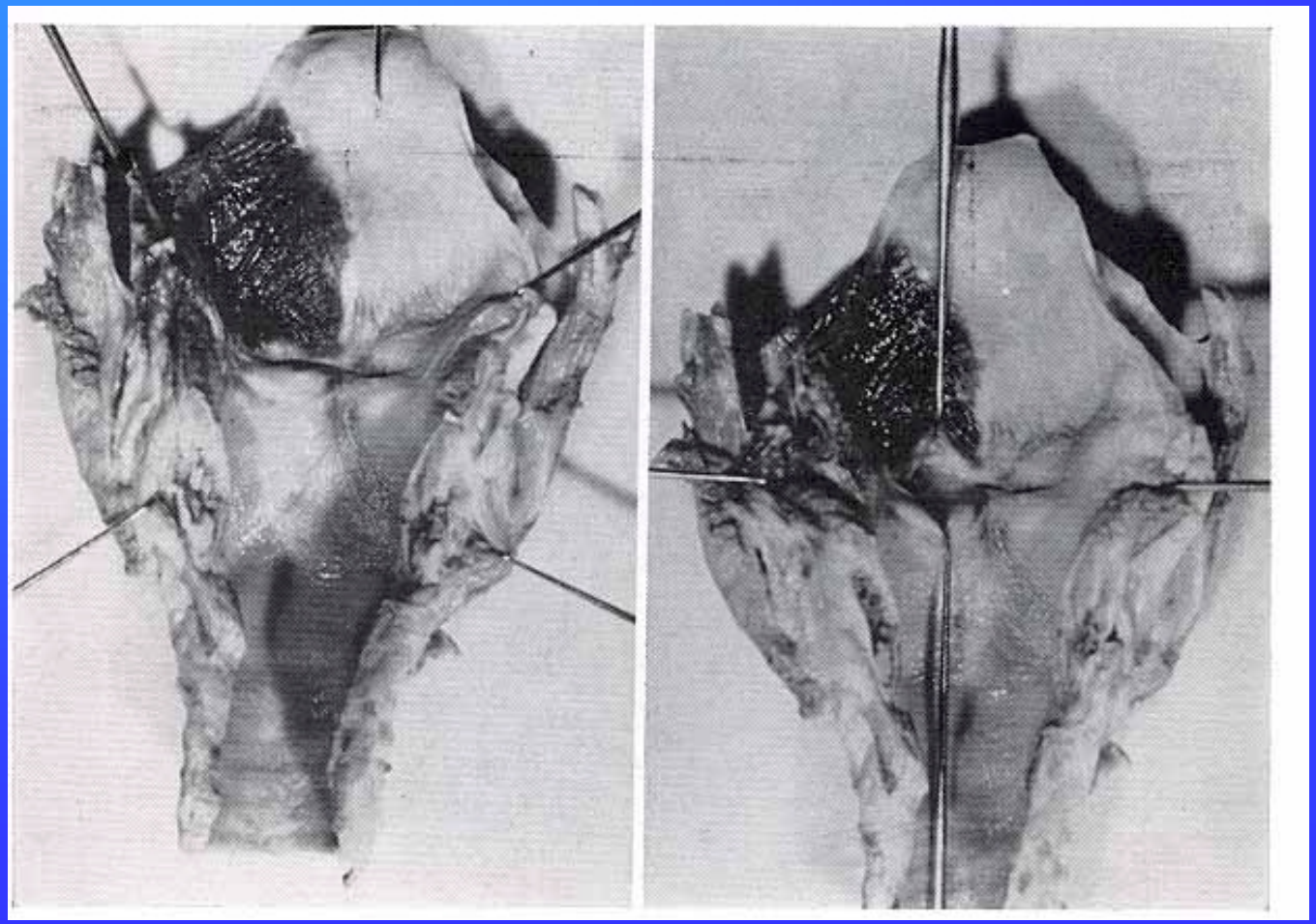
- Alonzo, 1947: introduced technique
  *required second stage closure of pharyngostoma
- Ogura, 1958: modified procedure
  *one stage
- Som, 1959: new reconstructive idea
  *primary closure of thyroid perichondrium to tongue base

Anatomy of the Larynx

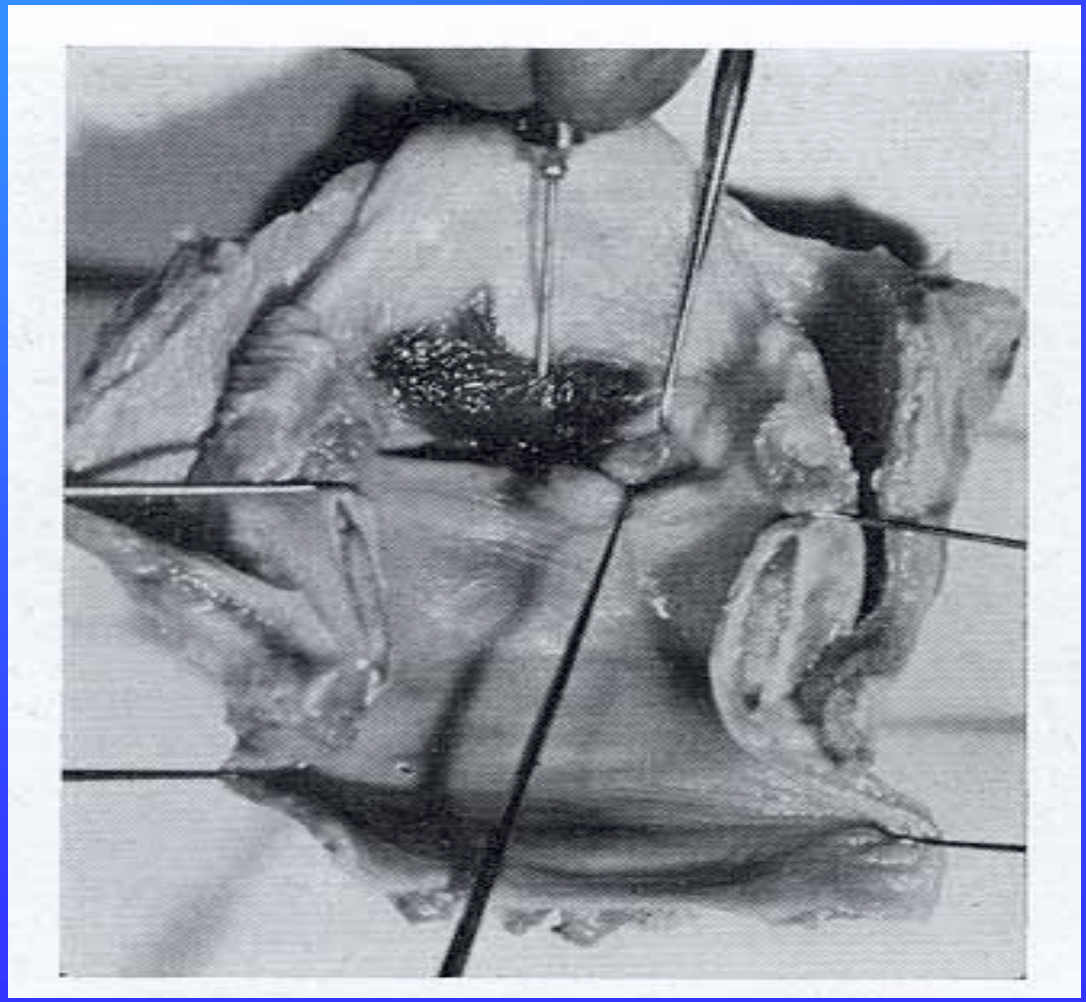
- Supraglottis
- Glottis
- Subglottis



Anatomy of the Larynx

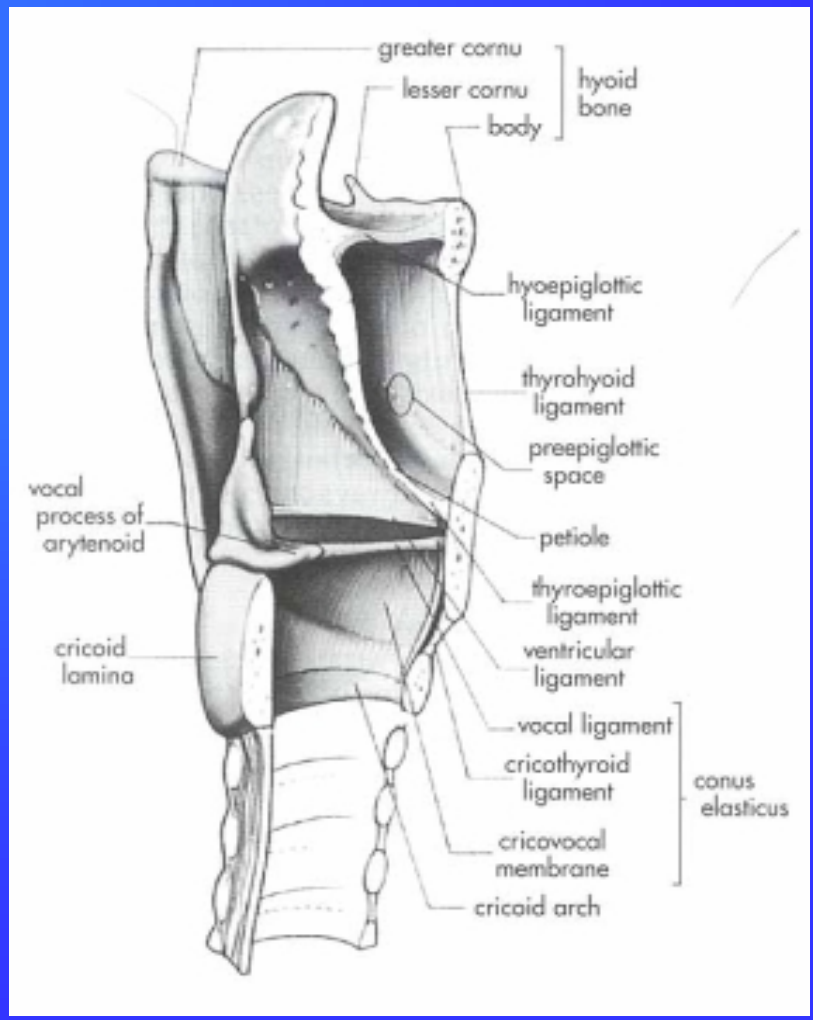


Anatomy of the Larynx



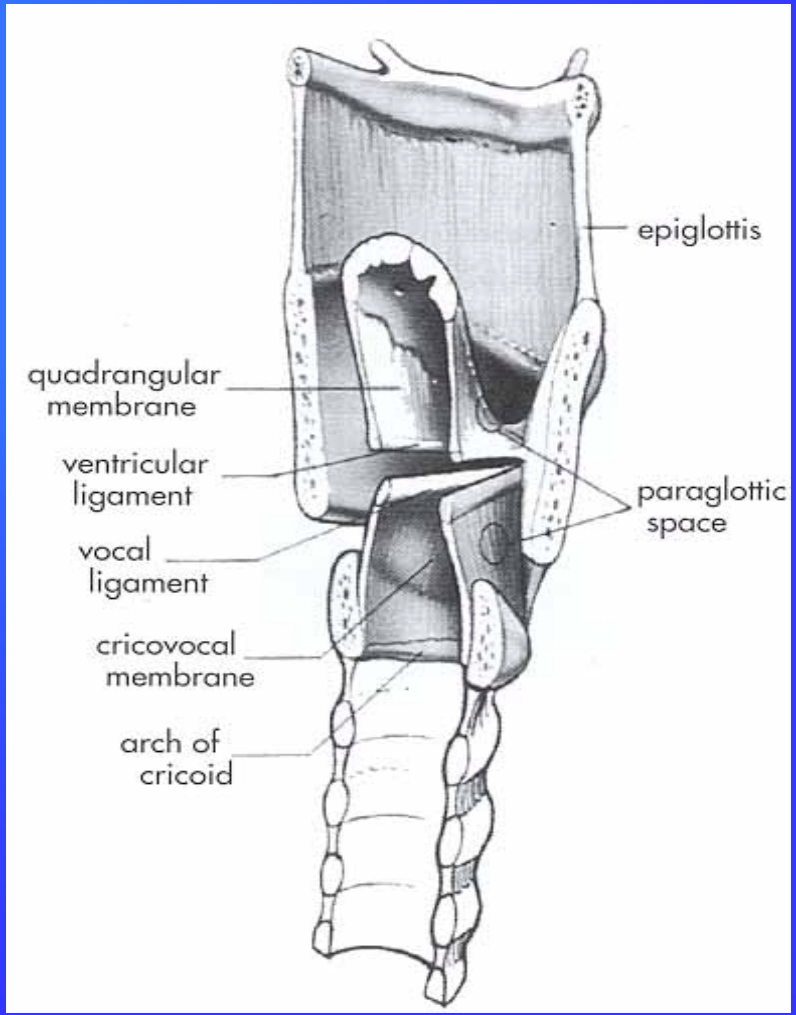
Anatomy of the Larynx

- Preepiglottic space
  - Superior: hyoepiglottic ligament
  - Anterior: thyrohyoid membrane
  - Inferior: thyroepiglottic ligament
  - Posterior: epiglottis

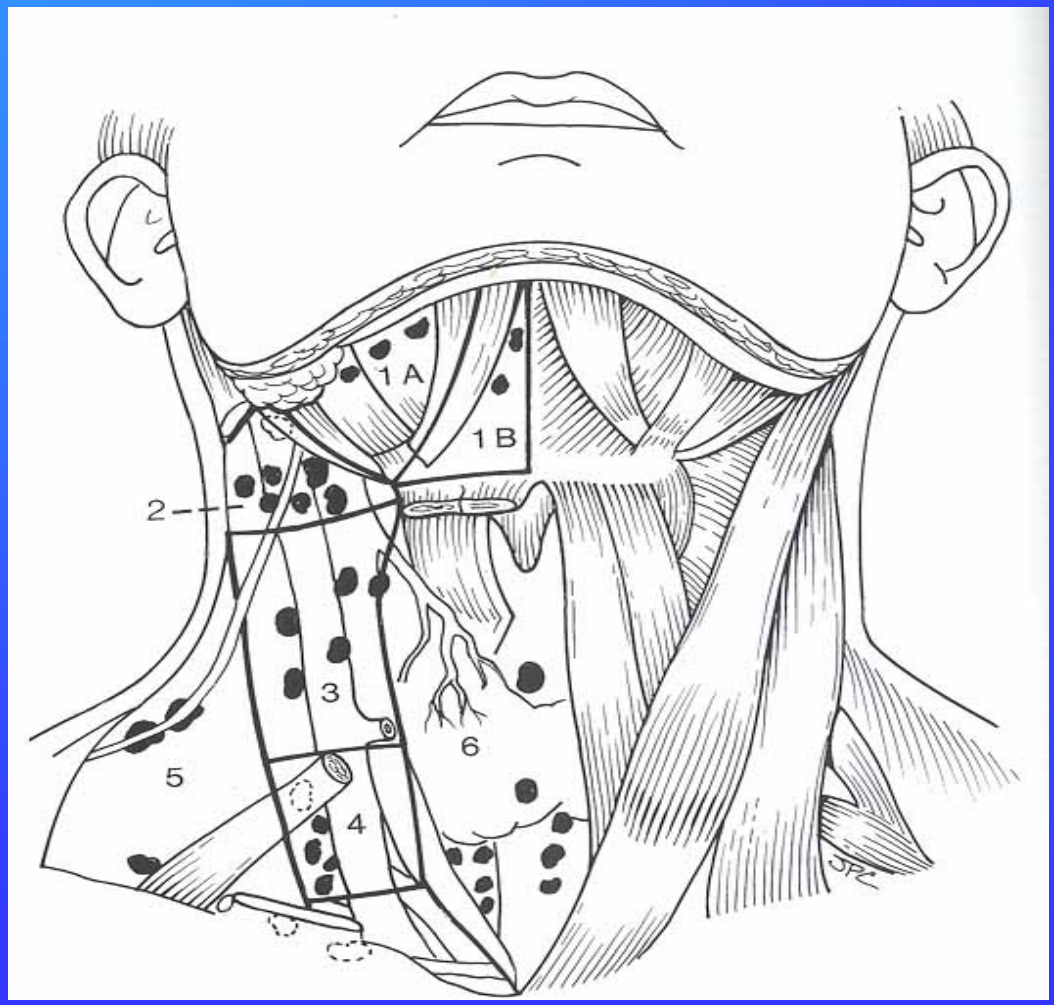


Anatomy of the Larynx

- Paraglottic Space
  - Superior: quadrangular membrane & medial pyriform sinus wall
  - Inferior: conus elasticus
  - Lateral: thyroid cartilage

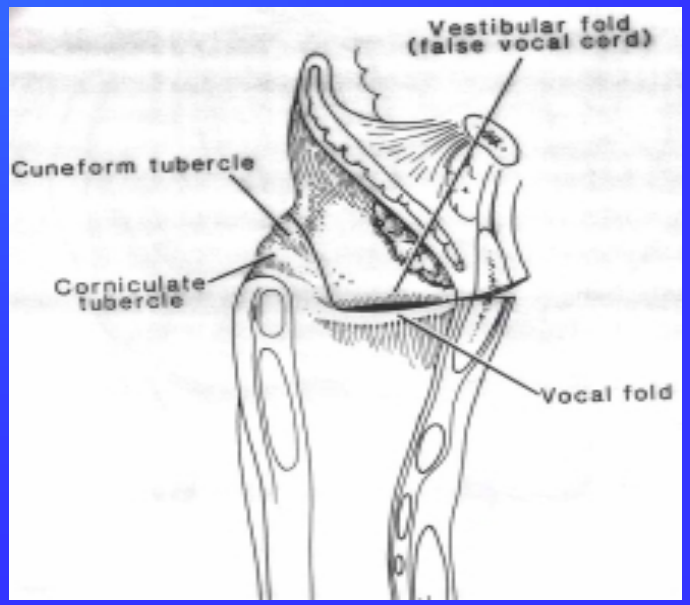


Lymphatic Drainage



Supraglottic Cancer

- 3,900-5,200 new cases diagnosed annually
- 95% SCCA
- Tobacco and EtOH are major risk factors
- M>F
- Most commonly found on infrahyoid epiglottis

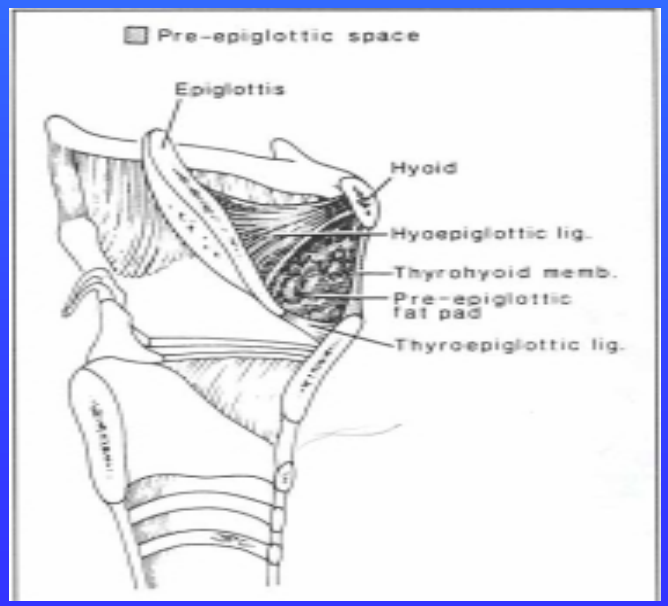


Supraglottic Cancer

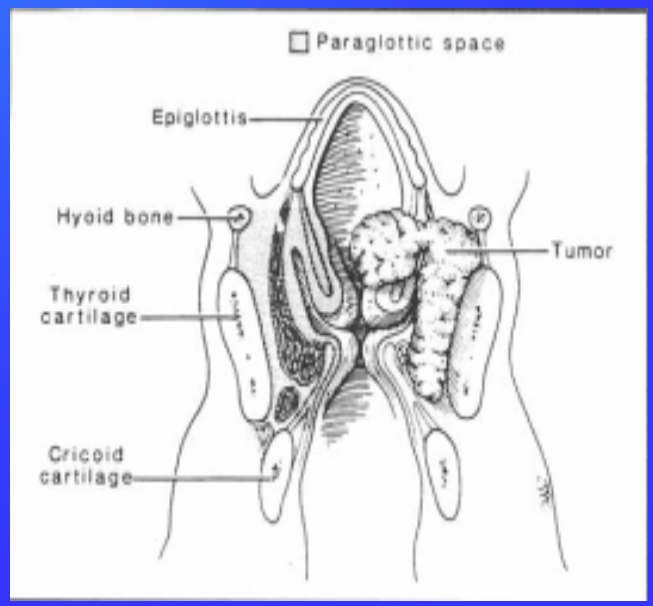
- Differential Diagnosis
  - SQUAMOUS CELL CARCINOMA
  - Salivary gland tumors
  - Mesenchymal tumors
  - Benign neoplasms

Supraglottic Cancer

- Preepiglottic space involvement through foramen in infrahyoid epiglottis.



- Paraglottic space involvement through mucosa of the ventricle.



Supraglottic Cancer

- 1997 AJCC

Supraglottis

T1	Tumor limited to one subsite of supraglottis with normal vocal cord mobility
T2	Tumor invades mucosa of more than one adjacent subsite of supraglottis or glottis or region outside the supraglottis (e.g., mucosa of base of tongue, vallecula, medial wall of pyriform sinus) without fixation of the larynx
T3	Tumor limited to larynx with vocal cord fixation and/or invades any of the following: postcricoid area, pre-epiglottic tissues
T4	Tumor invades through the thyroid cartilage, and/or extends into soft tissues of the neck, thyroid, and/or esophagus

Supraglottic Cancer

TABLE 41-1 ***T System of Supraglottic Carcinoma Staging***

Tis	Carcinoma in situ
Stage I	T_1, N_0, M_0
Stage II	T_2, N_0, M_0
Stage III	T_3, N_0, M_0; T_1, T_2, T_3; N_1, M_0
Stage IV	T_4, N_0 or N_1, M_0; any T, N_2 or N_3, M_0; any T, any N, M_1

Patient Evaluation

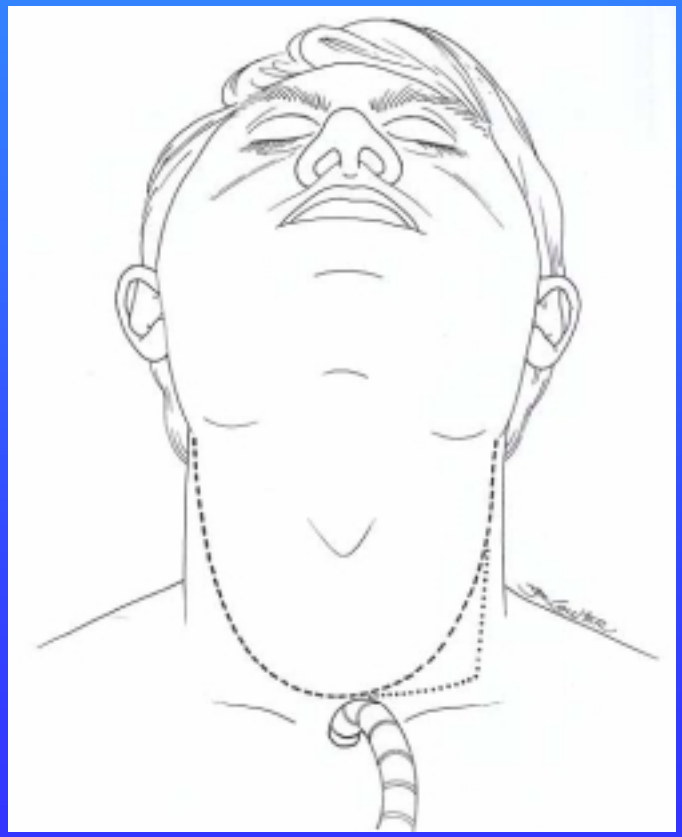
- History Taking
  - Symptoms
  - Medical History
  - Surgical History
  - Social History
- Preoperative Studies
  - Labs
  - CXR
  - CT Scan
- Physical Examination
  - Visualization
  - Palpation
  - Endoscopy
- Direct Laryngoscopy
  - Confirm preop exam
  - Establish clinical stage

Selection Criteria

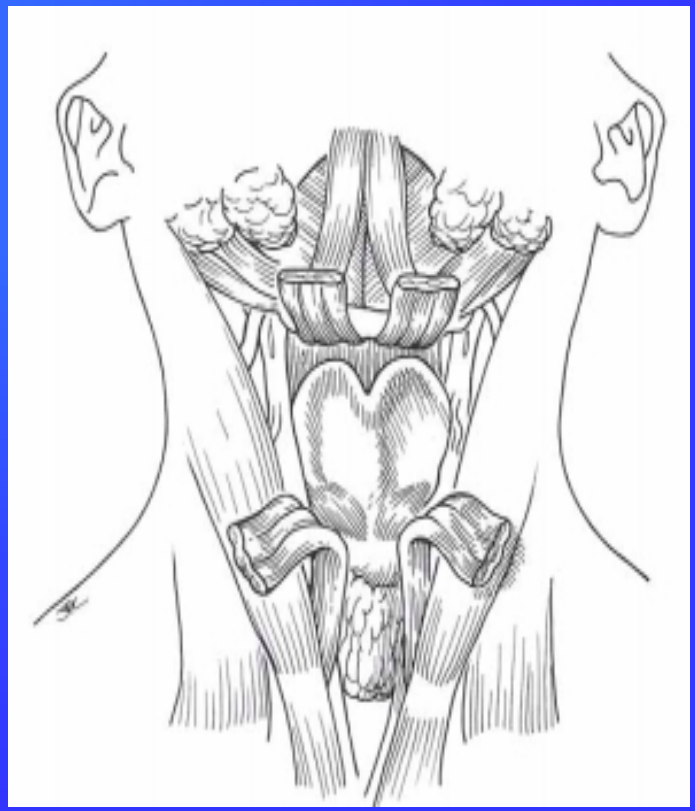
- Patient Factors
  - General performance status
  - Cardiopulmonary reserve
- Contraindications
  - Severe COPD, CAD
  - Stroke victims
  - Amputees
- Tumor Factors
  - Anatomic extent of tumor
- Contraindications
  - Thyroid cartilage
  - Anterior commissure
  - Vocal cord fixation
  - Bilateral arytenoid
  - Pyriform apex
  - Postcricoid mucosa

Technique

- Skin incision

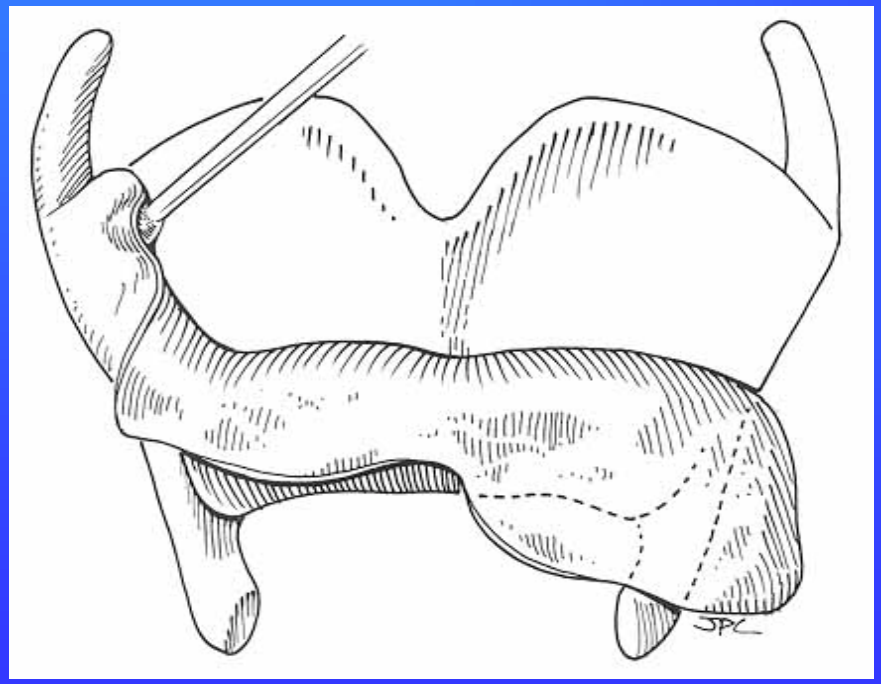


- Divide strap muscles



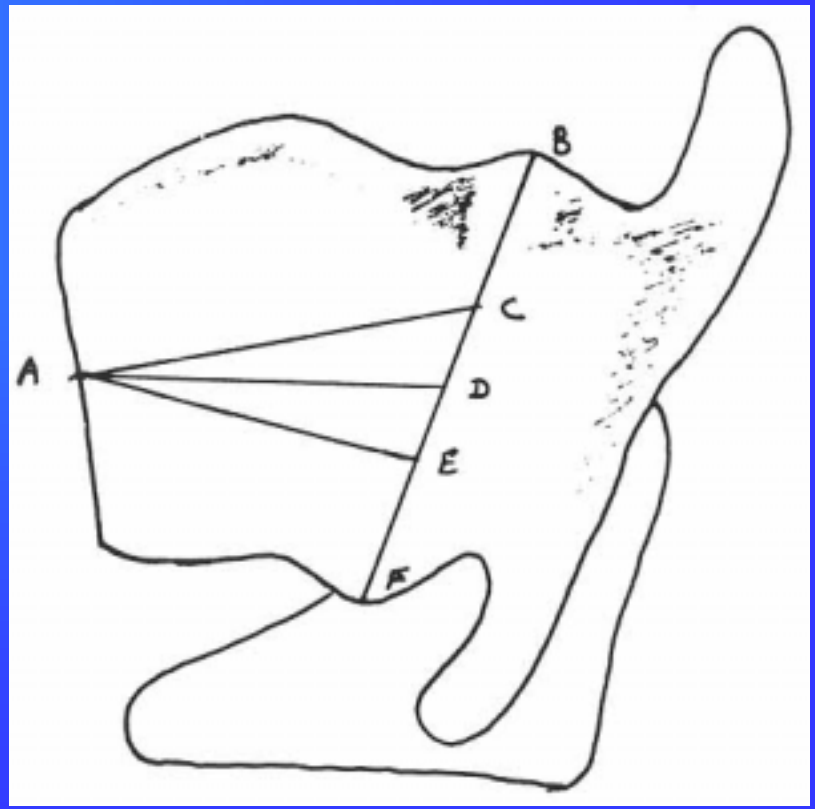
Technique

- Elevate outer thyroid perichondrium



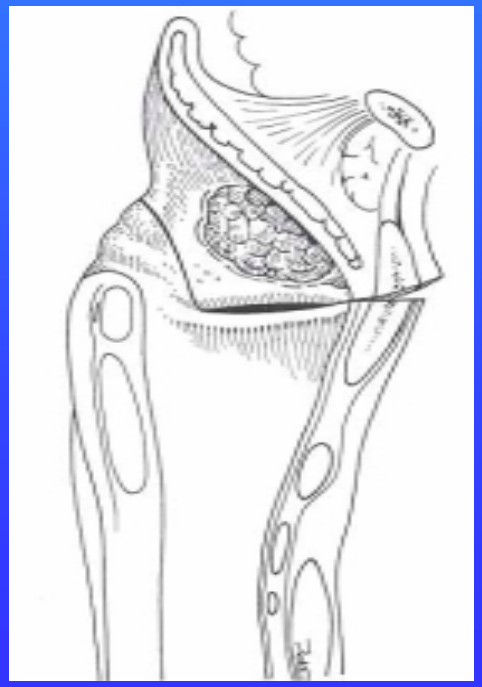
Technique

- Planning Cartilage Cuts
  - Location of anterior commissure
  - Position of the ventricle
  - Posterior extent of true vocal cords

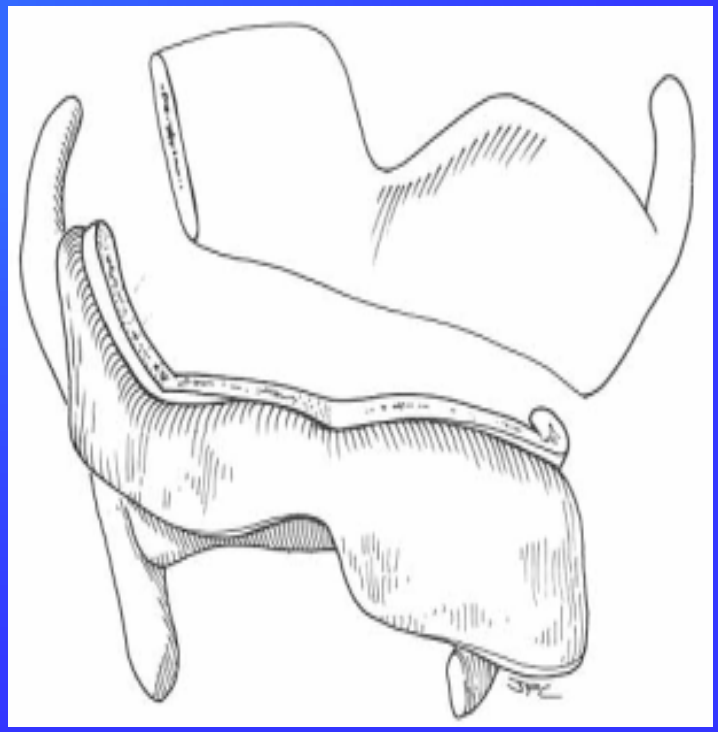


Technique

- Extend cuts through cartilage but leave inner perichondrium intact.

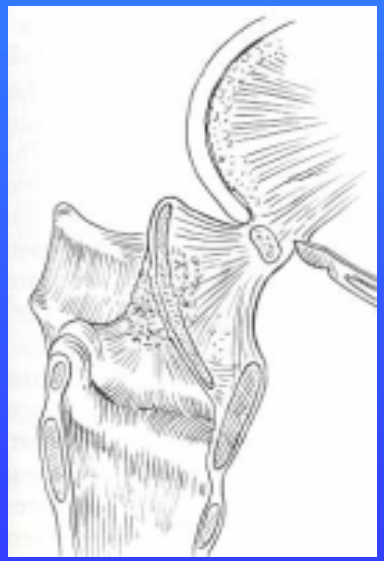


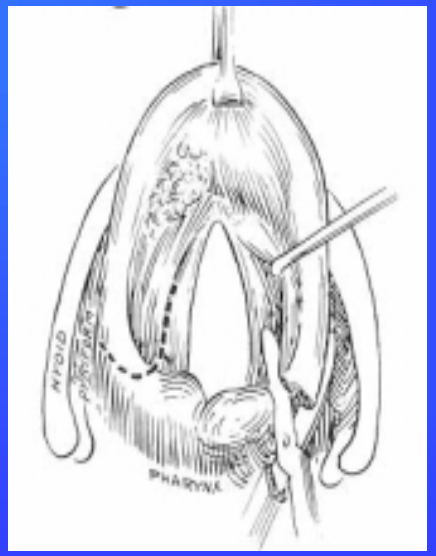
- Extend cuts posteriorly.

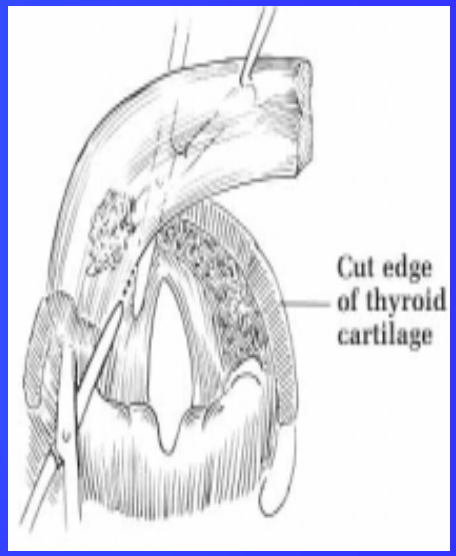


Technique

- Entry through the vallecula

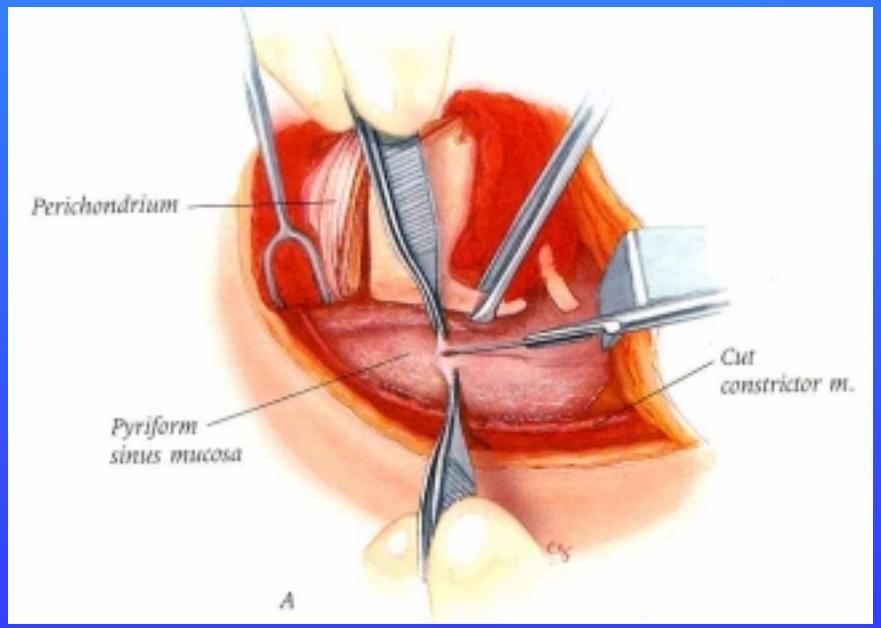


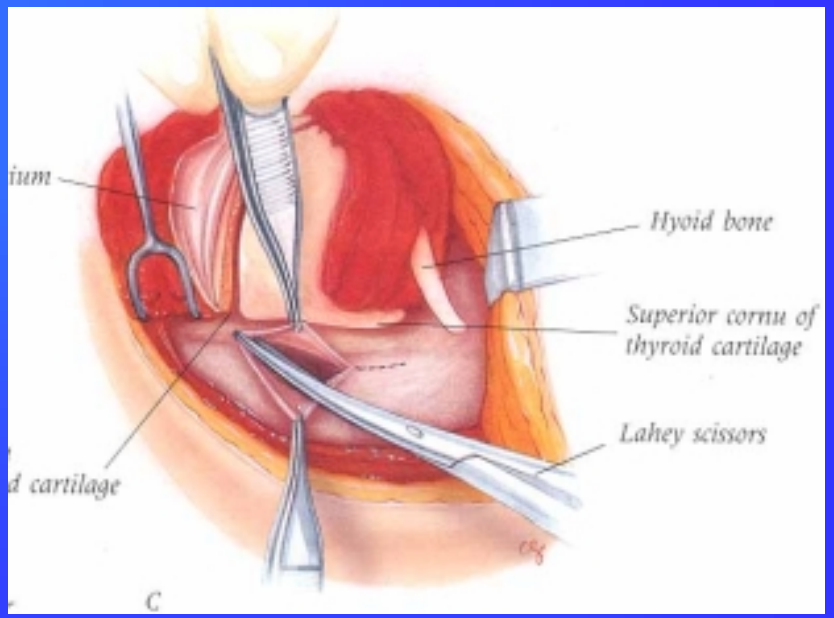




Technique

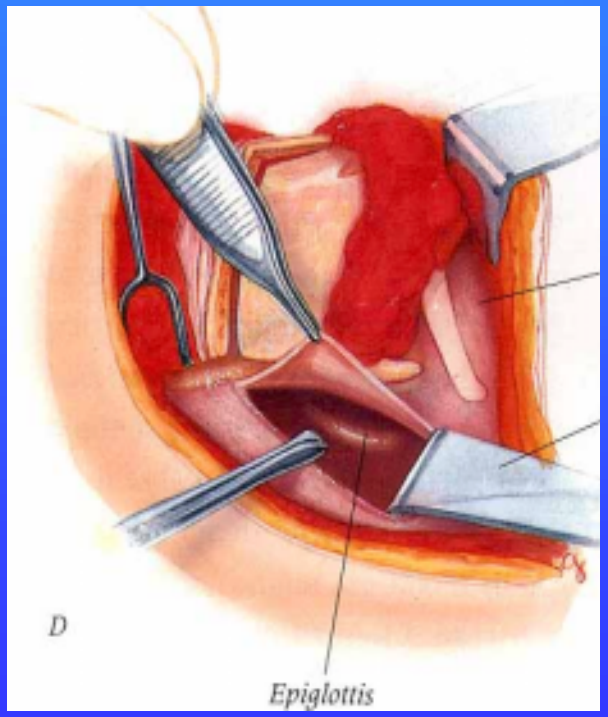
- Entry through pyriform sinus

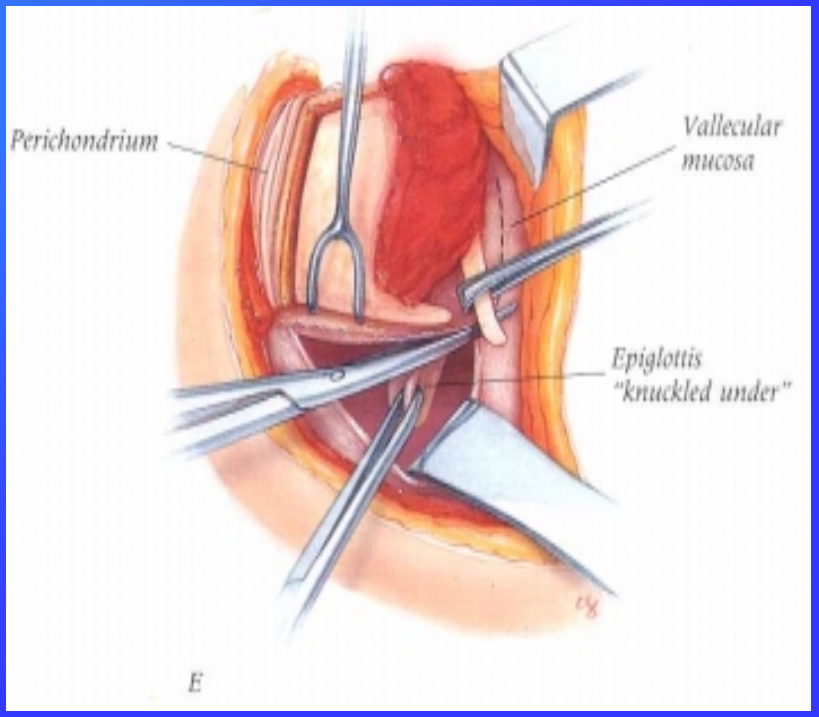




Technique

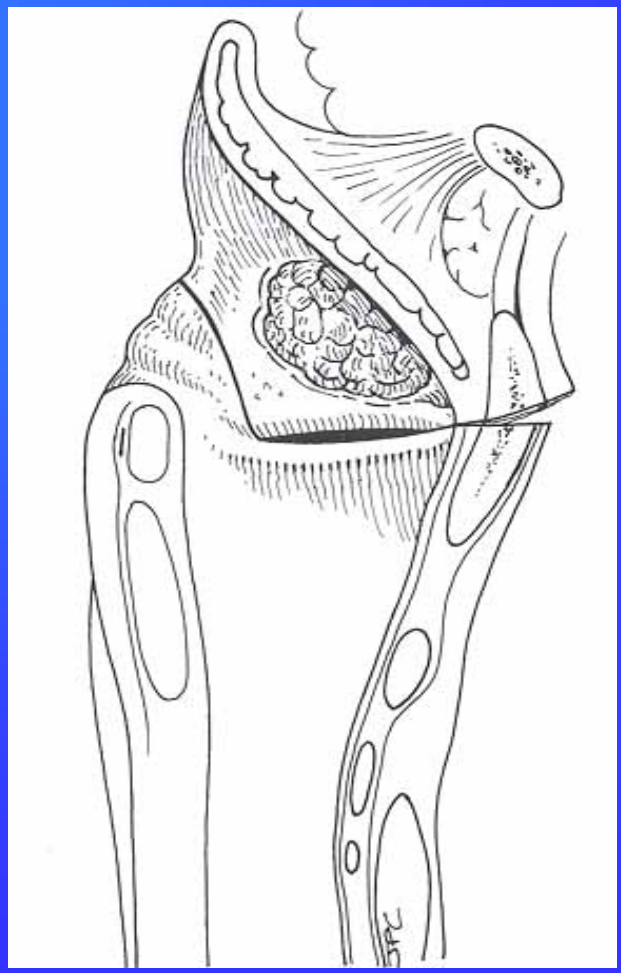
- Entry through pyriform sinus





Technique

- Mucosal cuts



Technique

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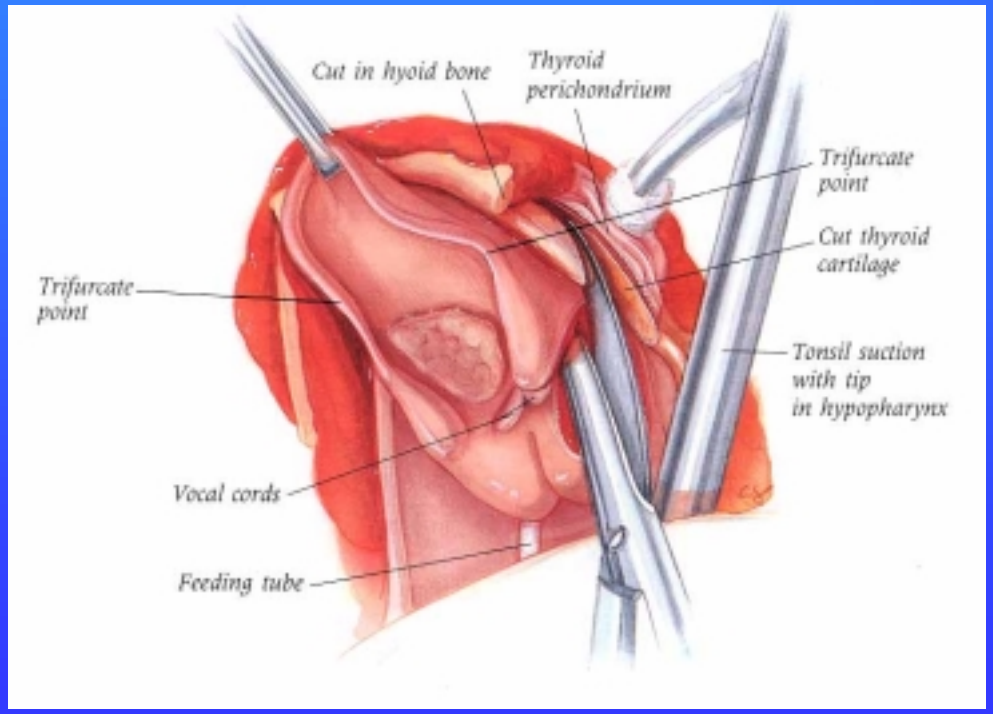

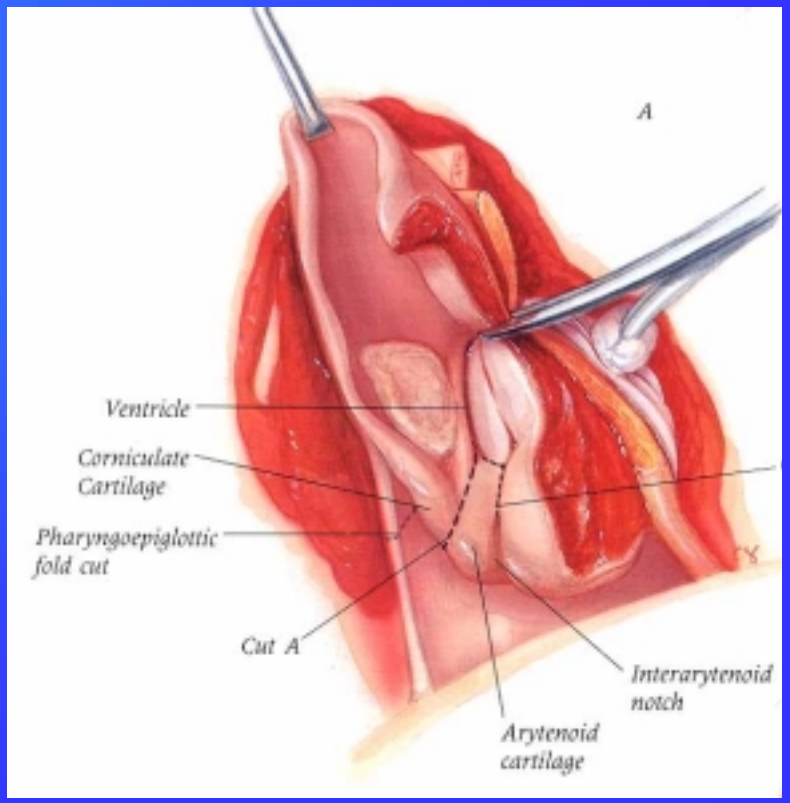

Technique

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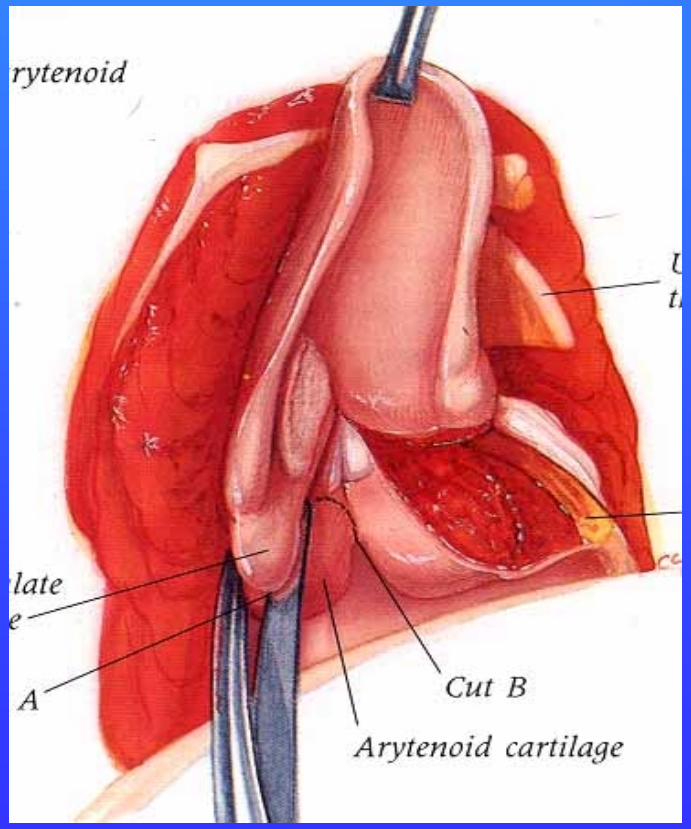
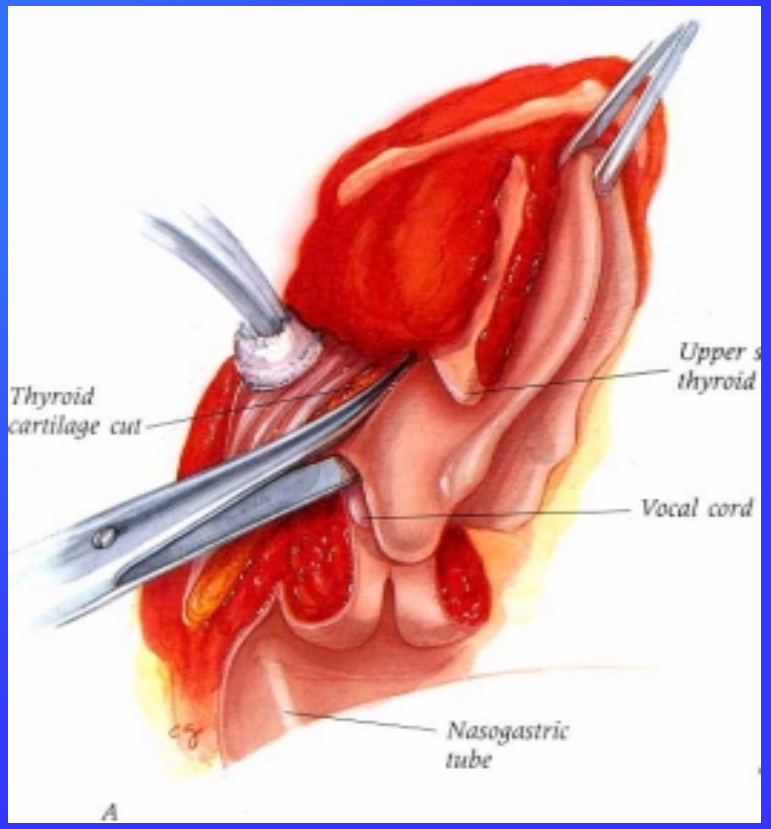
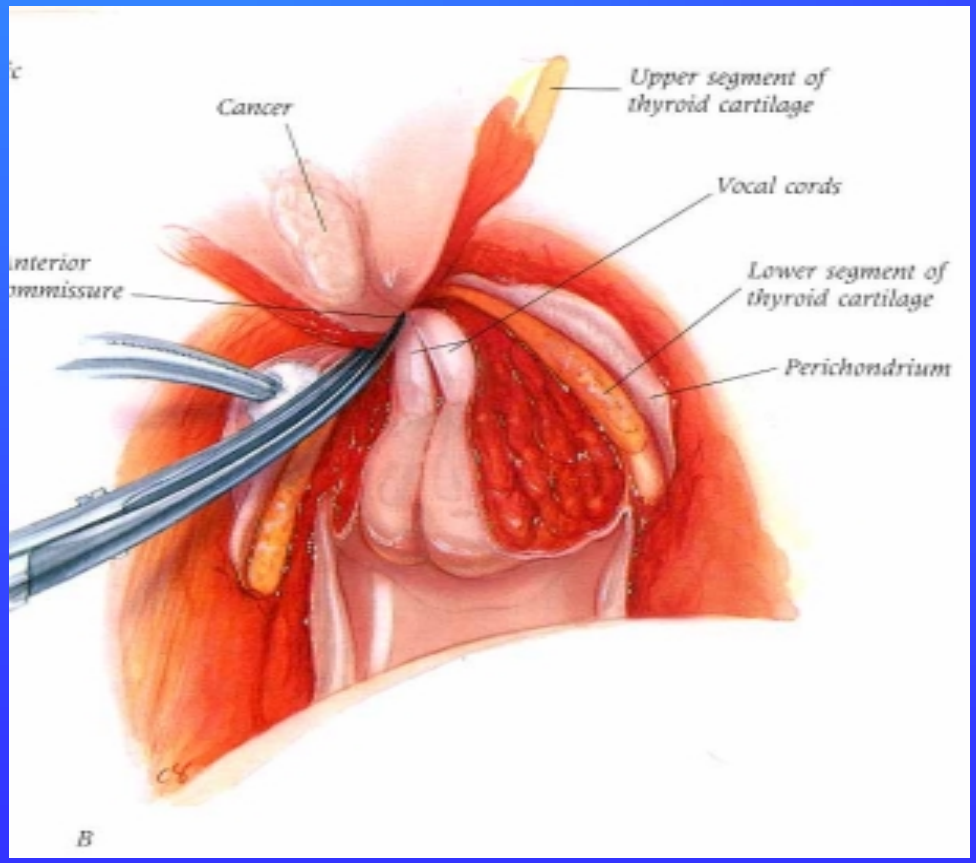




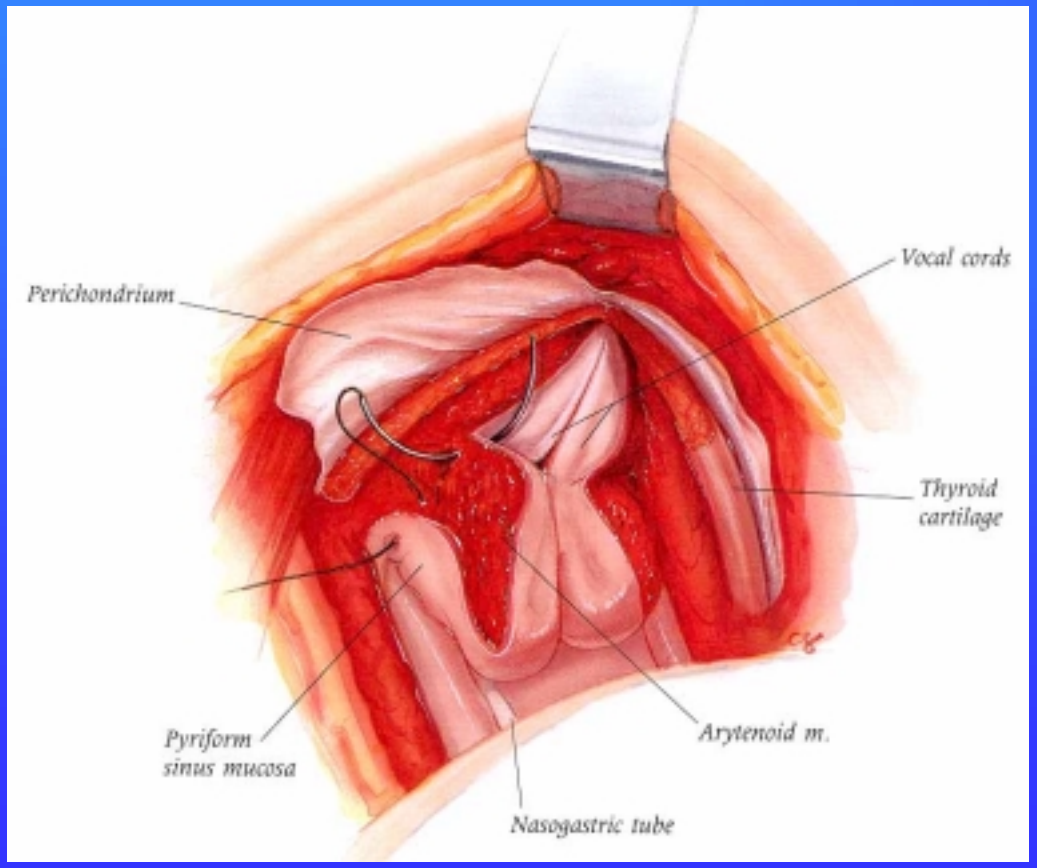
Technique

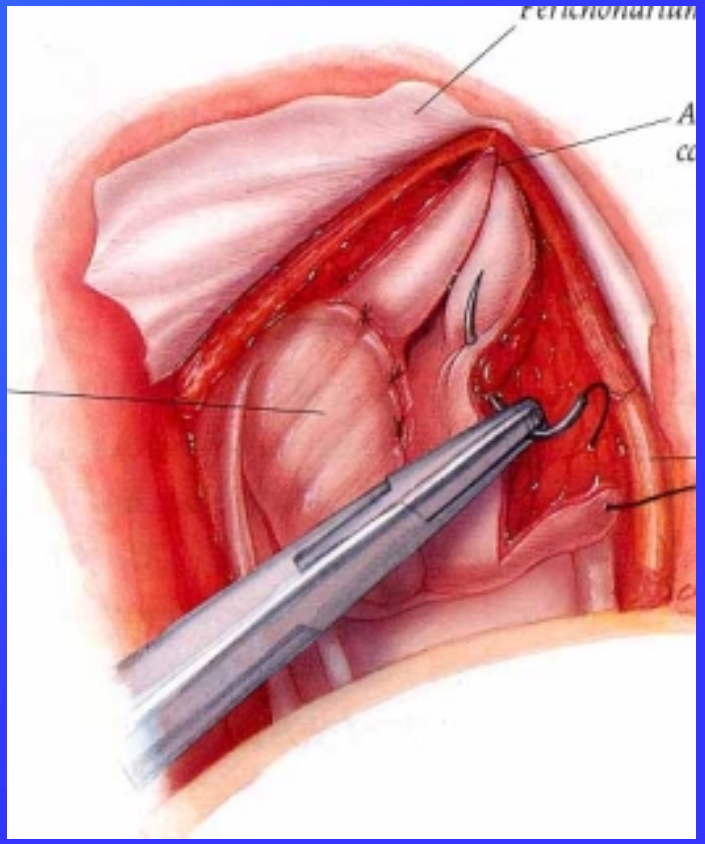
- Mucosal cuts



Technique

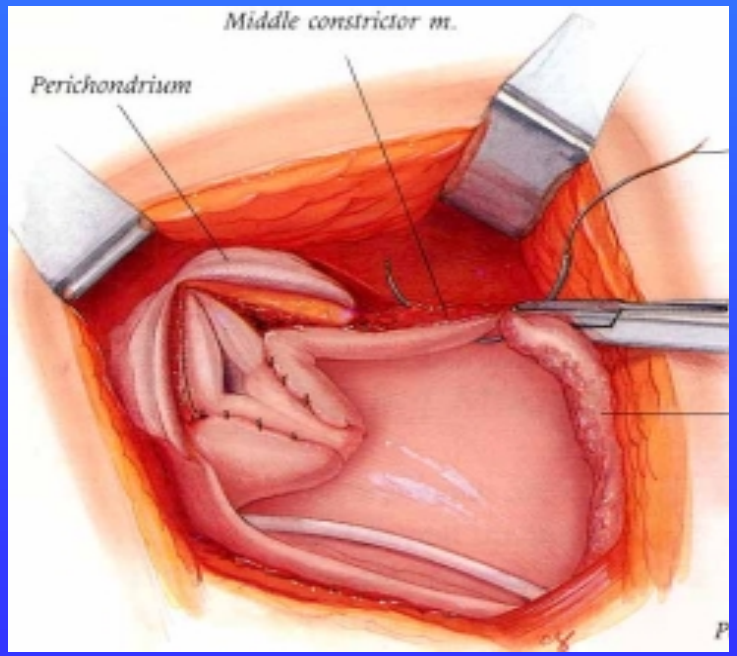
- Close mucosa over exposed cartilage

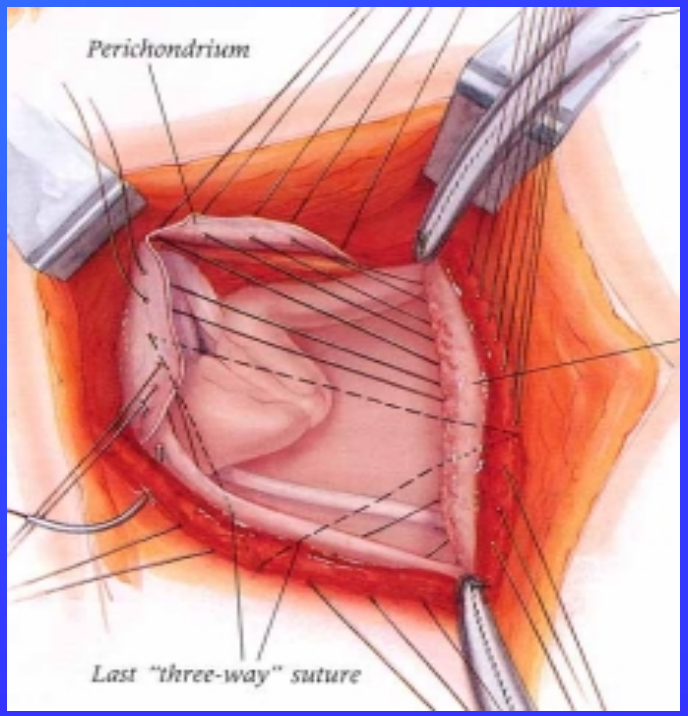




Technique

- Reapproximate outer thyroid perichondrium to tongue base





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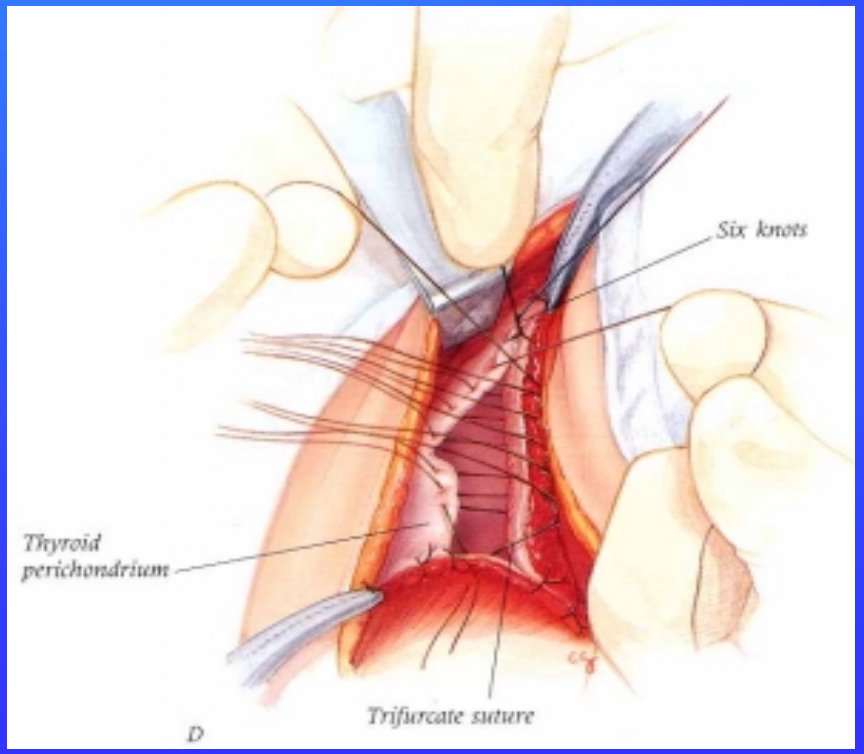
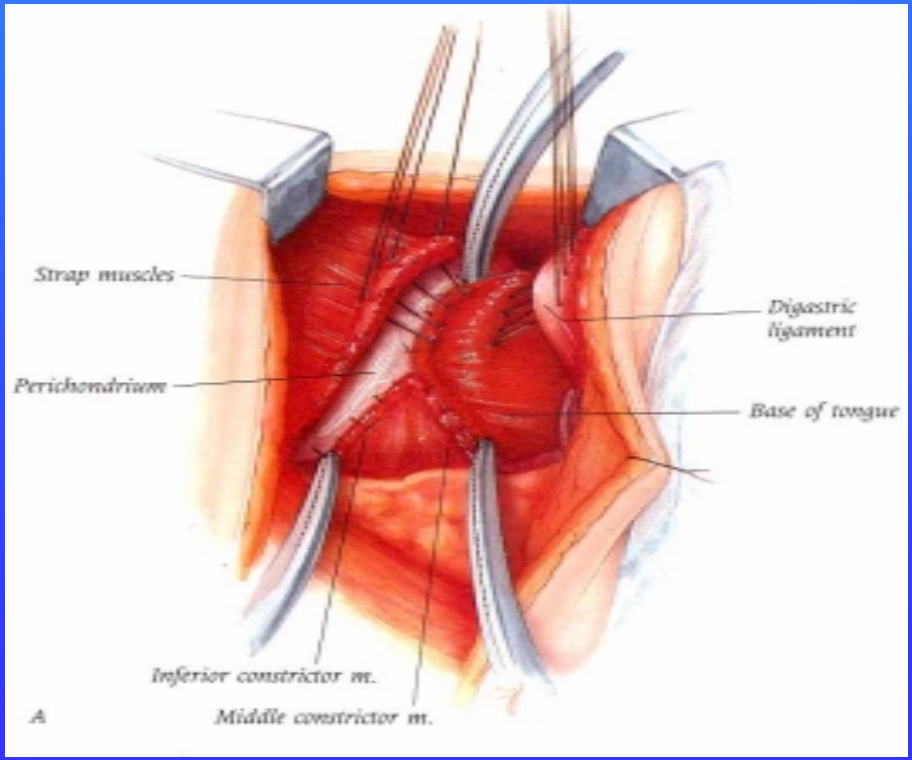
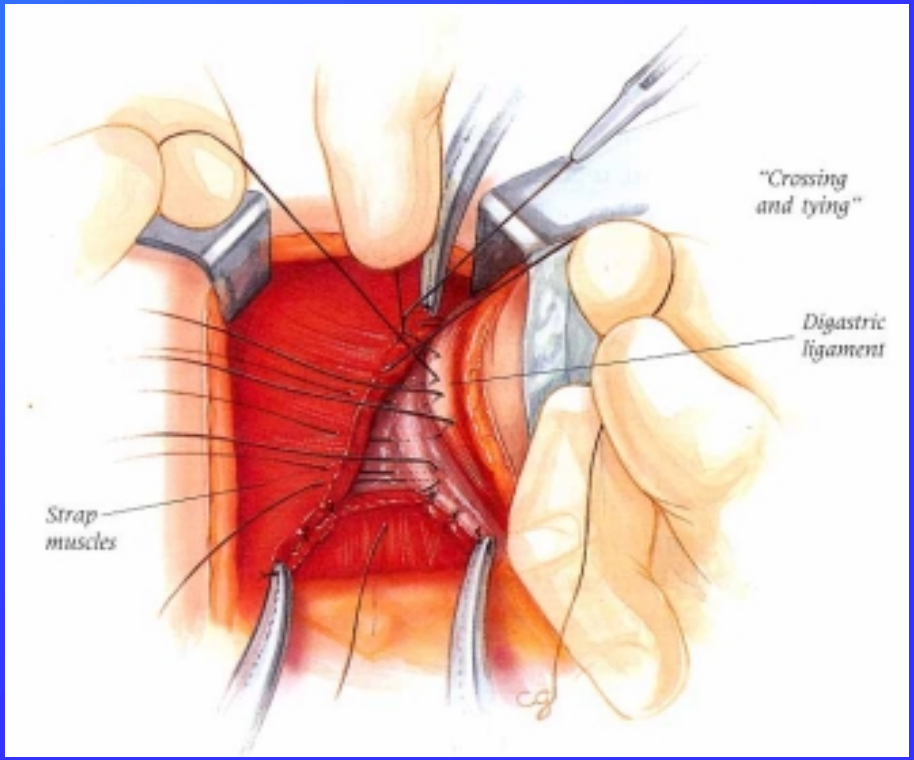


Technique

- Reinforce closure by reapproximating strap muscles





Extended Supraglottic Laryngectomy

- Include one arytenoid with reapproximation of free edge of true vocal cord to cricoid
- Include vallecula and base of tongue as far superiorly as the circumvallate papillae
- Include superior medial or anterior wall of pyriform sinus

Rehabilitation

- Voice
- Tracheostomy decannulation
- Swallow

Supraglottic Swallow

- 1. Deep inspiration
- 2. Valsalva (closes glottis)
- 3. Swallow
- 4. Cough (clears laryngeal inlet)
- 5. Swallow
- 6. Cough
- 7. Inspiration

Endoscopic Laser SGL

- Jackson, 1939
- Operating microscope, 1950’s
- Microsuspension laryngoscopy, 1960’s
- CO2 laser for endolaryngeal surgery, 1970’s
- Vaughn, 1978
- Davis, 1983

Endoscopic Laser SGL

- ADVANTAGES
  - No trach
  - Shorter OR time
  - Decreased P-C fistula
  - No neck incisions
  - Earlier swallow
- DISADVANTAGES
  - Specialized equipment
  - Surgeon inexperience
  - Prolonged healing time
  - Staged neck dissection

Endoscopic Laser SGL

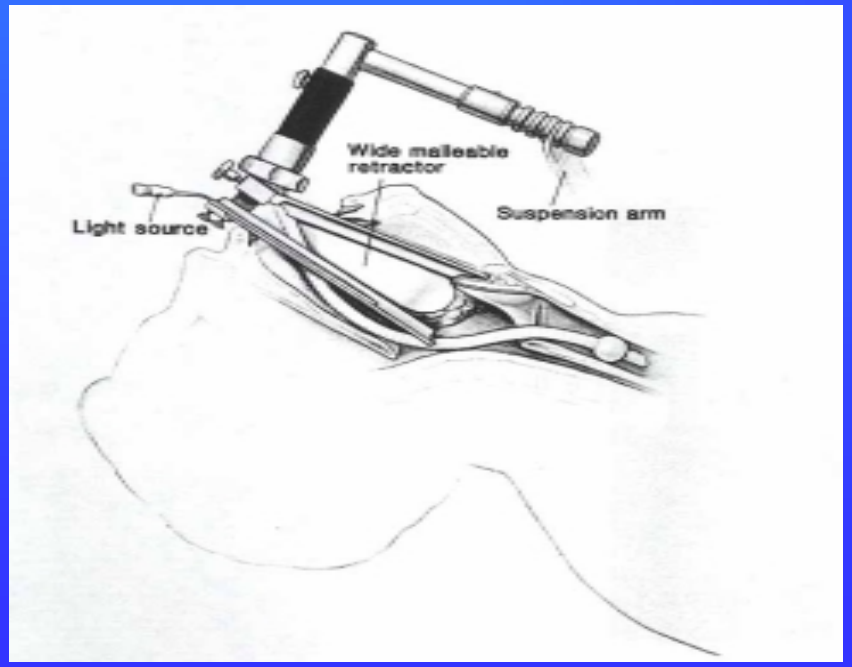
- Indications
  - T1/T2
  - Suprahyoid epiglottis, aryepiglottic fold, vestibular fold
  - Minimal preepiglottic space involvement
- Contraindications
  - T4
  - Paraglottic space involvement
- Relative Contraindications
  - T3
  - Infrahyoid epiglottis, upper false vocal cord
  - Extensive preepiglottic space involvement

Endoscopic Laser SGL

- Carbon Dioxide Laser
  - Superficial effect
  - Precise tissue cutting
  - Hemostatic
  - “No-touch” tissue destruction

Endoscopic Laser SGL

- EXPOSURE, EXPOSURE, EXPOSURE
  - Steiner, bivalved laryngopharyngoscope
  - Zeitels, adjustable supraglottiscope



Endoscopic Laser SGL

- Technique
  - Sagittal split of epiglottis, removal of suprahyoid and infrahyoid components
  - Identification and removal of preepiglottic fat
  - Identification of thyroid cartilage
  - Removal of aryepiglottic folds and false cords
  - Frozen sections
  - Re-resection as needed
  - Healing by secondary intention

Endoscopic Laser SGL

- Tumor control
  - Ambrosch, et al
    - T1: 100% (5-year)
    - T2: 89% (5-year)
  - Similar to open SGL
  - Slightly better than primary XRT
- Functional outcome
  - Ambrosch, et al
    - Average requirement for postop NGT: 6 days
    - Normal voice
  - Eckel
    - Average requirement for postop NGT: 10 days
    - No tracheostomy for 40/46 patients
    - Normal voice

Surgery vs. XRT

- Surgery
  - Advantages
    - Less long term tissue damage
    - Better f/u examination
    - Reserve XRT for recurrence
    - Pathologic staging
  - Disadvantages
    - Postop rehabilitation
    - Conversion to TL
- Radiation Therapy
  - Advantages
    - Avoid operative morbidity/mortality
    - Reserve surgery for salvage
  - Disadvantages
    - More long term tissue damage
    - More difficult f/u exam
    - Chondroradionecrosis
    - Cannot be used again for recurrence or second primary
    - Surgical salvage more difficult

Surgery vs. XRT

- Local control rates (2-year)

	Supraglottic Only (%)			
	T1	T2	T3	T4
Radiation alone	90	75	40	30
Surgery alone	95	90	85	80

Treatment Options

- Primary Surgery
- Primary XRT
- Combined Therapy
  - Preoperative XRT
  - Postoperative XRT
- Concomitant Chemotherapy and XRT

Management of the Neck

- Neck disease is associated with 50% decrease in overall survival.
- Supraglottic cancer is associated with early metastasis to the neck.
- More than 50% of patients will present with neck disease.
- More than 25% of patients will have occult neck disease.

Question #1

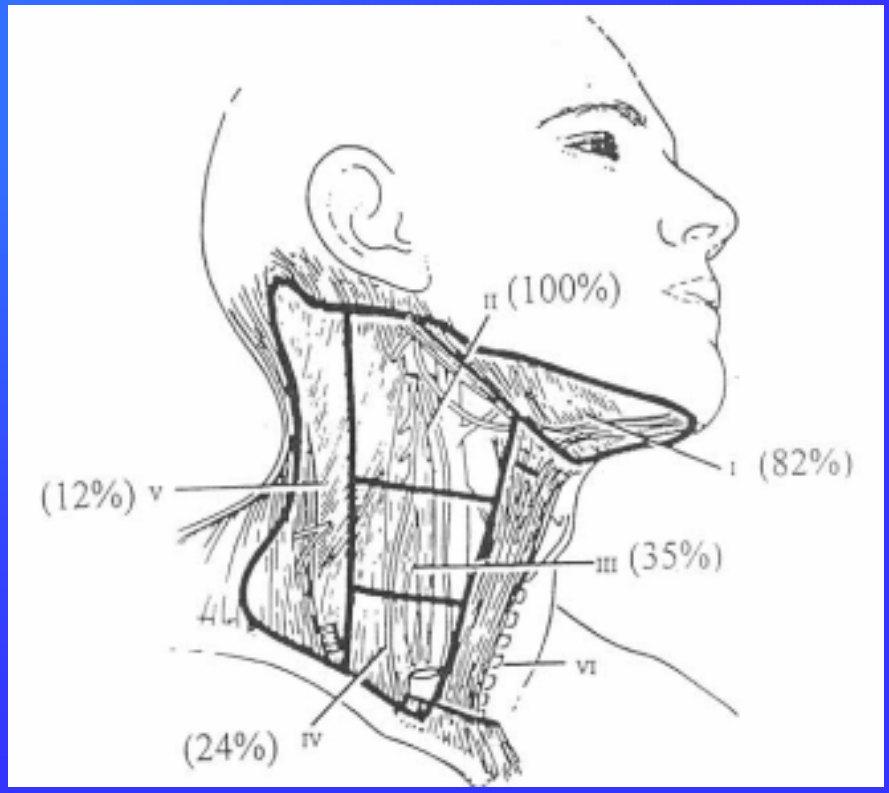
- Should the neck be treated with surgery or radiation therapy?
- Answer: single modality therapy is best.

Question #2

- Which side of the neck should be dissected?
- Answer: both.
  - Hicks et al found that of the 30% of patients with supraglottic SCCA and a clinically N0 neck, 44% had bilateral neck disease.
  - Lutz et al found that in patients with N0 or N+ necks, the most common site of locoregional failure was the unoperated neck regardless of the location of the primary tumor.

Question #3

- Which levels of the neck should be dissected?
- Answer: Levels I-IV
  - Pressman
  - Hicks et al



Conclusion

- *"I conclude by saying that many things have changed in the surgical management of supraglottic cancer, but changes concern the techniques and not the principles of cancer surgery, that is, the necessity of being radical in both the primary and the neck. Supraglottic laryngectomy combined with functional elective or curative neck dissection is fully in line with those principles and it represents a priceless contribution to saving lives while sparing mutilation…I am persuaded that the solution to the problem of supraglottic cancer in its entirety is still in the surgeon's hands, provided that we remember that we are waging a war against cancer in the larynx and in the lymph nodes of the neck, and not against the larynx and the neck."*

  » Ettore Bocca

  Ann Otol Rhinol Laryngol, 1991; 100: pp261-267.

Case Presentation

- 58 y/o male presents to ENT clinic with a 3 month h/o a change in quality of his voice and feeling of something stuck in his throat.
  - Any other questions about the history?

Case Presentation

- He denies any hoarseness, his voice is just “thicker”. On further questioning he admits to having a chronic sore throat and cough. He has had no stridor or respiratory difficulties. He also denies hemoptysis, dysphagia, odynophagia, weight loss and otalgia.
  - Other history?

Case Presentation

- Past Medical History: arthritis
- Past Surgical History: inguinal herniorraphy
- Medications: celebrex
- Allergies: NKDA
- Social History:
  - + 38 pack/year h/o cigarette use
  - Denies alcohol use
  - Employed as an auto mechanic
  - Hunts and fishes for fun

Case Presentation

- Physical Examination
  - Relatively healthy appearing man in no distress with a “hot potato” voice.
  - IDL: exophytic mass on laryngeal surface of epiglottis.
  - Fiberoptic Endoscopy: exophytic mass on laryngeal surface of epiglottis, normal vocal cord mobility, airway is adequate.
  - No palpable LAD in the neck.
  - Heart is RRR, Lungs are clear.

  - Anything else you want to evaluate?

Case Presentation

- Physical Examination
  - Walking up 2 flights of stairs he gets only slightly winded.

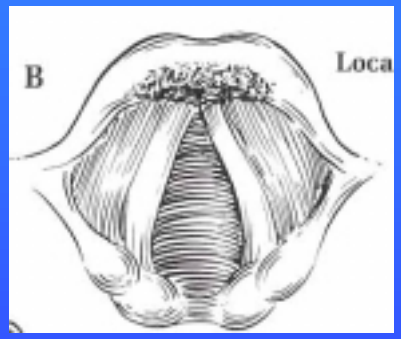
  - What preoperative studies do you want?
  - What else will you do for him at this visit?

Case Presentation

- Preoperative Studies
  - CBC, 10/60, LFTs, CXR, CT Neck
- Schedule for Panendoscopy and Biopsy

Case Presentation

- Panendoscopy reveals the following mass:



- What is the clinical stage of his disease?
- What treatment options are available to this patient?

Case Presentation

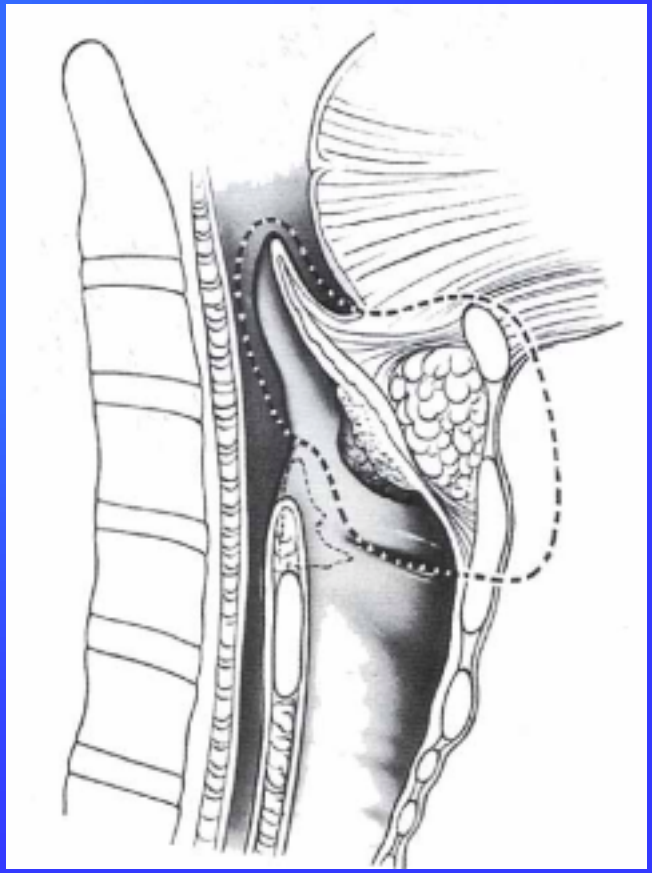
- T1
- Treatment Options
  - Primary XRT
  - Endoscopic Laser SGL
  - Open Horizontal SGL
- If he chooses surgery, would you proceed with endoscopic or open resection?

Case Presentation

- Although you could attempt endoscopic surgery, the location of the tumor on the infrahyoid epiglottis limits exposure and access to the mass therefore open SGL would be reasonable.

Case Presentation

- If we change the primary to look like this, what is his stage now?
- How would you manage this lesion surgically?
- How would you manage the necks?



Supraglottic Laryngectomy