

# Clinical Anatomy of the Thyroid Gland

25 October 2011

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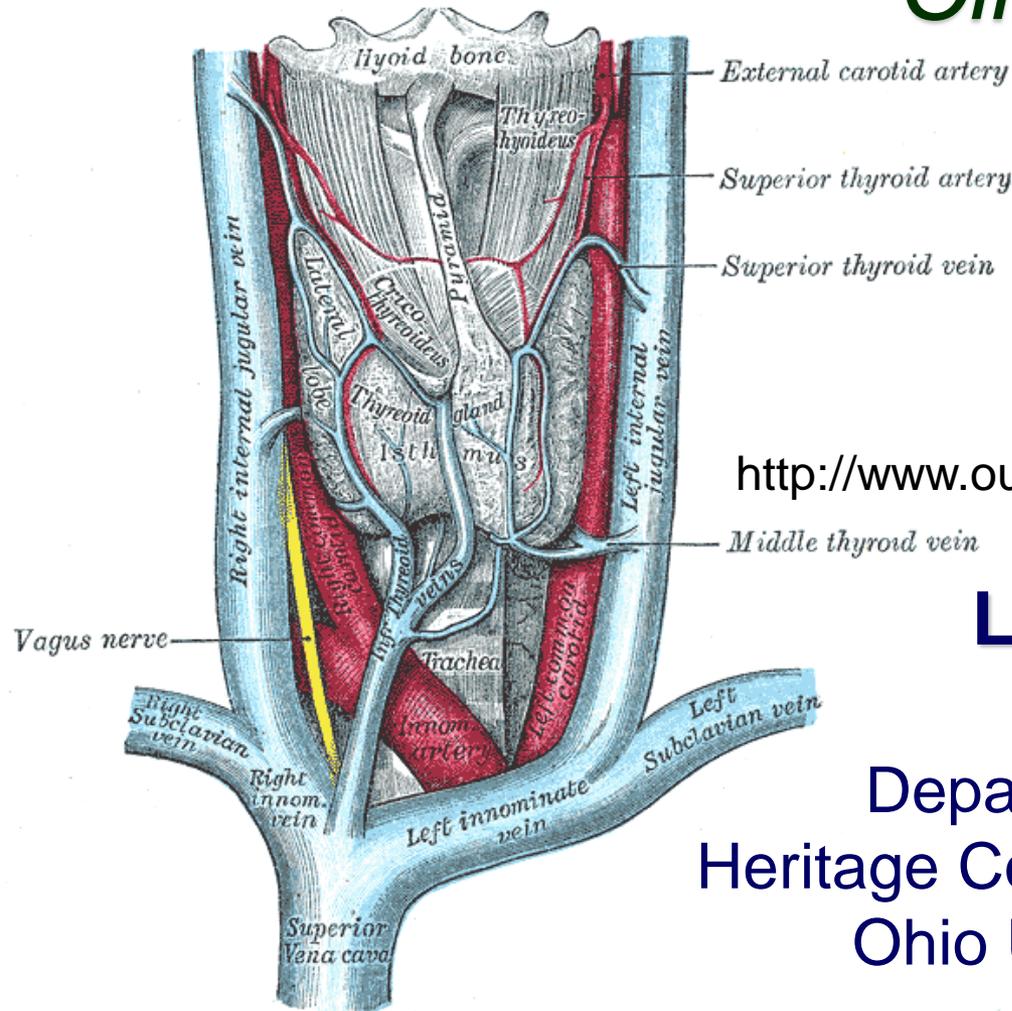
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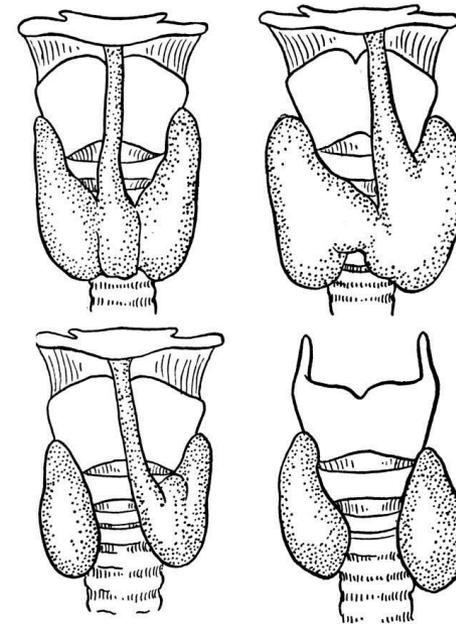
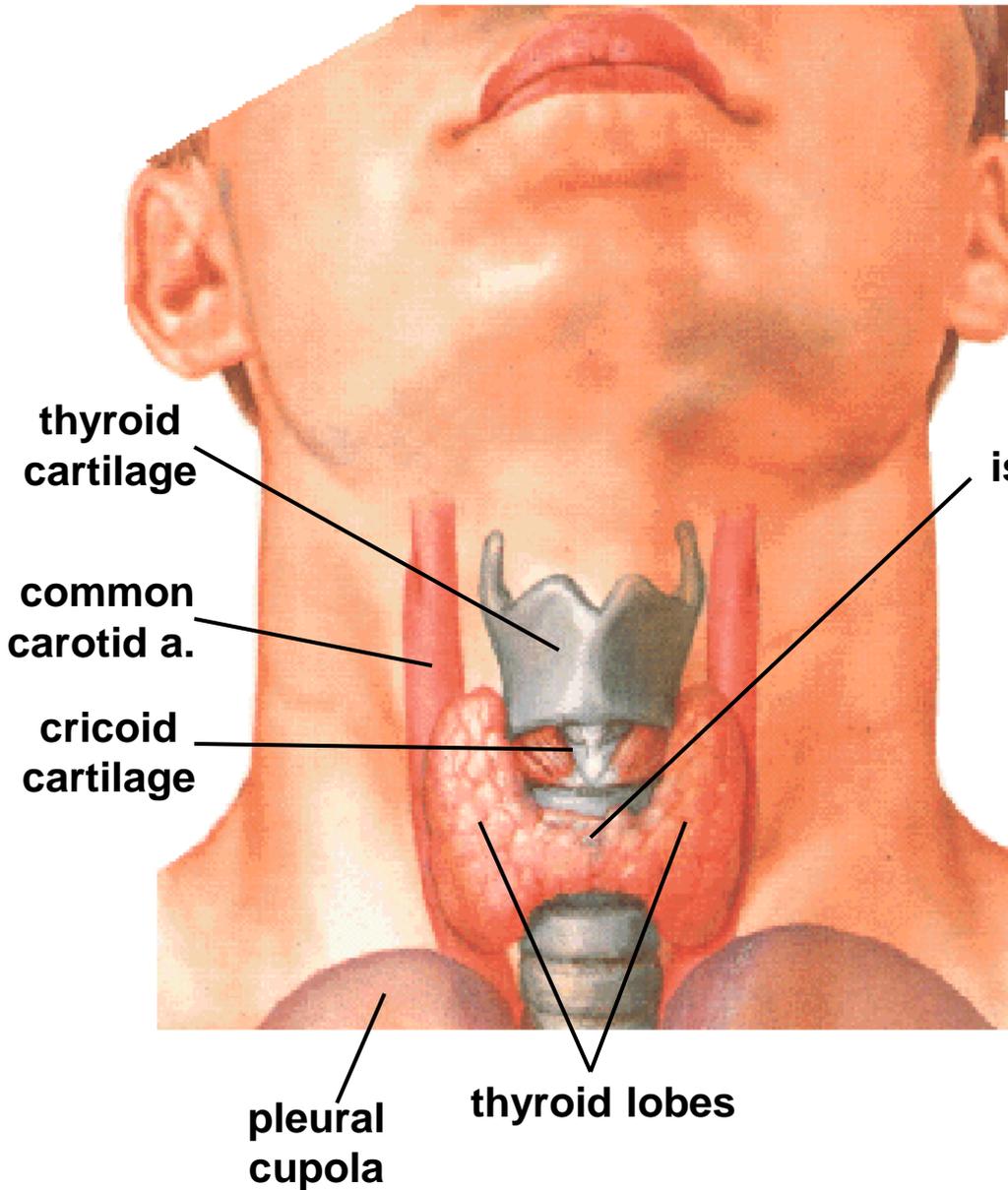
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CENTERS FOR OSTEOPATHIC RESEARCH AND EDUCATION

# Anatomical Overview

- Right & left lobes connected by an isthmus
- Occasional pyramidal lobe
- Levator glandulae thyroideae
- Slightly larger in women; may enlarge during menstruation & pregnancy
- Extends from oblique line on isthmus thyroid cartilage down to 4<sup>th</sup> or 5<sup>th</sup> tracheal ring
- Attaches to cricoid cartilage via suspensory ligament



# Case Presentation

A 32-year-old woman presents with a swelling on the anterior part of her neck. She also reports that her breathing is sometimes affected by the swelling. On examination, a single, firm, rounded mass can be felt on the left side of the laryngotracheal region. It moves up and down with swallowing. Ultrasound reveals a solid nodule in the left lobe of her thyroid gland. A needle biopsy subsequently indicates that malignant changes have taken place in the cells.

*Preliminary Diagnosis:*

**Tumor of the left lobe of the thyroid**

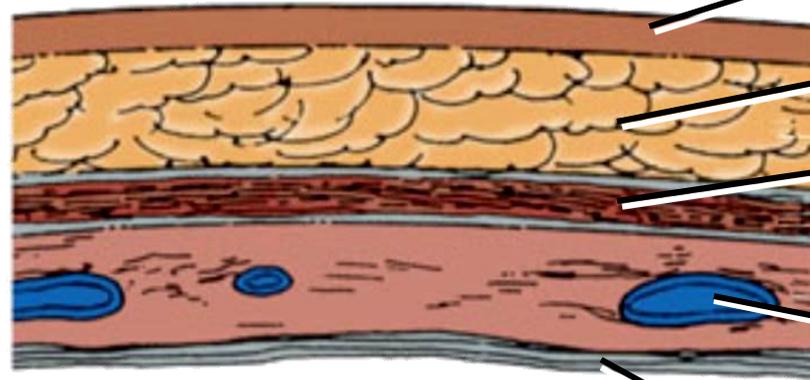
# Questions

- 1. Why does the mass move up and down on swallowing?**
2. What can explain the difficulty breathing?
3. What structures would be endangered by subtotal or total thyroidectomy?
4. Why is the nature of the patient's voice of interest postoperatively?

# Fascia & Spaces

## superficial fascia

Skandalakis' Surgical Anatomy 2004



skin

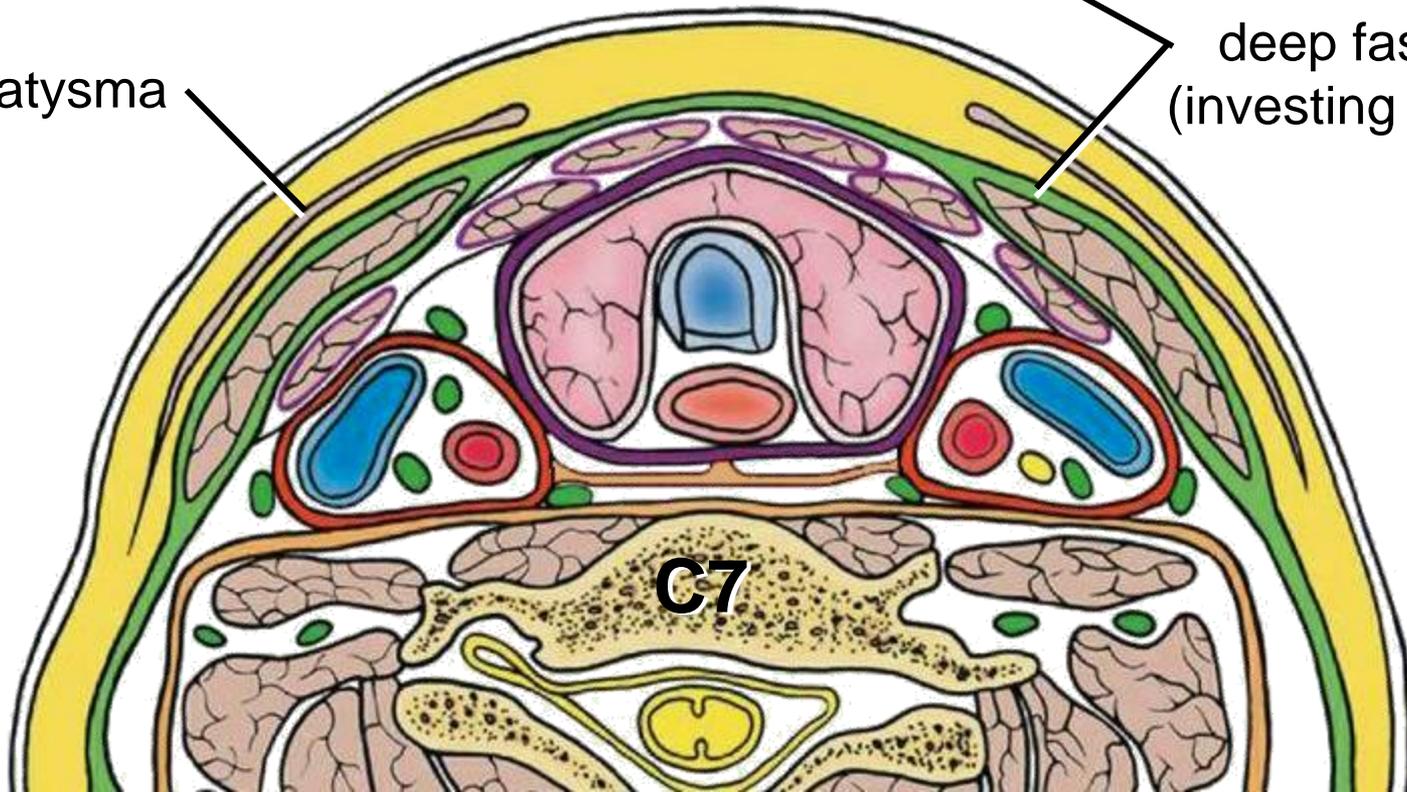
fat

platysma

veins (ant. & ext. jug.) and cutaneous nn.

platysma

deep fascia (investing layer)



C7

# Fascia & Spaces

## Deep Fascia

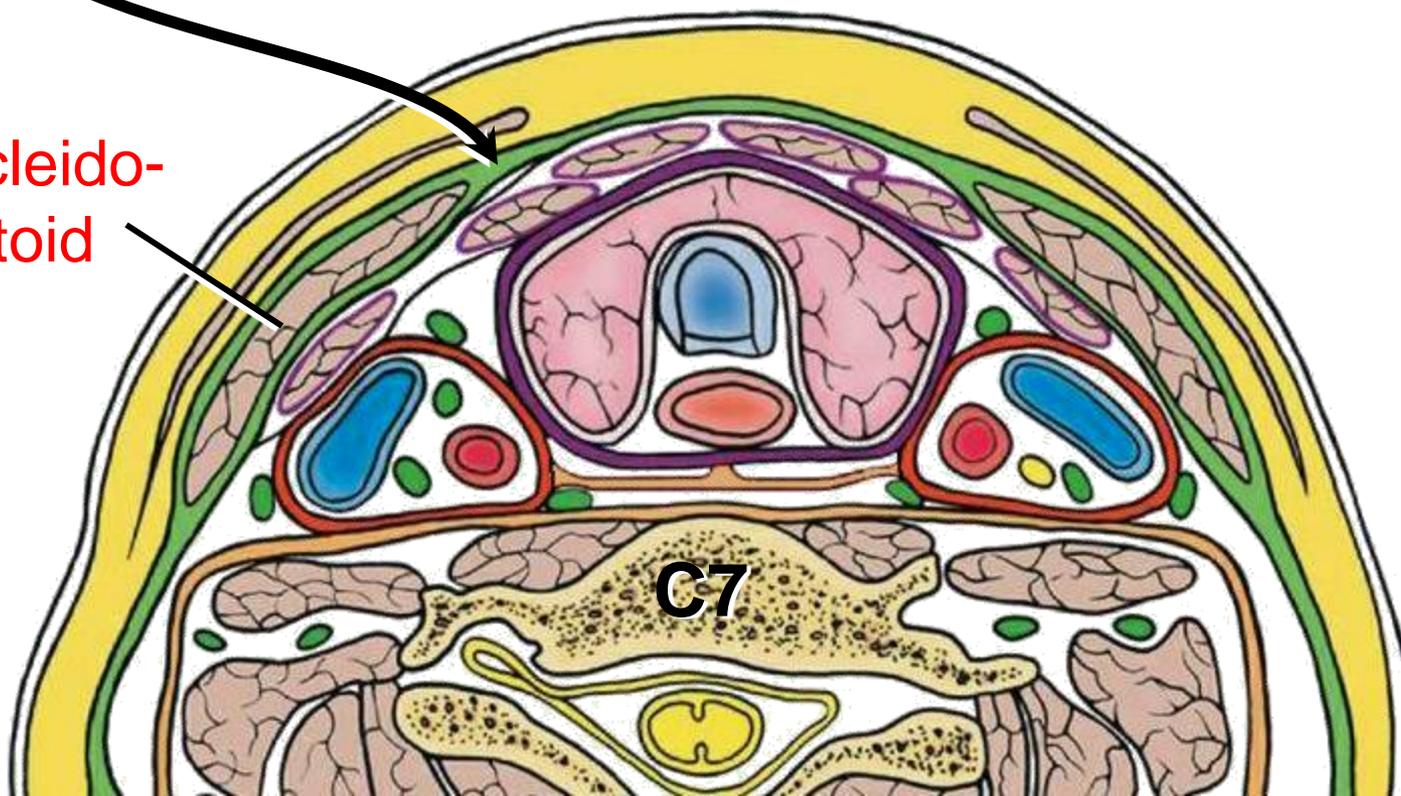
1. investing fascia

2. pretracheal fascia

3. prevertebral fascia

4. carotid sheath

sternocleido-  
mastoid

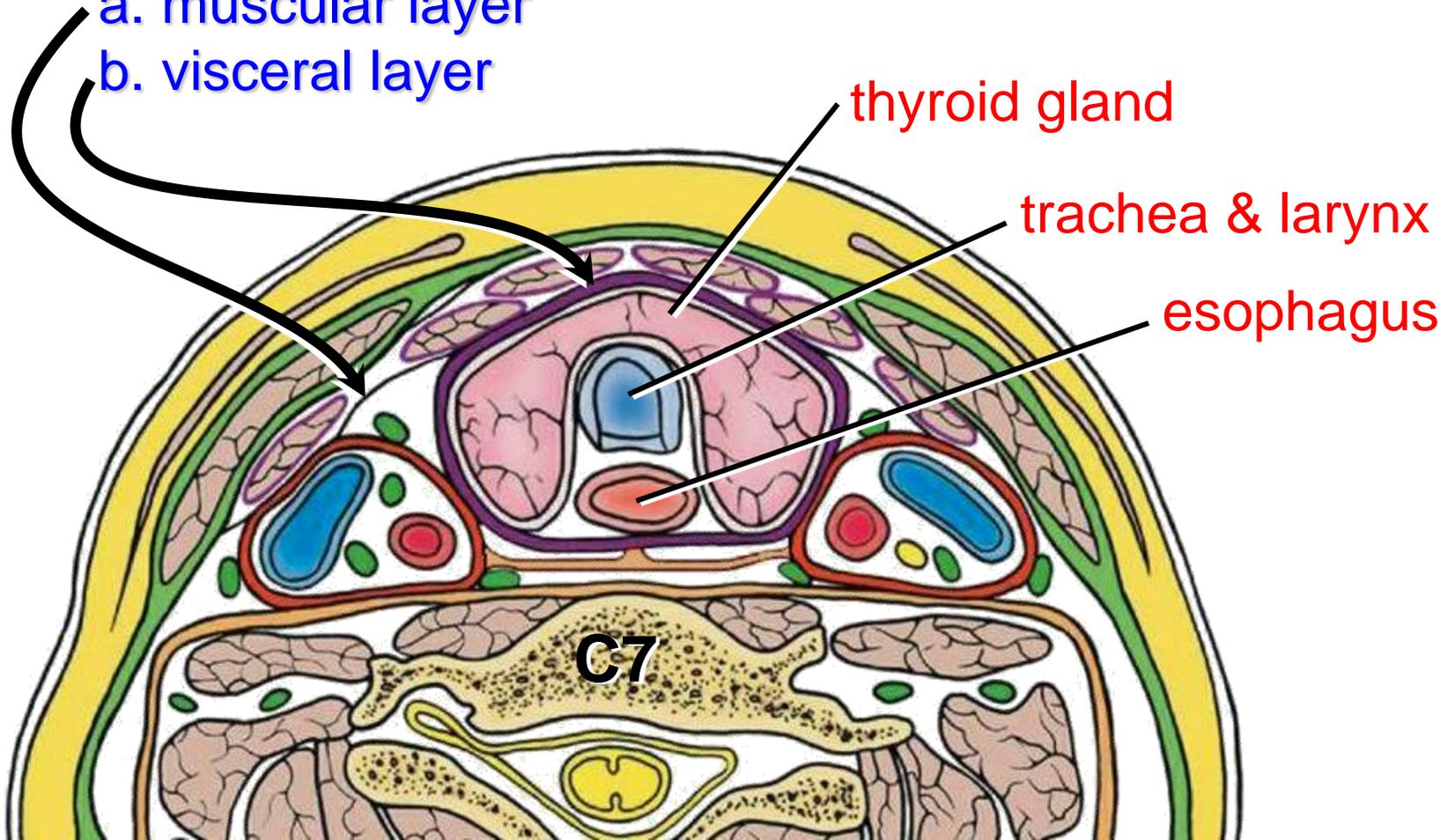


# Fascia & Spaces

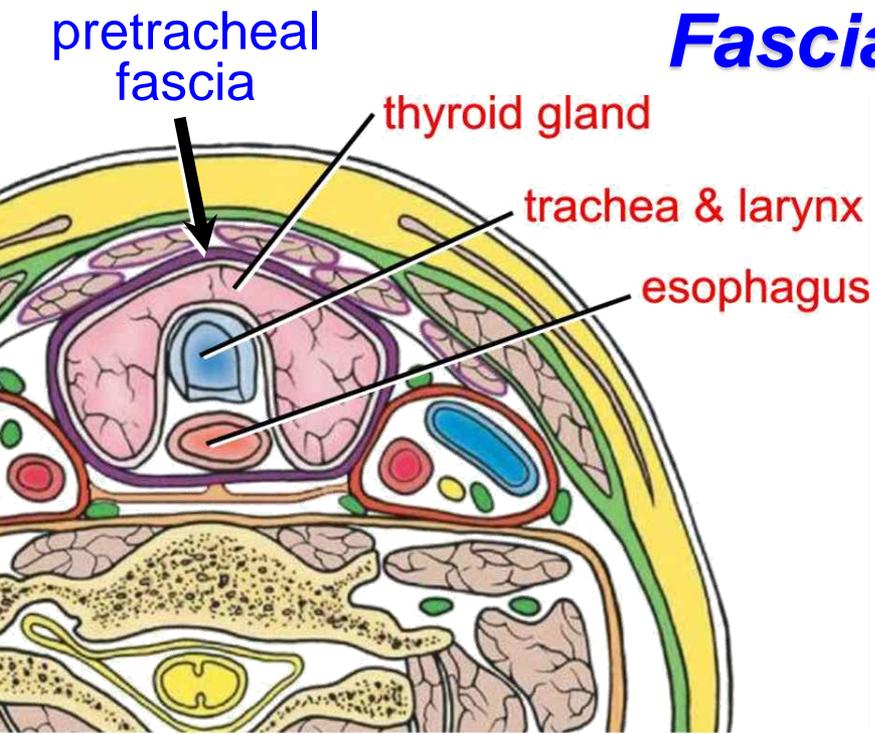
## Deep Fascia

1. investing fascia
2. pretracheal fascia
  - a. muscular layer
  - b. visceral layer

3. prevertebral fascia
4. carotid sheath



# Fascia & Spaces



Moore et al.  
2010

## **suspensory ligament of Berry**

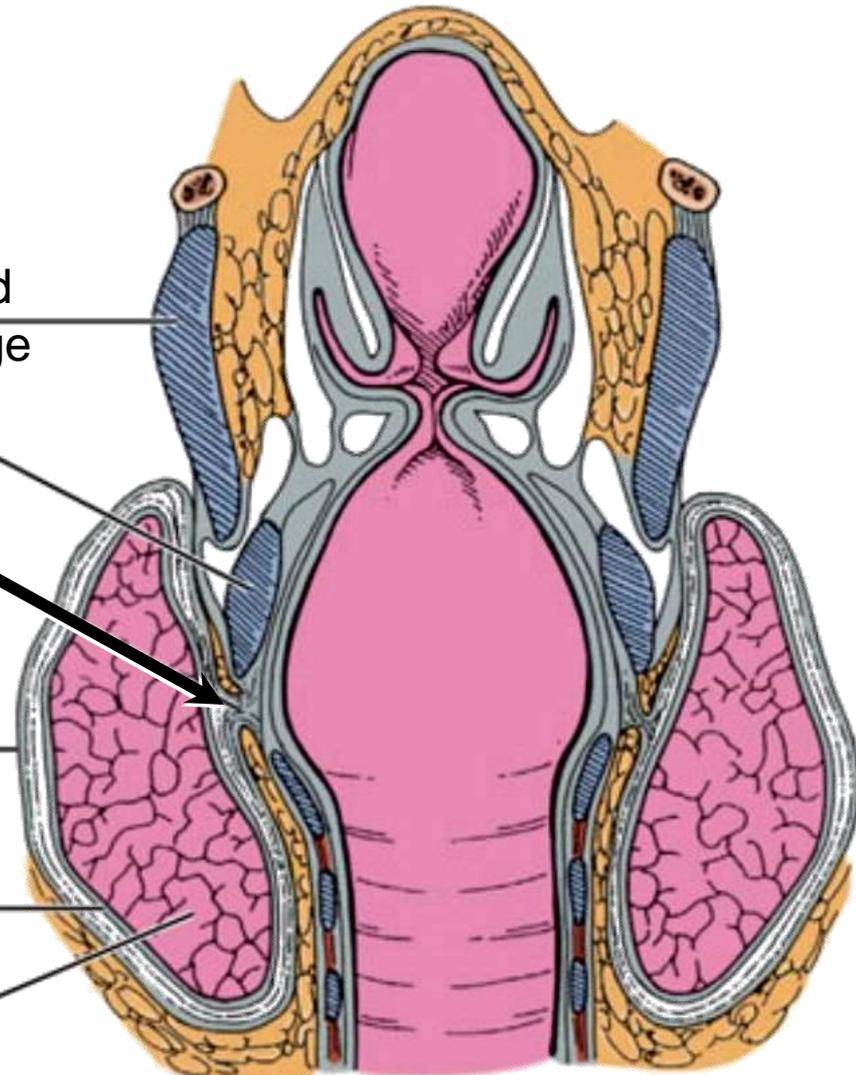
visceral layer of pretracheal  
fascia (false capsule)

true capsule

thyroid gland

thyroid  
cartilage

cricoid  
cartilage

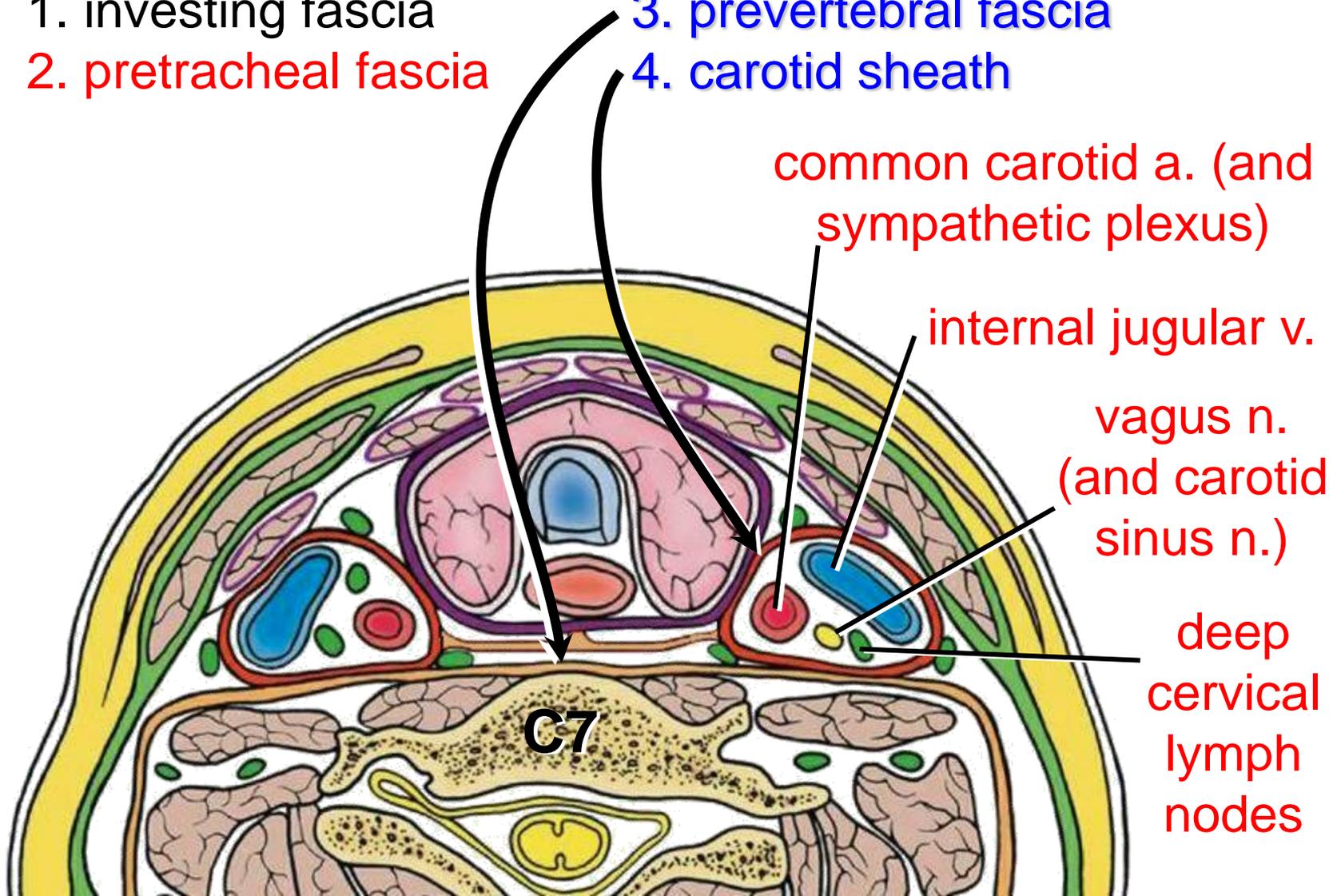


# Fascia & Spaces

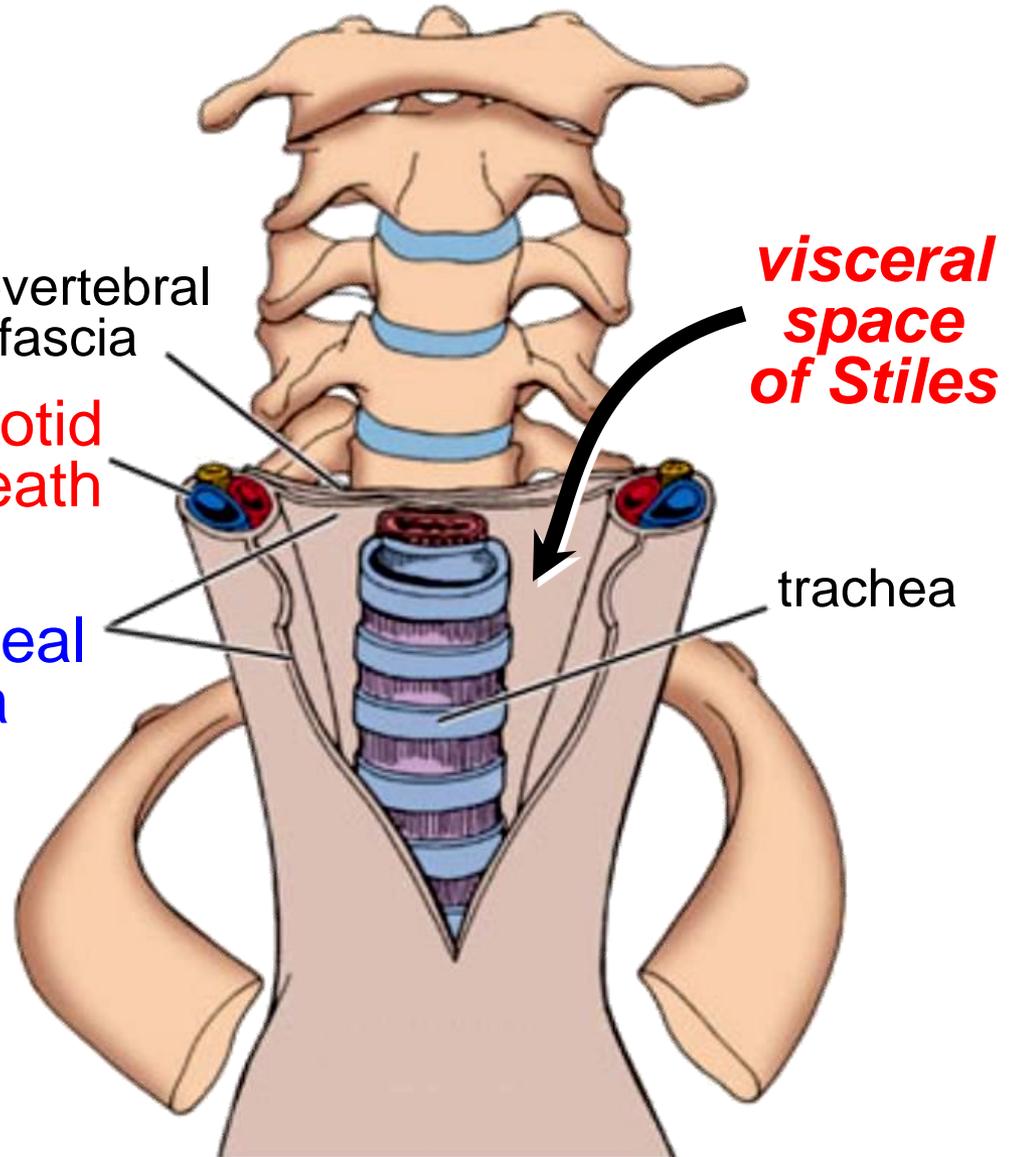
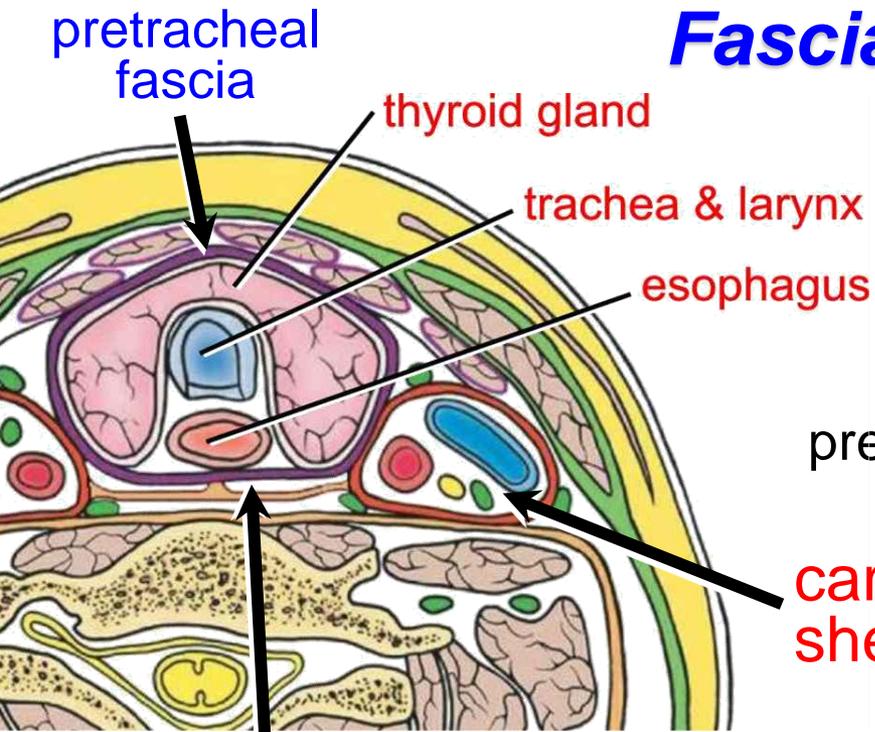
## Deep Fascia

1. investing fascia
2. pretracheal fascia

3. prevertebral fascia
4. carotid sheath



# Fascia & Spaces



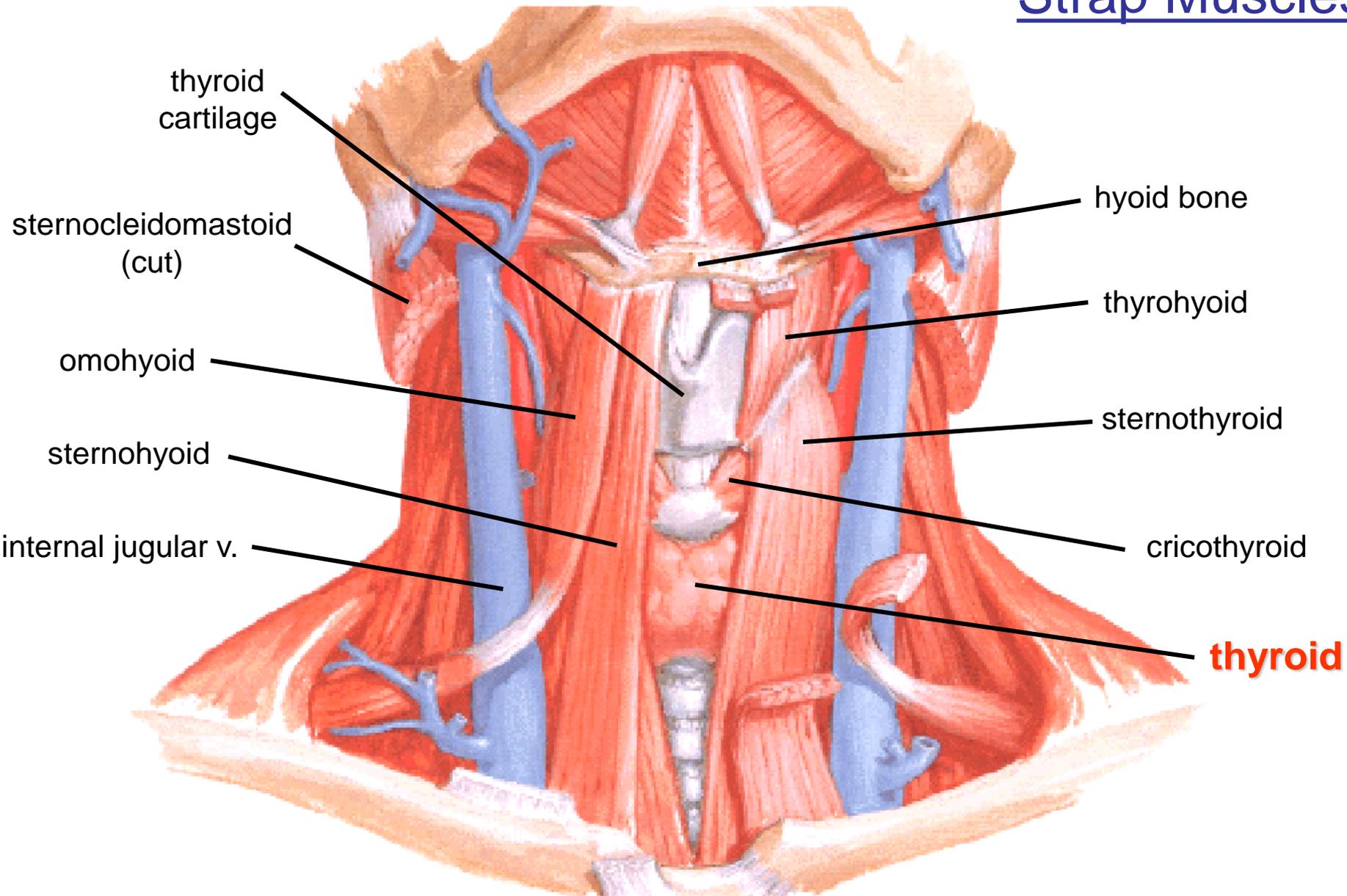
Moore et al.  
2010

Skandalakis' Surgical  
Anatomy 2004

not discussed today:

- suprasternal space of Burns
- "Danger space" of Grodinsky & Holyoke

# Strap Muscles

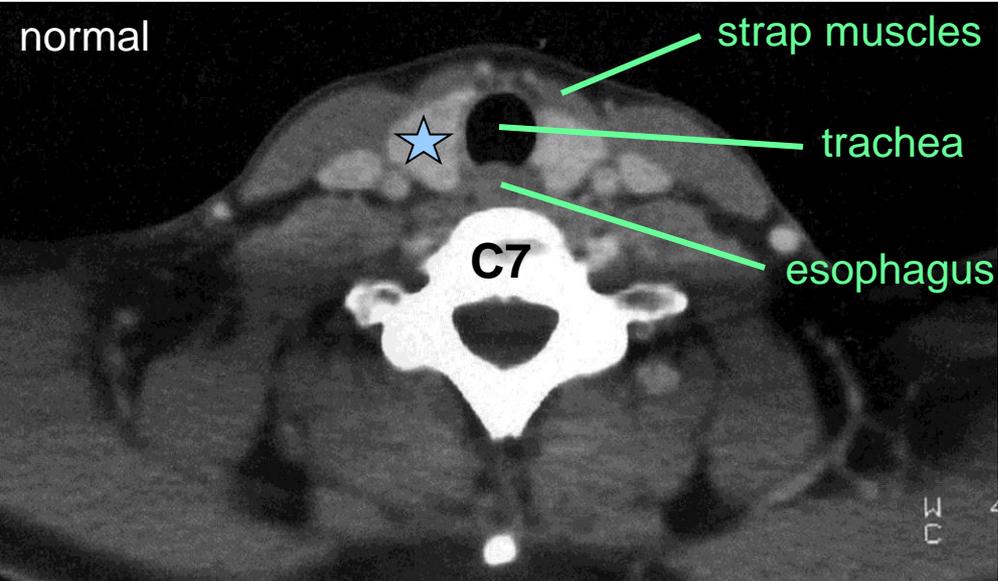


**Attachment of sternothyroid to oblique line on thyroid cartilage prevents superior expansion of thyroid**

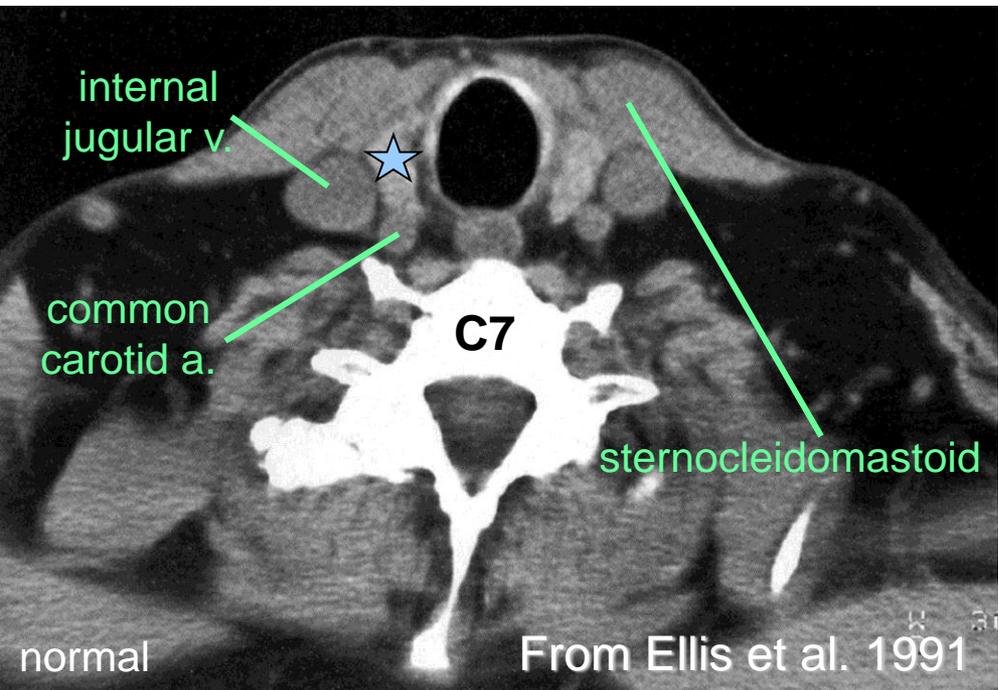
From Netter's Atlas

# Questions

1. Why does the mass move up and down on swallowing?
- 2. What can explain the difficulty breathing?**
3. What structures would be endangered by subtotal or total thyroidectomy?
4. Why is the nature of the patient's voice of interest postoperatively?

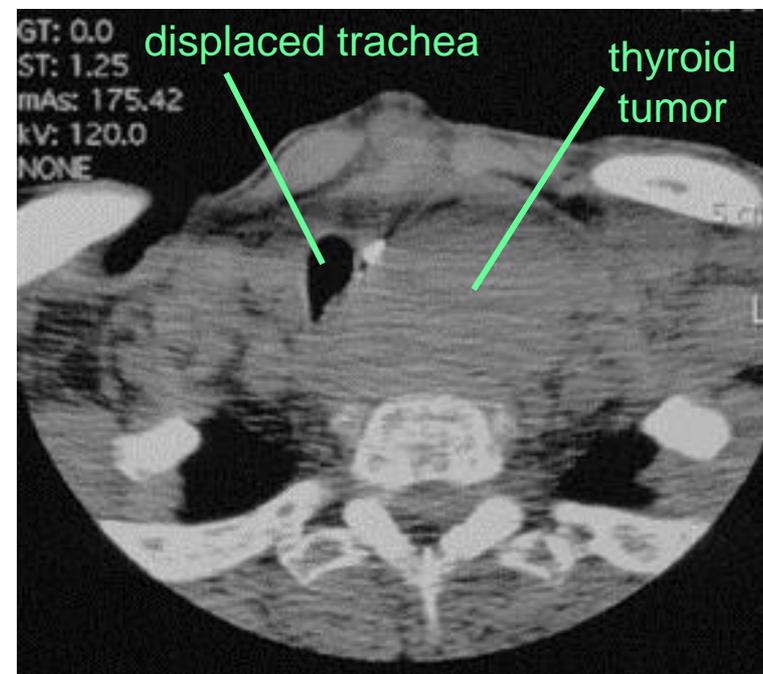


**Thyroid (★)**



## Thyroid CT

Compression and displacement of trachea by thyroid tumor



From web reference 1

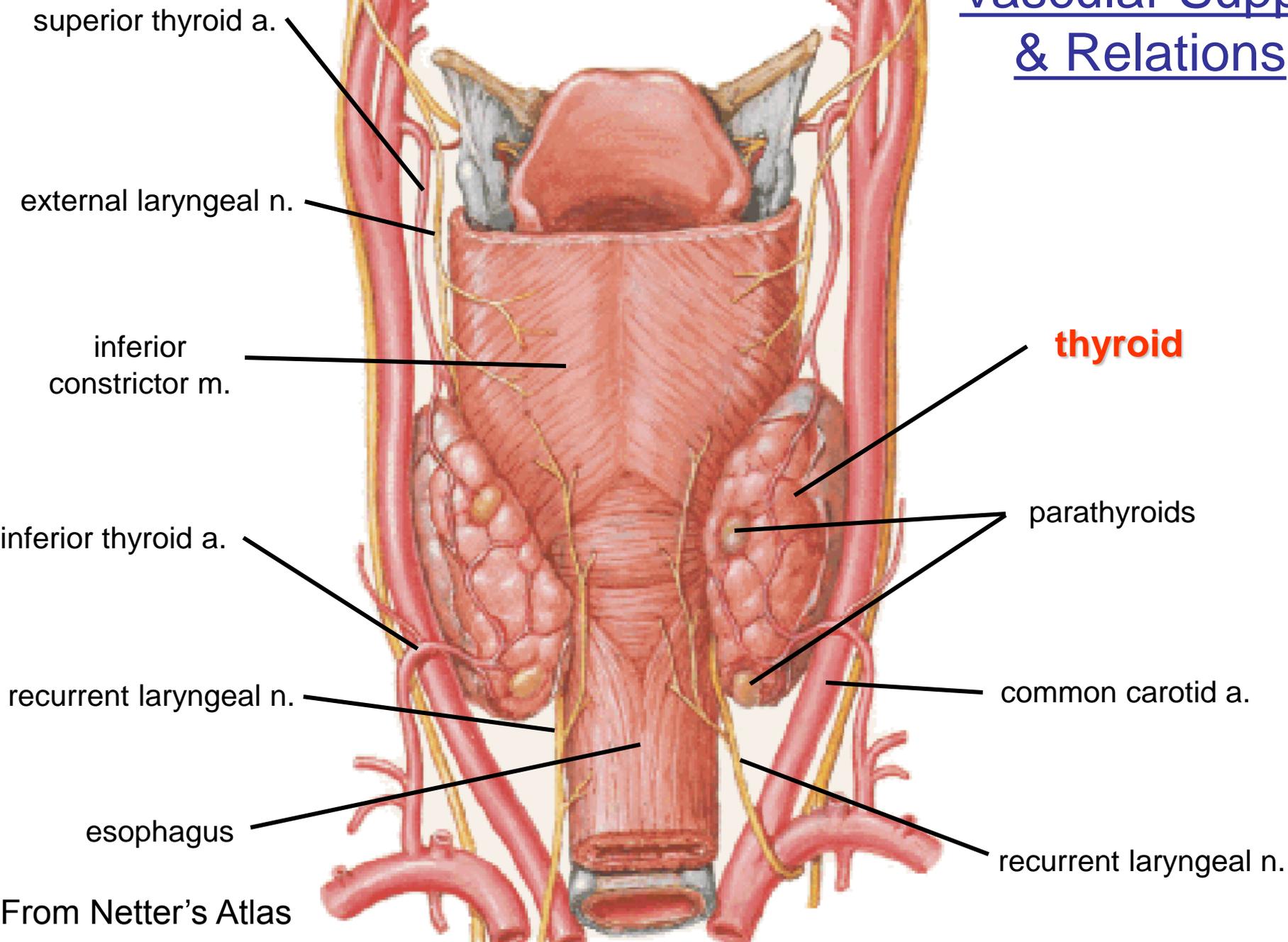
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*Posterior View*

Vascular Supply & Relations



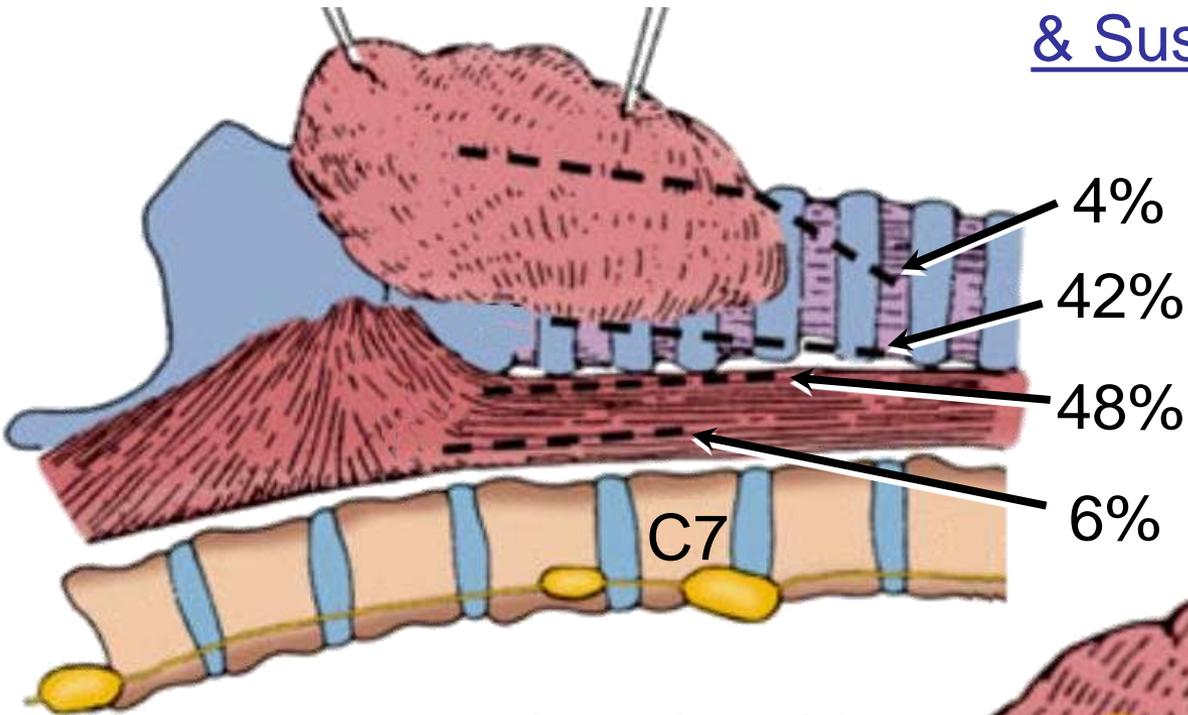
From Netter's Atlas

# Questions

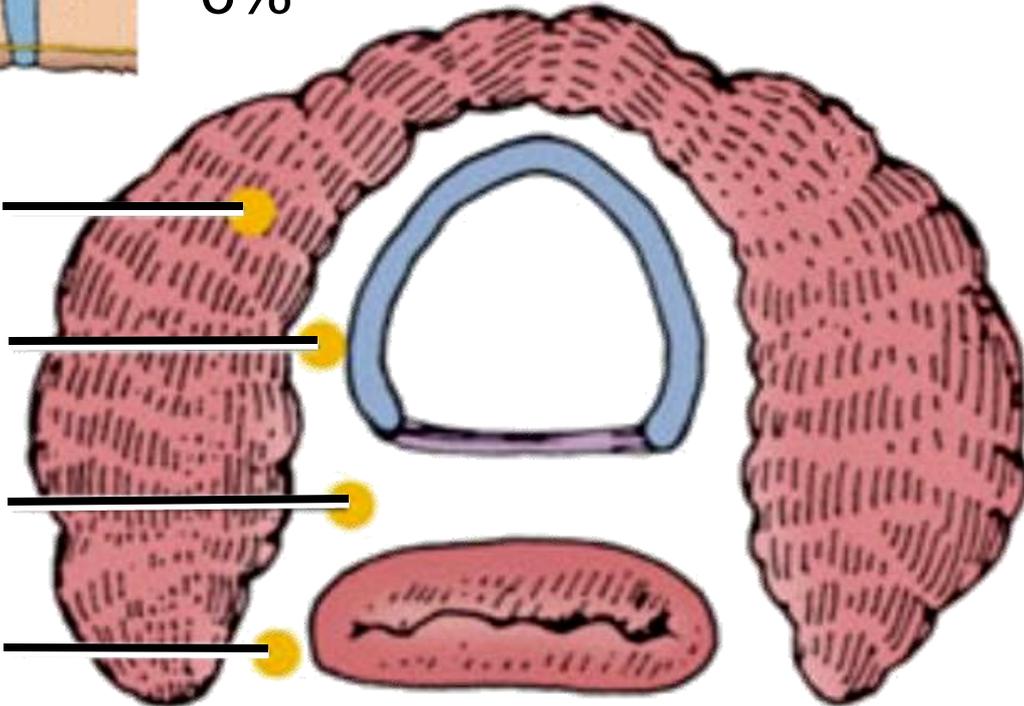
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# Recurrent Laryngeal N. & Suspensory Lig. of Berry

**variation in recurrent laryngeal nerve position (n = 204)**

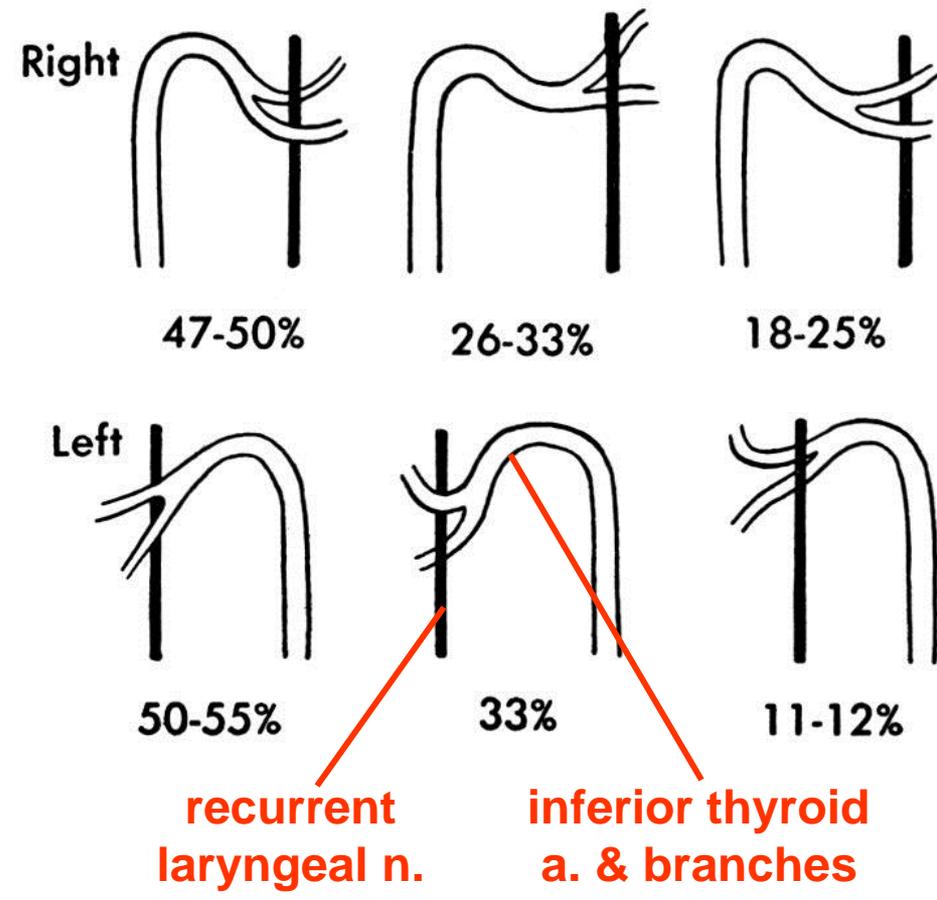
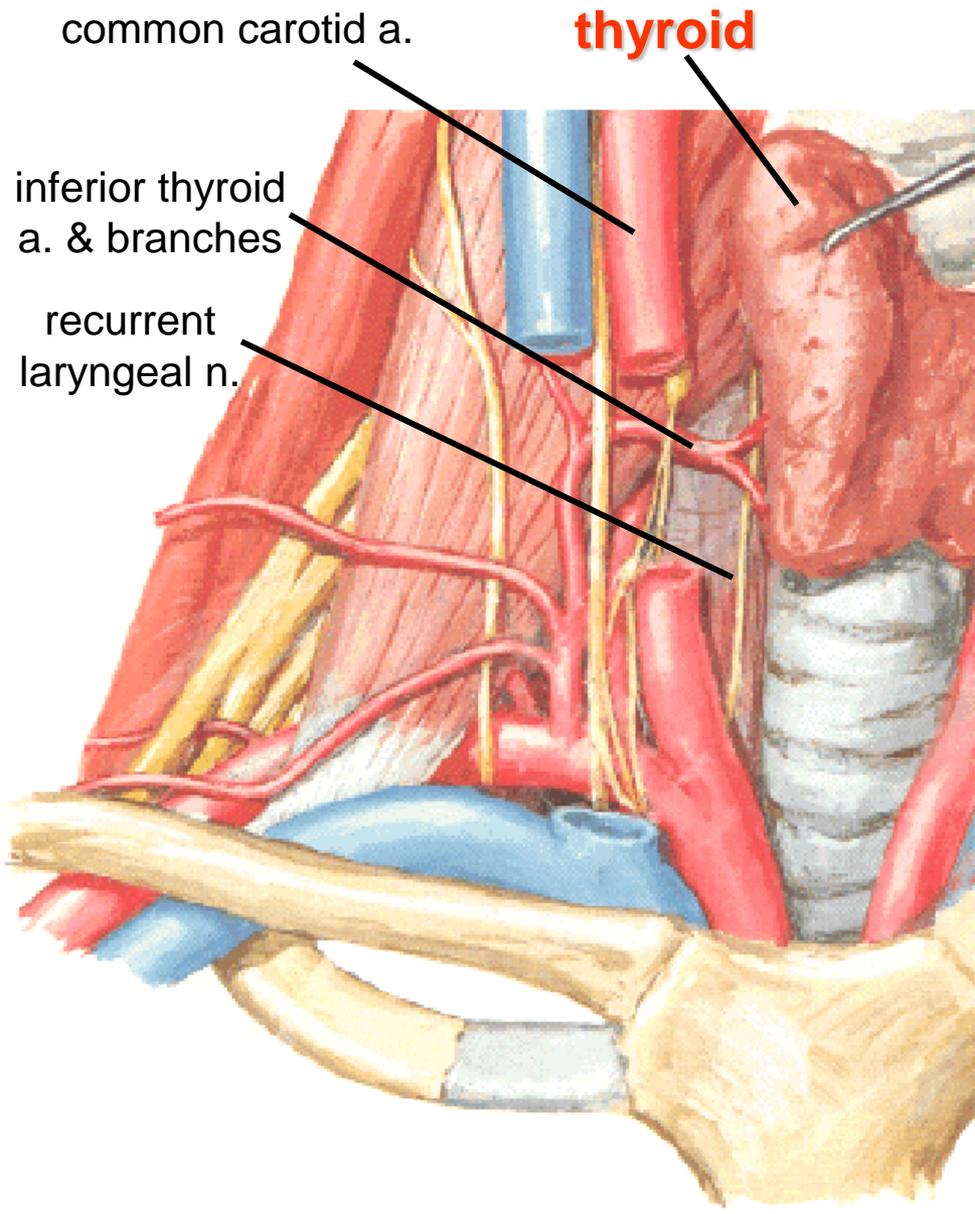


- 4% intrathyroid
- 42% paratracheal
- 48% tracheoesoph. groove
- 6% paraesophageal



# Recurrent Laryngeal N. & Suspensory Lig. of Berry

Variation in relationship of recurrent laryngeal n. to inferior thyroid a.

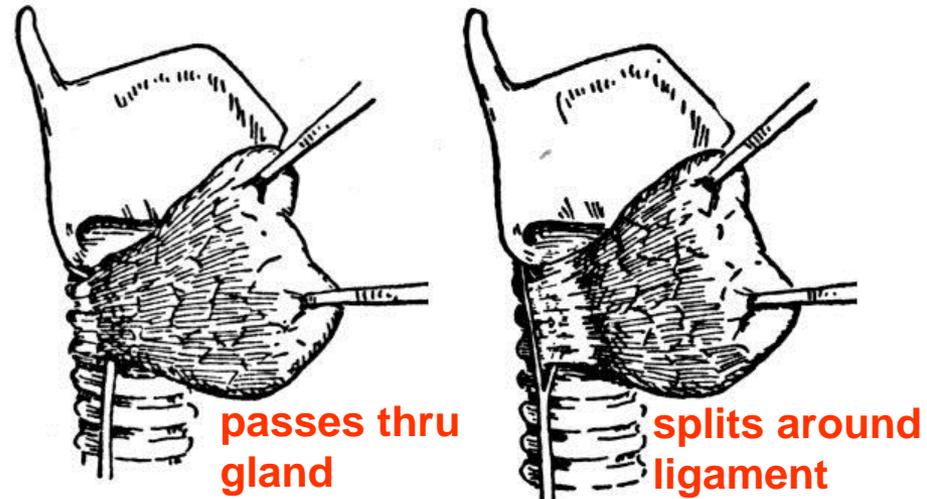
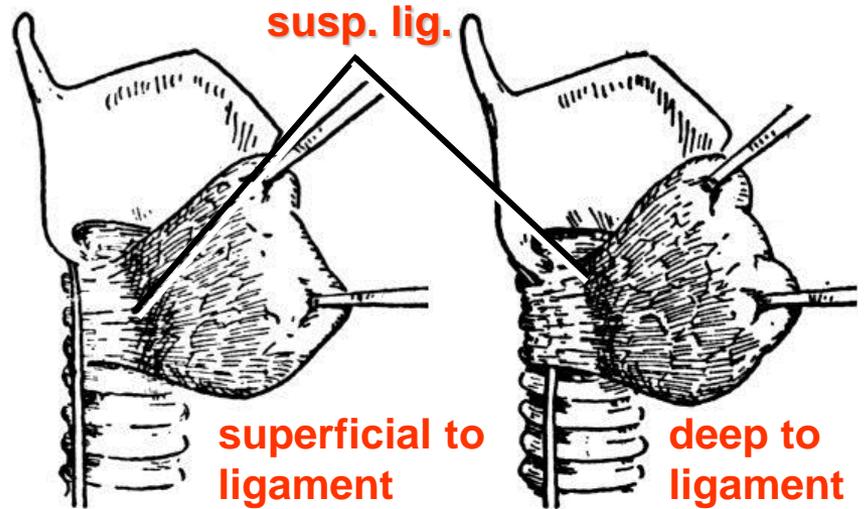
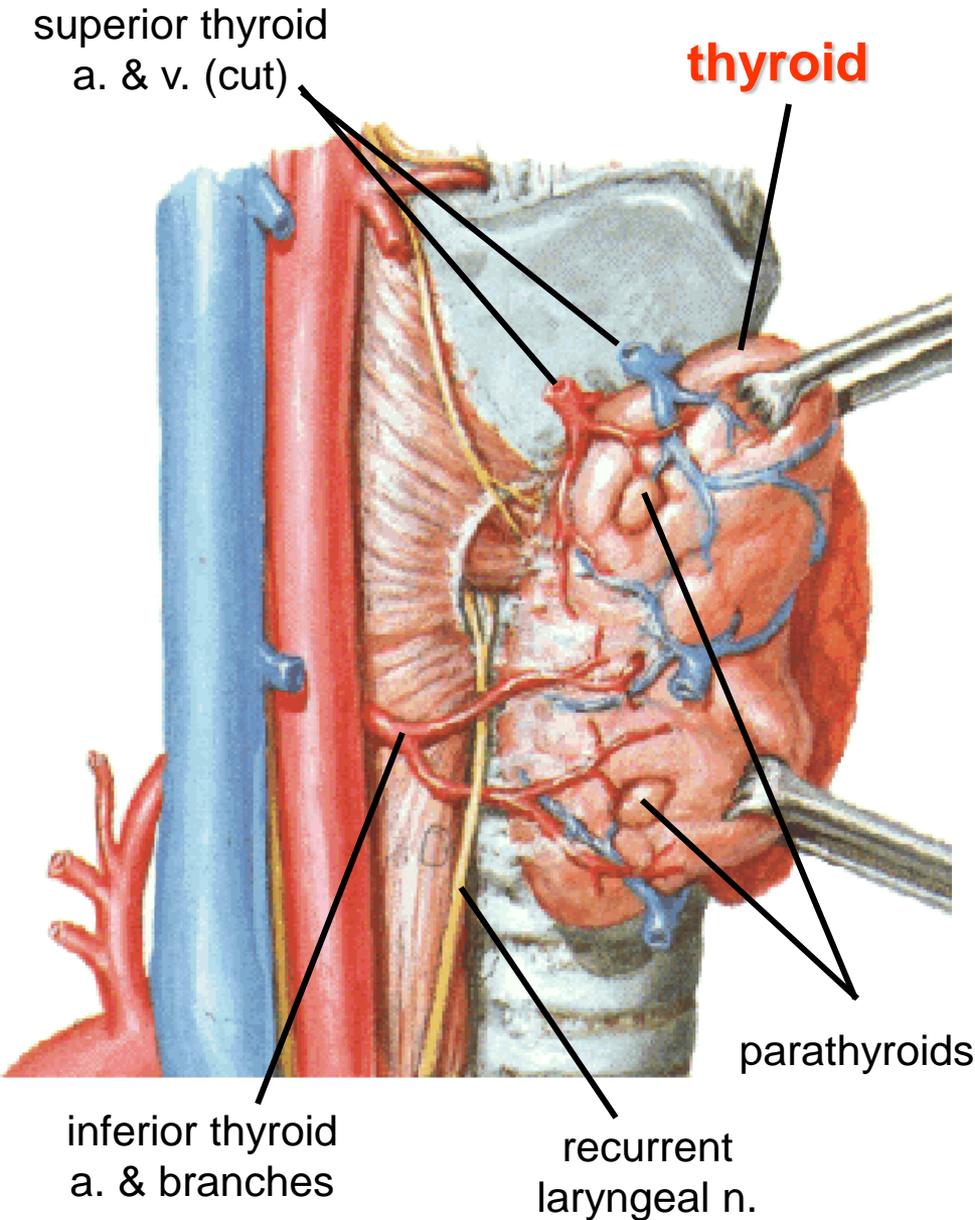


From Netter's Atlas

(from Hollinshead 1968)

# Recurrent Laryngeal N. & Suspensory Lig. of Berry

Variation in relationship of recurrent laryngeal n. to suspensory lig.

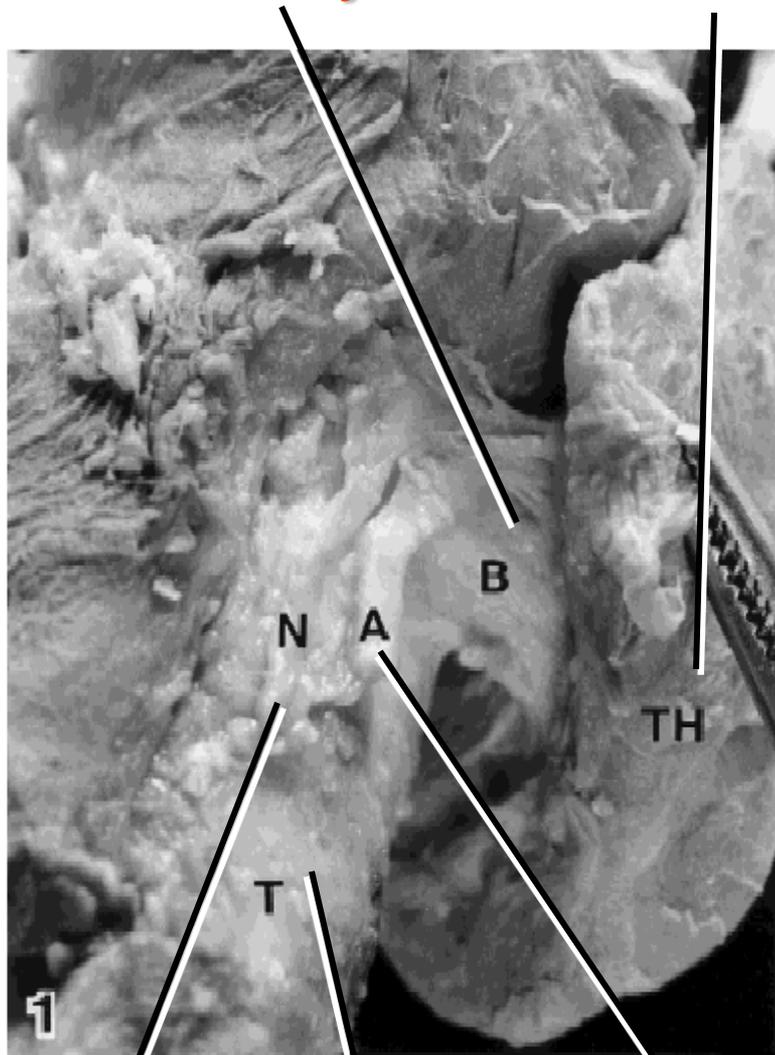


(from Hollinshead 1968)

From Netter's Atlas

**suspensory ligament  
of Berry**

**thyroid**



recurrent  
laryngeal n.

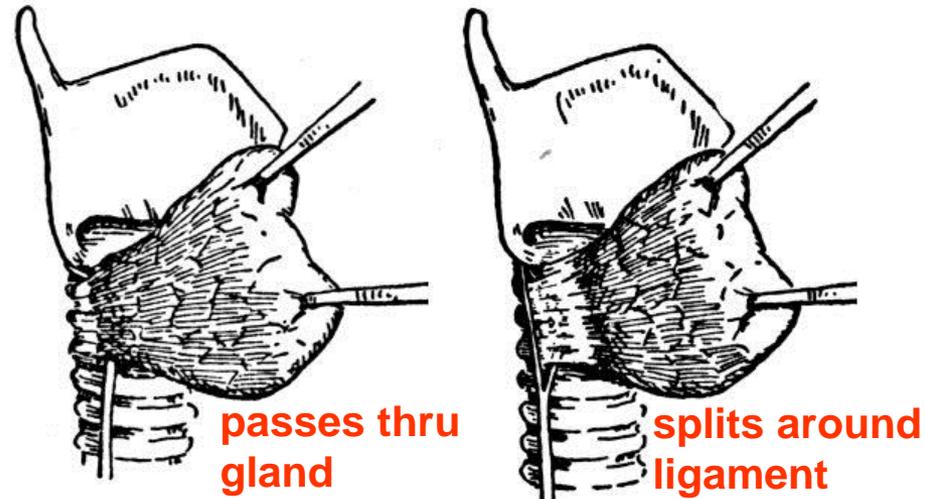
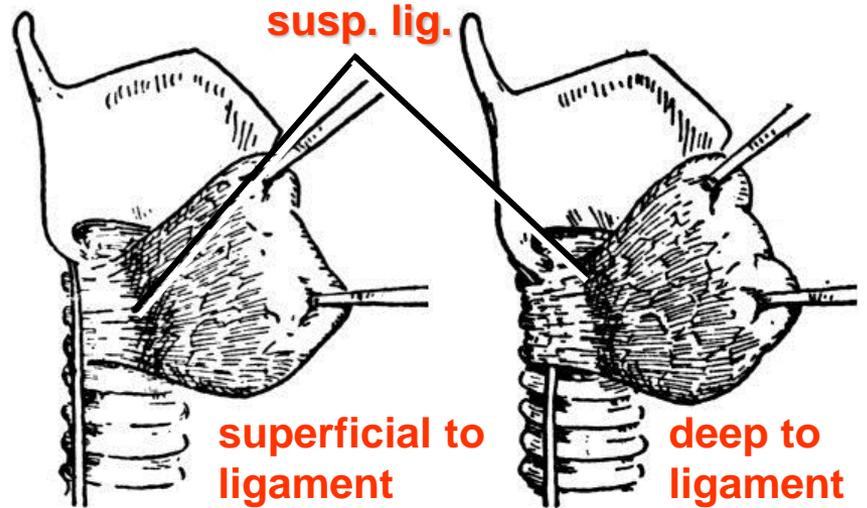
trachea

inferior thyroid a

From Sasou et al. 1998

Recurrent Laryngeal N.  
& Suspensory Lig. of Berry

Variation in relationship of recurrent  
laryngeal n. to suspensory lig.

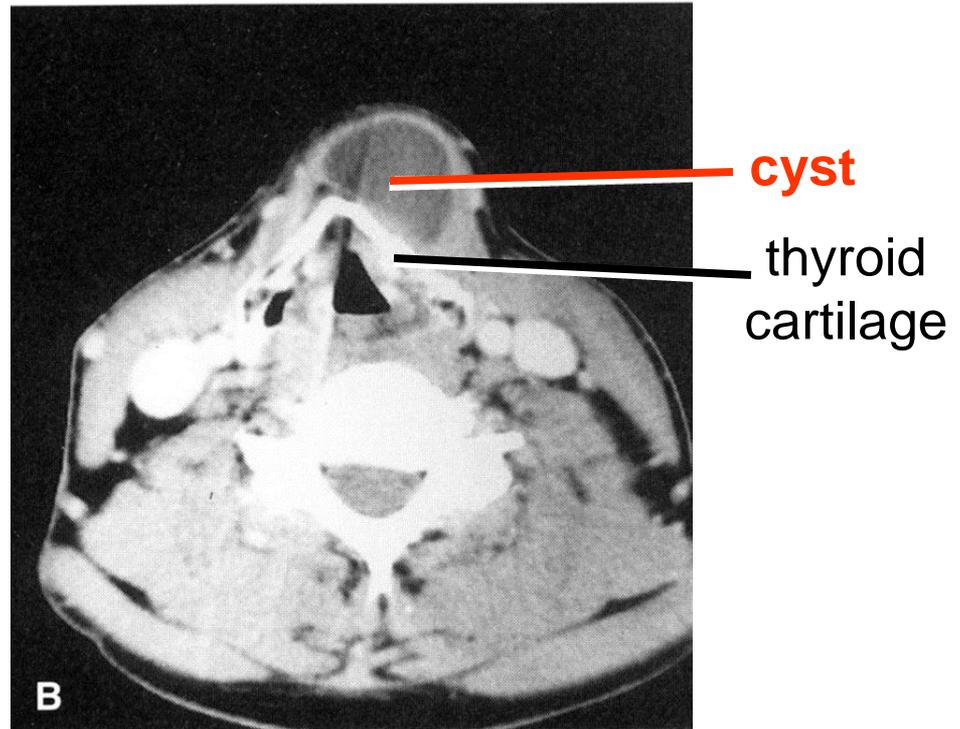


(from Hollinshead 1968)

# Case Presentation

A 43-year-old male presents with a swelling in the front of his neck. He first noticed it 9 months ago and it has steadily grown. The lump lies near the midline and moves on swallowing. On palpation, it is firm and lays anterior to the thyroid cartilage. The mass is smooth, non-pulsatile, and non-fluctuant. The dorsum of the tongue was inspected but no thyroid tissue was observed. Ultrasound showed the mass to be cystic and separate from the thyroid gland.

*Preliminary  
Diagnosis:*  
**Thyroglossal Cyst**

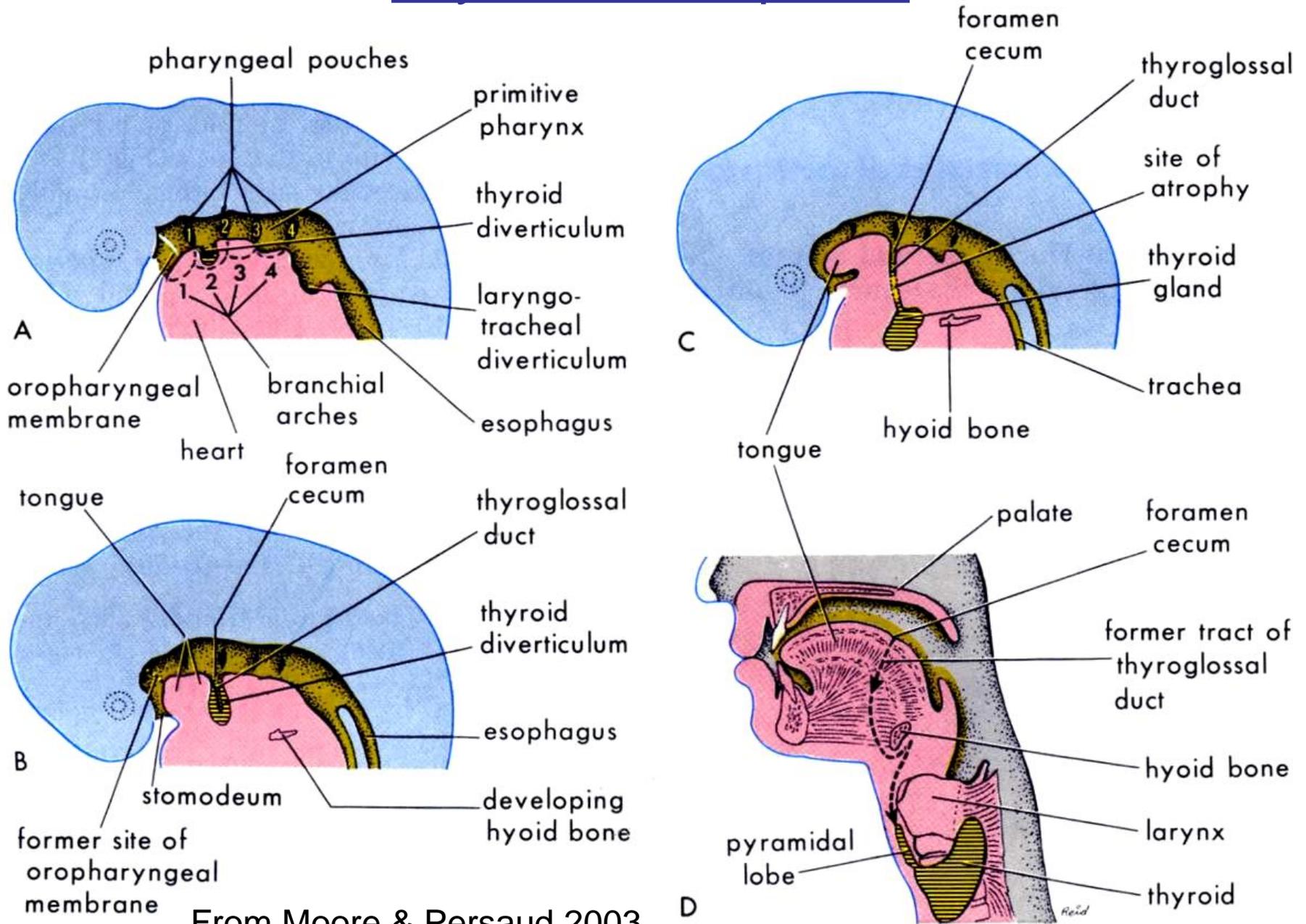


From Moore & Persaud 2003

# Questions

- 1. What is the embryonic derivation of a thyroglossal cyst?**
2. Why did the mass move upwards on swallowing?
3. Why did the surgeon look for thyroid tissue on the tongue?

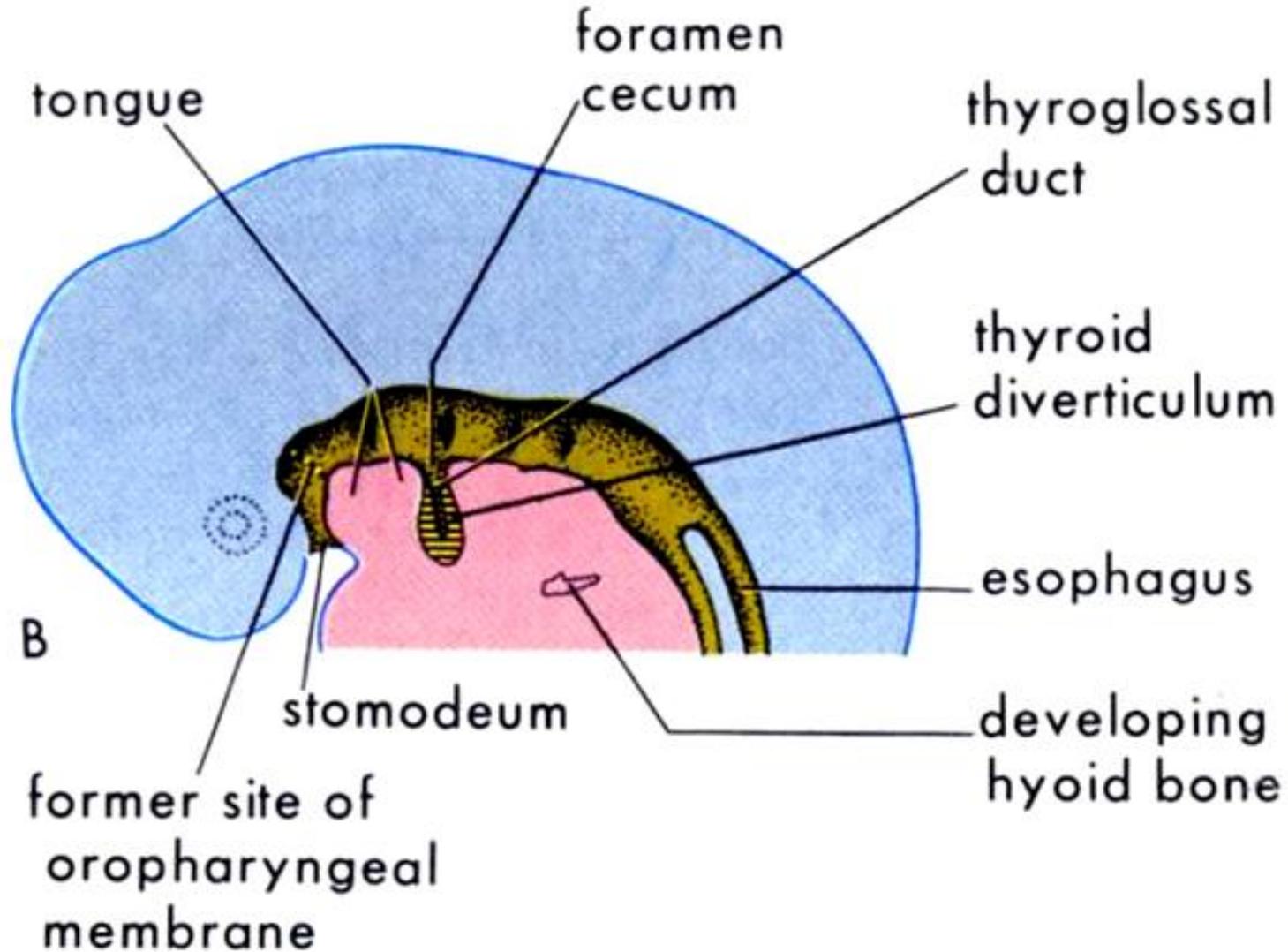
# Thyroid Development

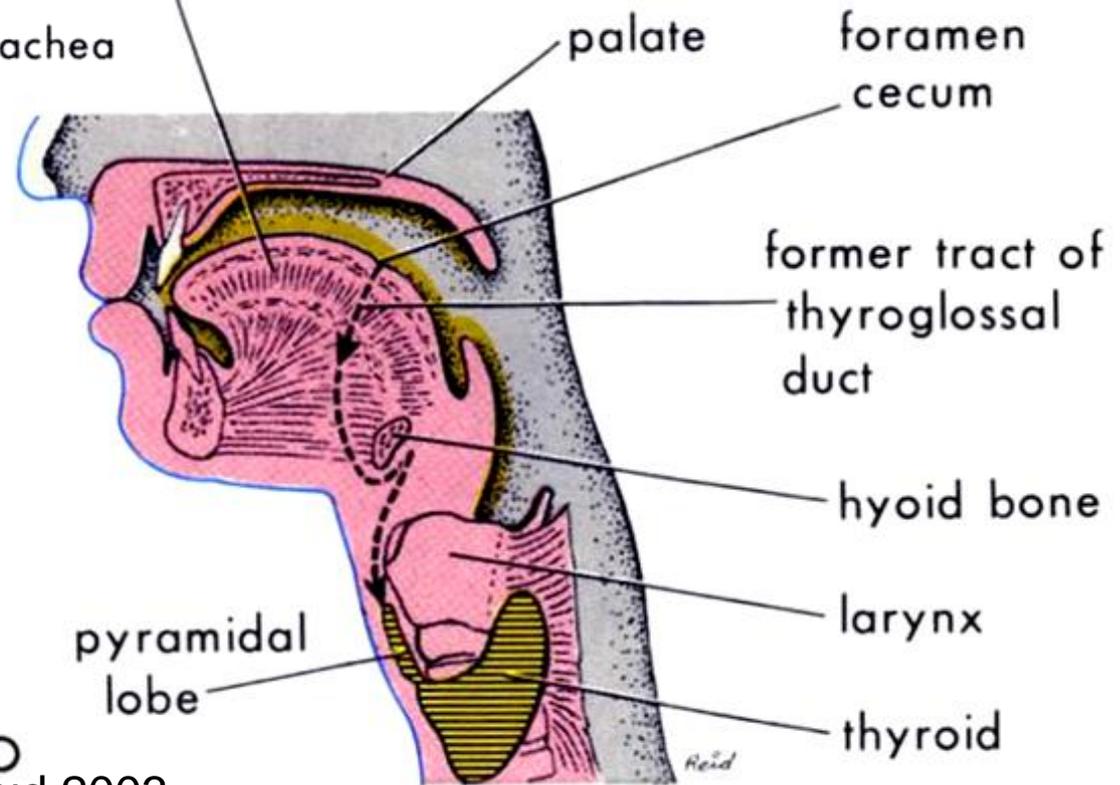
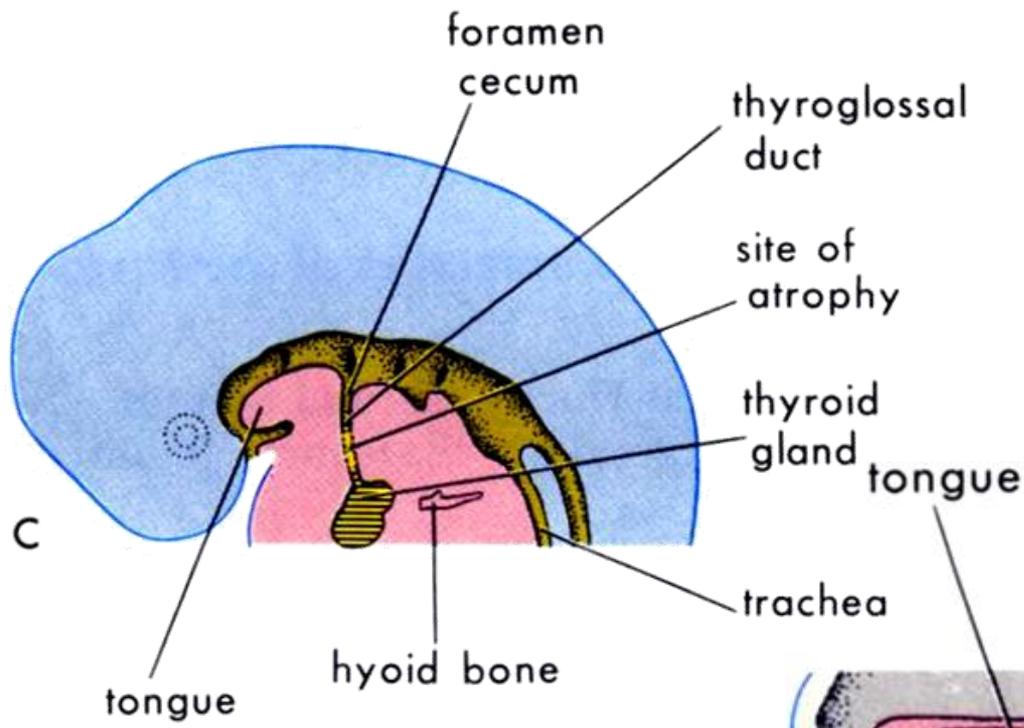


From Moore & Persaud 2003

D

# Thyroid Development



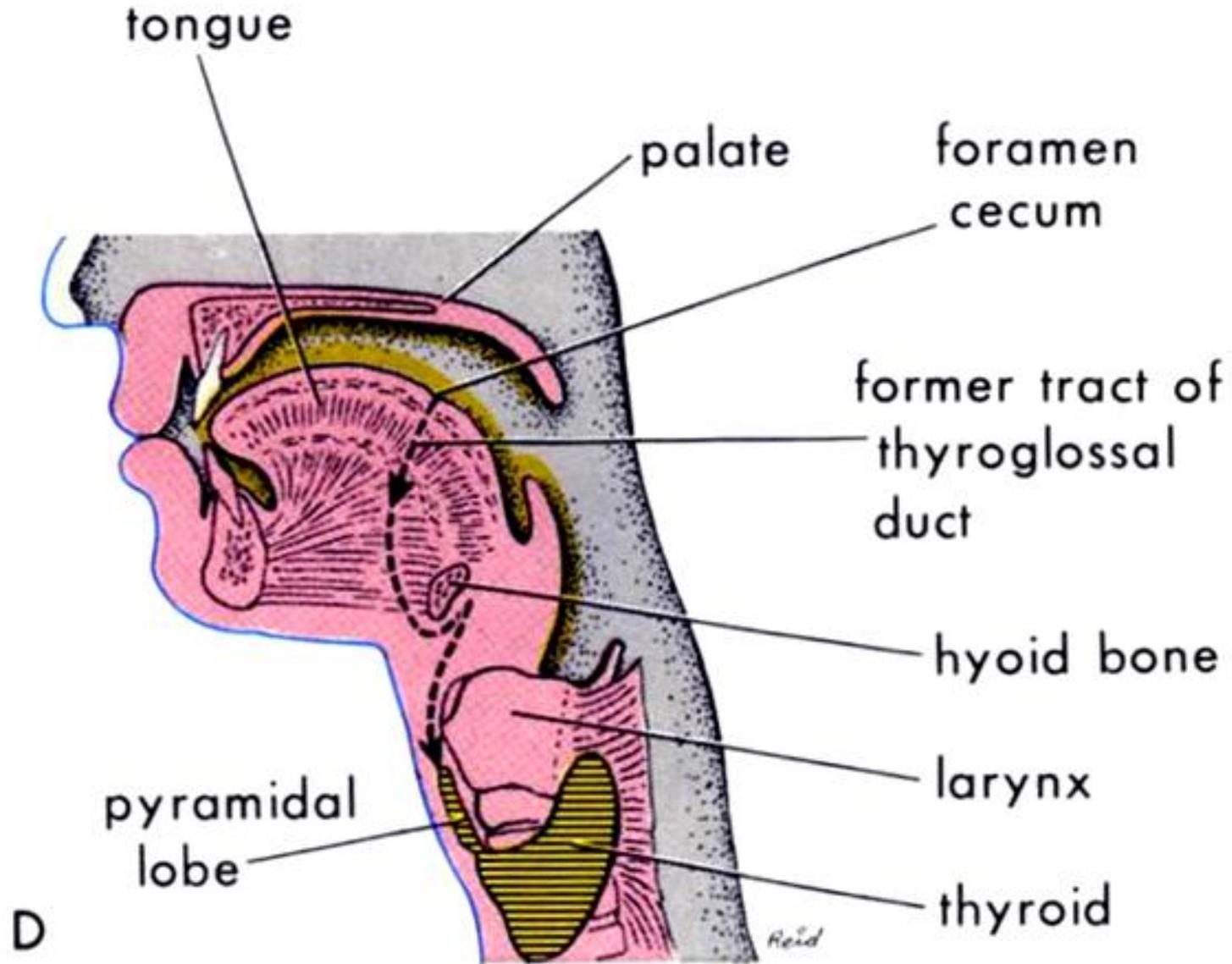


D  
From Moore & Persaud 2003

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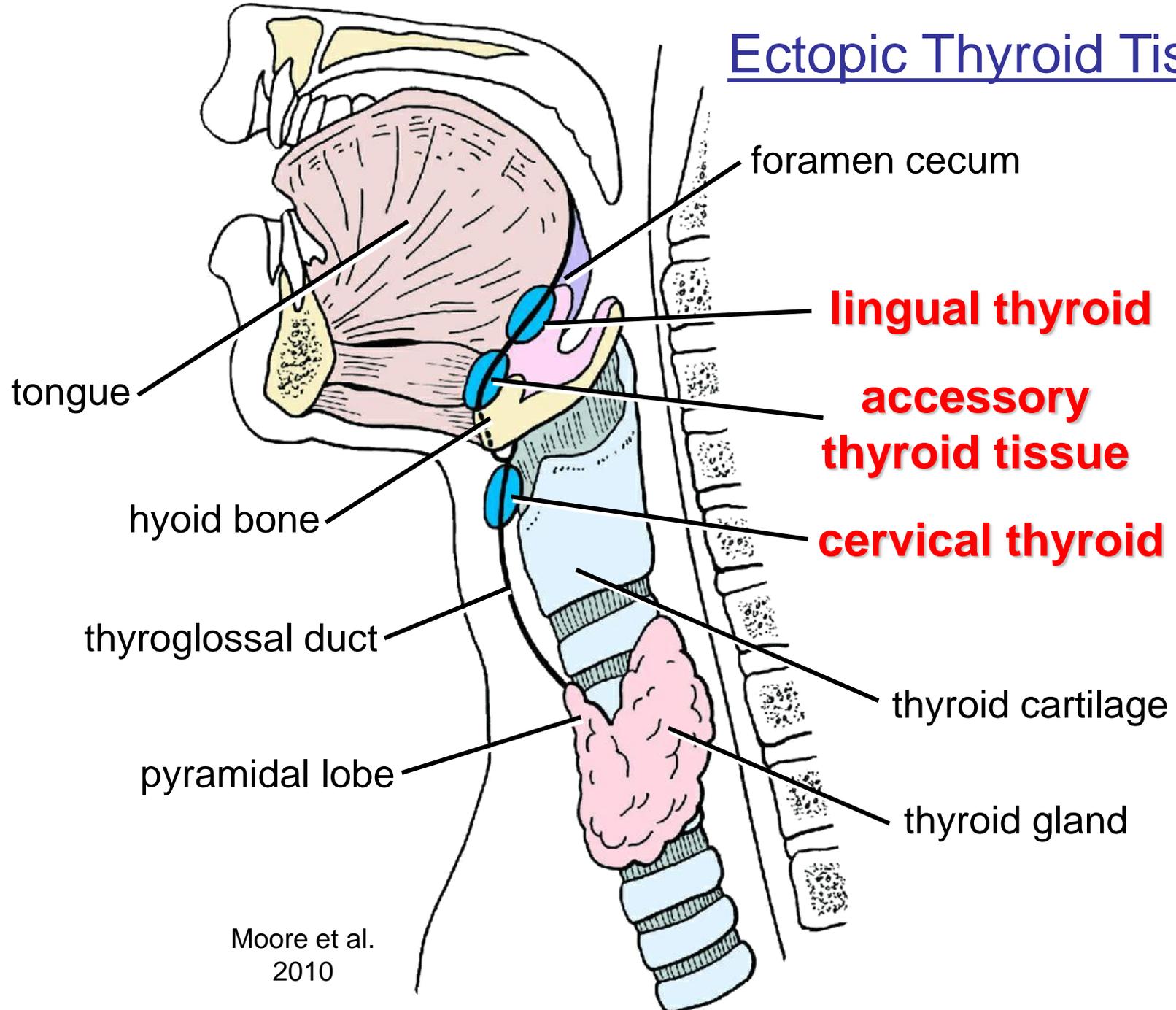


From Moore & Persaud 2003

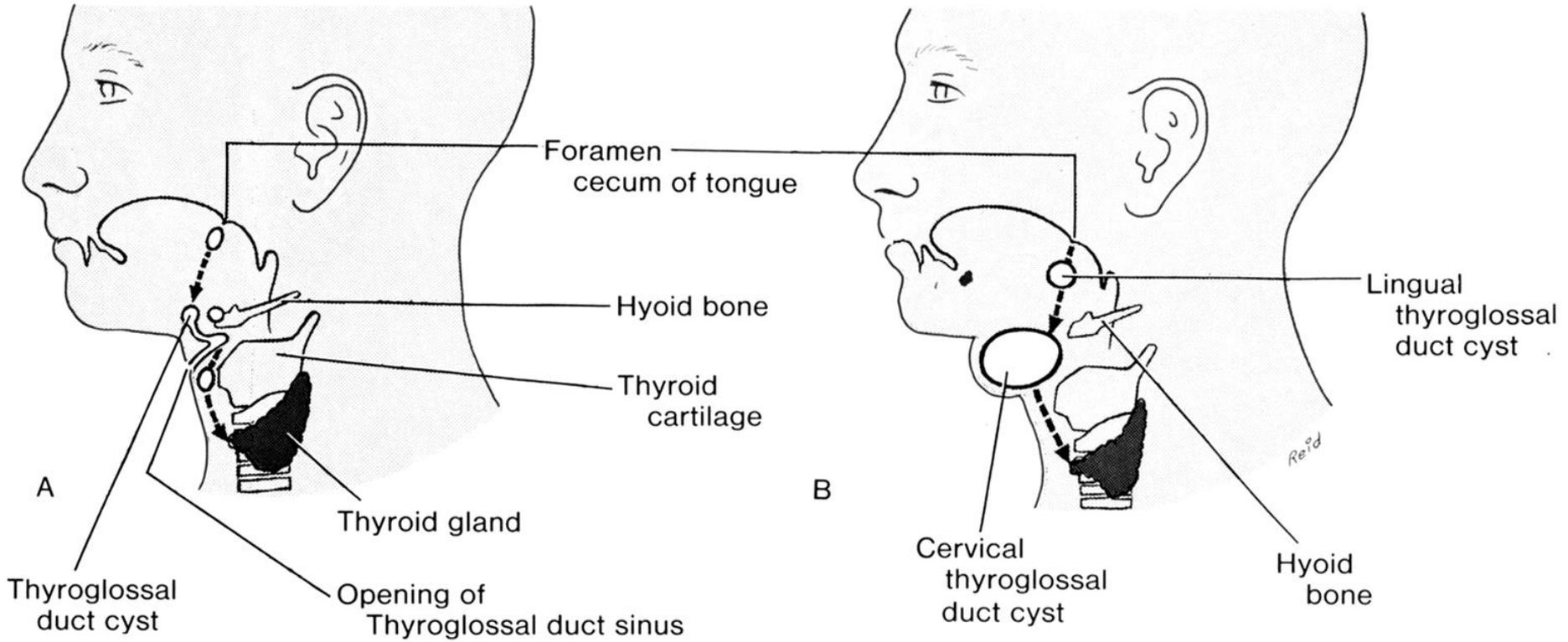
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# Ectopic Thyroid Tissue



# Possible Locations of Thyroglossal Duct Cysts



From Moore & Persaud 2003

# References

## Print

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- Skandalakis, J. E., G. L. Colborn, T. A. Weidman, R. S. Foster, A. N. Kingsnorth, L. J. Skandalakis, N. P. Skandalakis, P. Mirilas (Editors). 2004. *Surgical Anatomy: The Embryologic And Anatomic Basis Of Modern Surgery*. McGraw-Hill, New York.
- Younes, N. A., and D. H. Badran. 2002. The cricothyroid space: a guide for successful thyroidectomy. *Asian Journal of Surgery* 25(3):226–231.

## Web

1. Thyroid tumor: <http://www.auntminnie.com/ScottWilliamsMD2/nucmed/Tumor/Thallium/Thallium.htm>
2. Gray's *Anatomy of the Human Body*: <http://www.bartleby.com/107/>