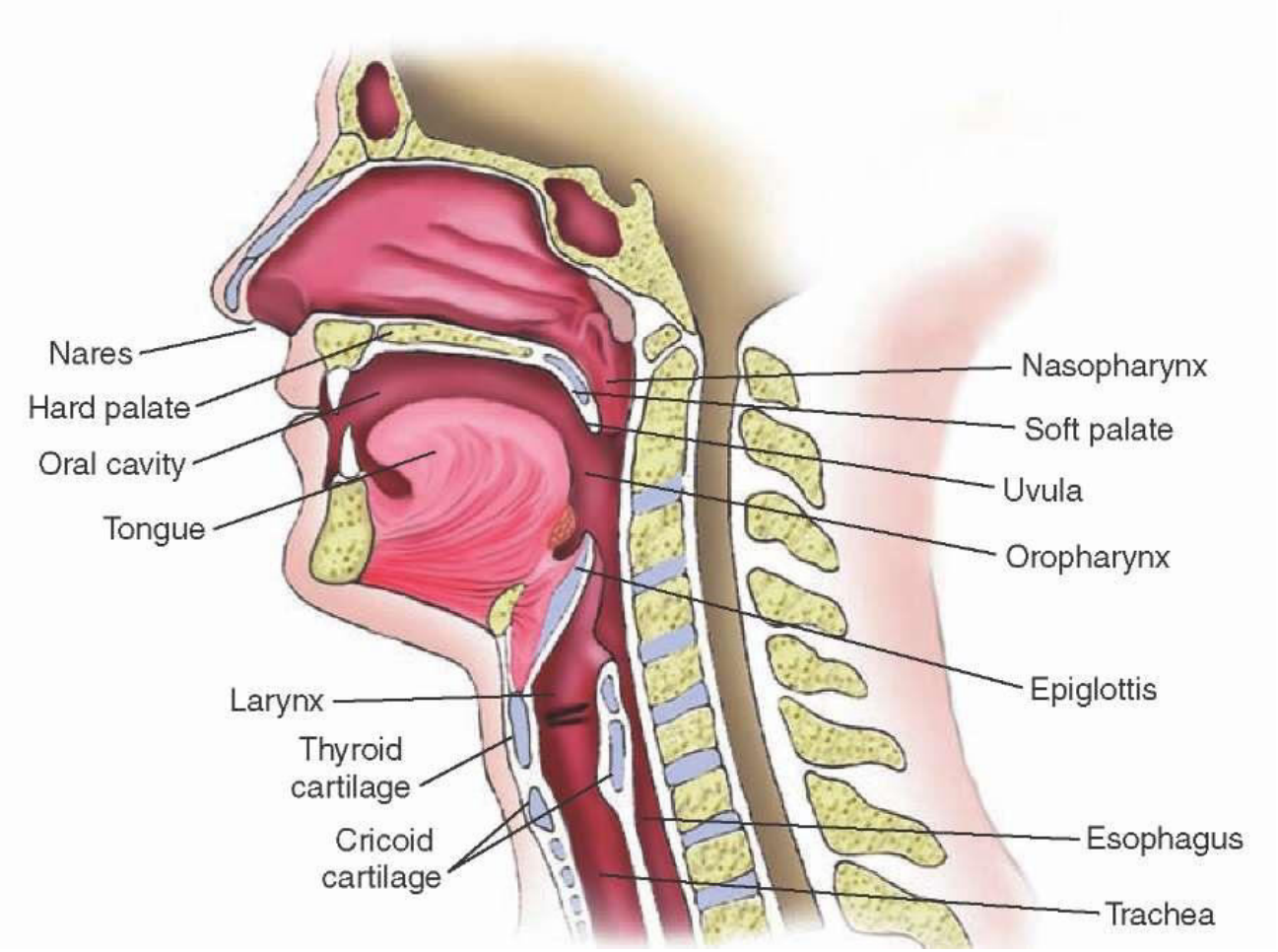
Airway Anatomy and Innervation

Clinical Case

- A 57 year old woman presents for left neck dissection 3 months after thyroidectomy and right neck dissection for papillary thyroid cancer. Her first surgery was complicated by injury to her right recurrent laryngeal nerve with associated hoarseness. She now has enlarged lymph nodes on the left necessitating surgery. What would you like to confirm before induction of anesthesia? What would happen if her left recurrent laryngeal nerve was injured during the case? What if there was injury to the superior laryngeal nerve?

Upper Airway Anatomy



http://what-when-how.com/wp-content/uploads/2012/04/tmp26117.jpg

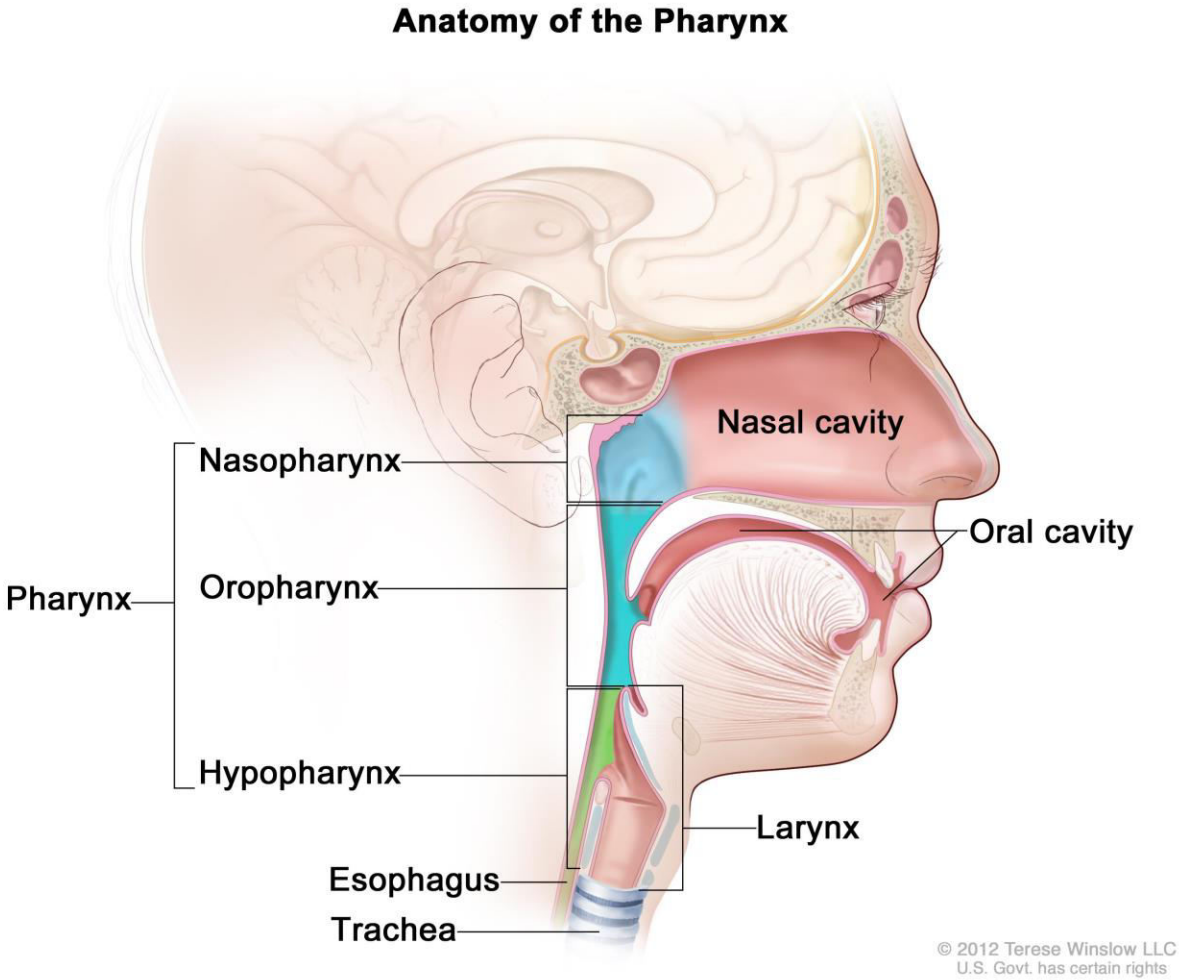
Upper Airway Anatomy

- Consists of pharynx and nasal cavities +/- larynx and trachea
- Pharynx: nasopharynx, oropharynx, laryngo(hypo)pharynx
- Nose – bone/cartilage. Divided by septum into two cavities with three turbinates on each side
- Maxillary branch of trigeminal nerve provides sensory innervation to nasopharynx

Upper Airway Anatomy

- Pharynx – U-shaped fibromuscular tube that extends from base of skull to cricoid cartilage
  - Bounded anteriorly and superiorly by nasal cavity followed more inferiorly by mouth and then larynx
- Nasopharynx –between nasal cavity and soft palate
- Oropharynx – lies between soft palate and hyoid bone. Can be site of airway obstruction when supine and unconscious
- Hypopharynx – lies beside and behind the larynx, entrance to esophagus
- Glossopharyngeal nerve – sensory innervation to posterior 1/3 tongue, pharynx, and areas above the epiglottis

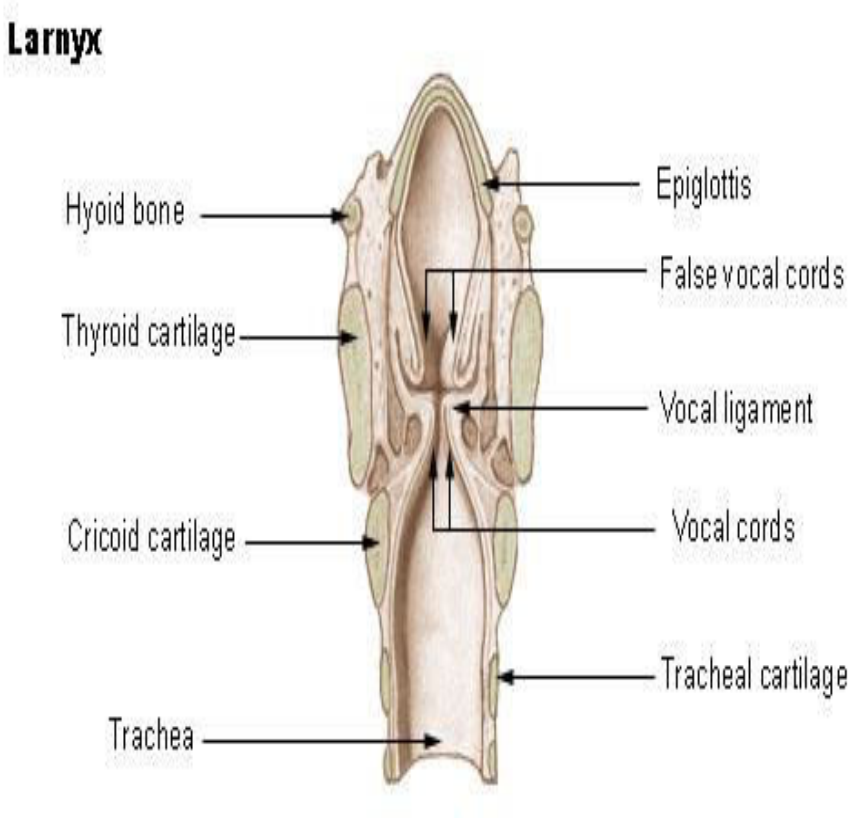
Upper Airway Anatomy



https://www.cancer.gov/images/cdr/live/CDR713970.jpg

Upper Airway Anatomy

- Epiglottis guards the opening to the glottis
  - Flap of elastic cartilage covered by mucosa that is attached superiorly and anteriorly to the larynx
- Beyond glottic inlet is the larynx
  - Bounded by aryepiglottic folds, tip of epiglottis and the posterior commissure of the lower border of the cricoid cartilage
- Trachea lies beyond cricoid – formed by u-shaped cartilaginous rings



https://upload.wikimedia.org/wikipedia/commons/3/3a/Illu_larynx.jpg

Upper Airway Anatomy

- Larynx has 9 cartilages – 3 unpaired and 3 paired
- Unpaired – Thyroid, Cricoid, Epiglottis
- Paired – Arytenoid, Corniculate, Cuneiform
- Intrinsic muscles control sound production
  - Includes cricothyroid muscle– lengthens and tenses vocal folds
  - Posterior cricoarytenoid – abducts vocal folds
- Extrinsic muscles support and position larynx within trachea

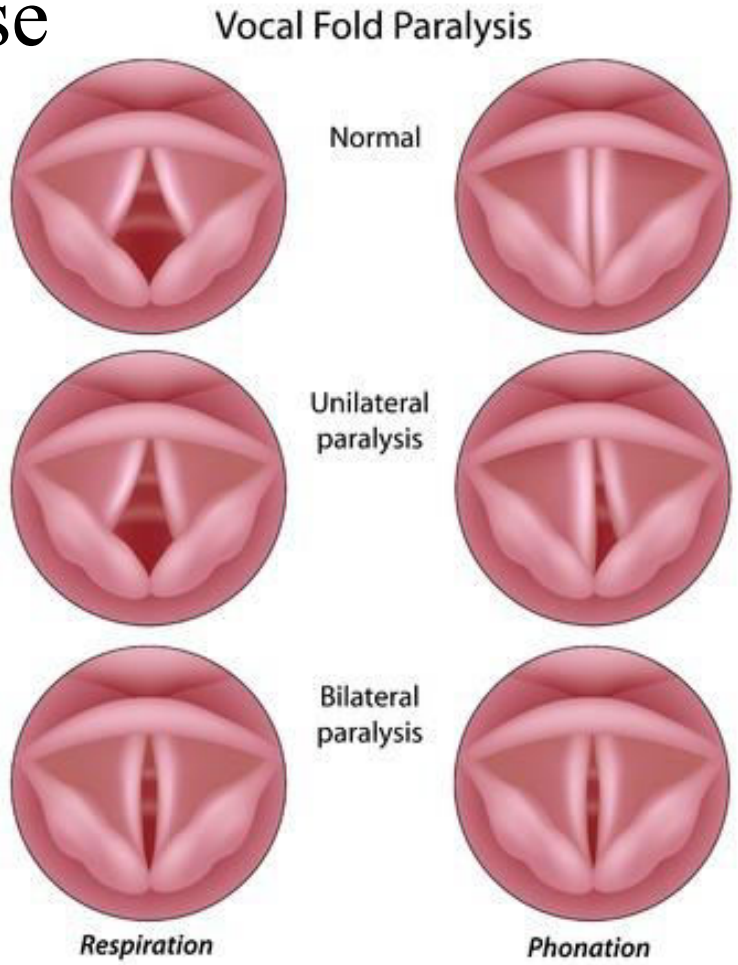
Laryngeal Innervation

Nerve	Sensory	Motor
Superior laryngeal, internal division	Epiglottis Base of tongue Supraglottic mucosa Thyroepiglottic joint Cricothyroid joint	None
Superior laryngeal, external division	Anterior subglottic mucosa	Cricothyroid m.
Recurrent laryngeal	Subglottic mucosa Muscle spindles	Thyroarytenoid m. Lateral cricoarytenoid m. Interarytenoid m. Posterior cricoarytenoid m.

Clinical Case

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  - What would happen if her left recurrent laryngeal nerve was injured during the case?
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Clinical Case



https://www.endocrineweb.com/sites/default/files/wysiwyg_imageupload/48/2015/02/13/largnx16334994_s_1.jpg

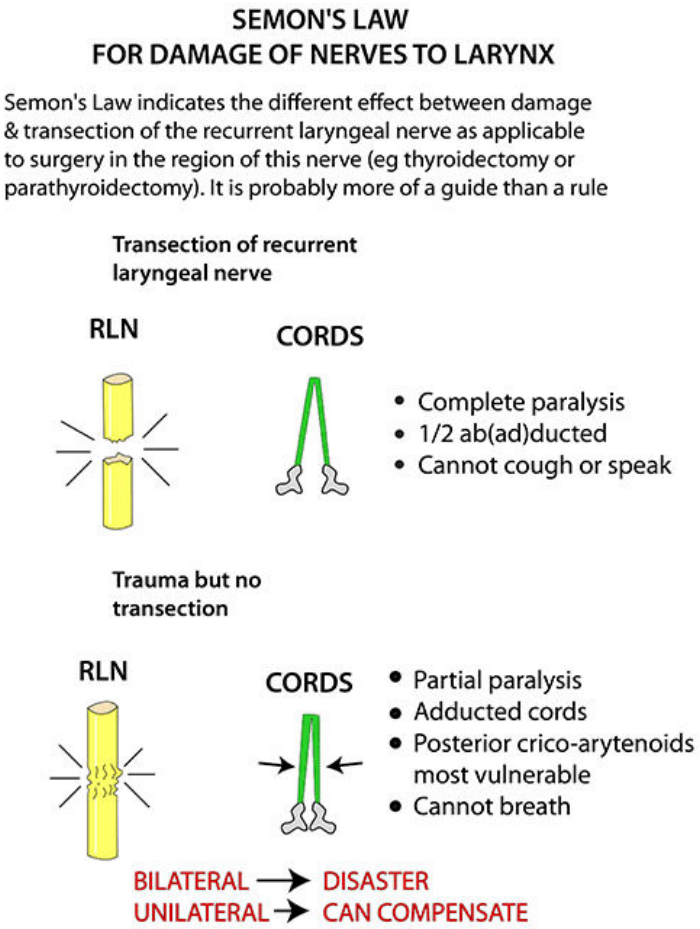
Board Question

- A patient already has right sided vocal cord paralysis due to partial recurrent laryngeal nerve injury after thyroidectomy. Which would be the most devastating nerve injury to occur during a left neck dissection?
  - A. Injury to the internal branch of the left superior laryngeal nerve
  - B. Injury to the external branch of the left superior laryngeal nerve
  - C. Partial section of the left recurrent laryngeal nerve
  - D. Complete section of the left recurrent laryngeal nerve

Board Question Answer

- A patient already has right sided vocal cord paralysis due to partial recurrent laryngeal nerve injury after thyroidectomy. Which would be the most devastating nerve injury to occur during a left neck dissection?
  - A. Injury to the internal branch of the left superior laryngeal nerve
  - B. Injury to the external branch of the left superior laryngeal nerve
  - **C. Partial section of the left recurrent laryngeal nerve (because there is a greater degree of paralysis of abductor muscles than adductor muscles, whereas with complete section the vocal fold assumes position between abduction and adduction)**
  - D. Complete section of the left recurrent laryngeal nerve

Board Question Answer



References

- https://www.openanesthesia.org/upper-airway-anatomy/
- https://www.openanesthesia.org/airway_innervation/
- https://www.openanesthesia.org/laryngeal_innervation/