

Tools for Treating Feeding in the Medically-Challenging Child



1

Disclosure Statement

I have the following relevant financial relationships to disclose:

- CEU-Espresso, Inc.: ownership interest, employee, speaker fee
- Feeding & Dysphagia Resources, P.C.: ownership interest

I have no relevant nonfinancial relationships in the products or services described, reviewed, evaluated or compared in this course.

2

Notes

- Agenda times are only approximate. Don't get OCD about it.
- Relax and HAVE FUN today!
- You will need your mirror, markers, scissors, and glue in the next 10 minutes. If you left them in your car, run and get them now. If you forgot them totally, you should make friends with the people around you very quickly.



3

My Lyme Grid – LifeInFirstGear.com

Level of function	1	2	3	4	5	6	7	8	9
Activity	Death Bed	Lie in Bed	Sit up in Bed	Lie on Couch	Wheelchair Lean/Shuffle	Walk	Drive	Go for a few hours at a time	Teach; Work abbreviated schedule
Pain Relief	Pain Pill Level 3	Pain pill Level 2	Pain pill Level 1 (whole pill)	Pain pill Level 1 (1/2 pill)	Morphine bomb; Parsely/Burbur Detox;	Massage, Pain spray; 600mg Ibuprofen; Distractions (TV)	OrthoEase with EOC's Bath; Tiger Balm; Weighted Blanket	OrthoEase	None needed
Environment	Dark; Totally Still; ALONE	Go to bed	Control Light	Control Noise	Soft Worship Music	Soft TV shows (Downton Abbey, Sense & Sensibility)	Small amb interaction	Radio, Movie with the kids; Crowd	Action movies, Mail, News/radio with commercials
Mental State	Nil	Pinterest	Read Facebook; Look at pics in magazines	Repost on Facebook; Paper Scrapbook	Post on Facebook; Read magazine	Read email; Work on Digital photo/scrapbook	Pay Bills; answer email; short phone conv.	Write courses; Balance ckbt; Work on Business; Live interaction	Mentoring; read journal articles, books
Emotional	Black Hole; Cell Mom; Tell Jim; Prayer Room	Despairing; Activate Prayer Chain	Grieving; Sleep; Food; Journal; Worship; cuddle; Amazon	Sad; Journal; Worship; Cuddle; Eat; Choc; Shop on Amazon	Discouraged; Self-nurturing/soothing activities; Funny Movies; GET OUT OF THE HOUSE	Neutral; Rest; Read; Bath	Hopeful; Jot ideas down for 1+ Gear; Putter	Excited; Work on the ideas	Feel competent; productive; Make plans for future

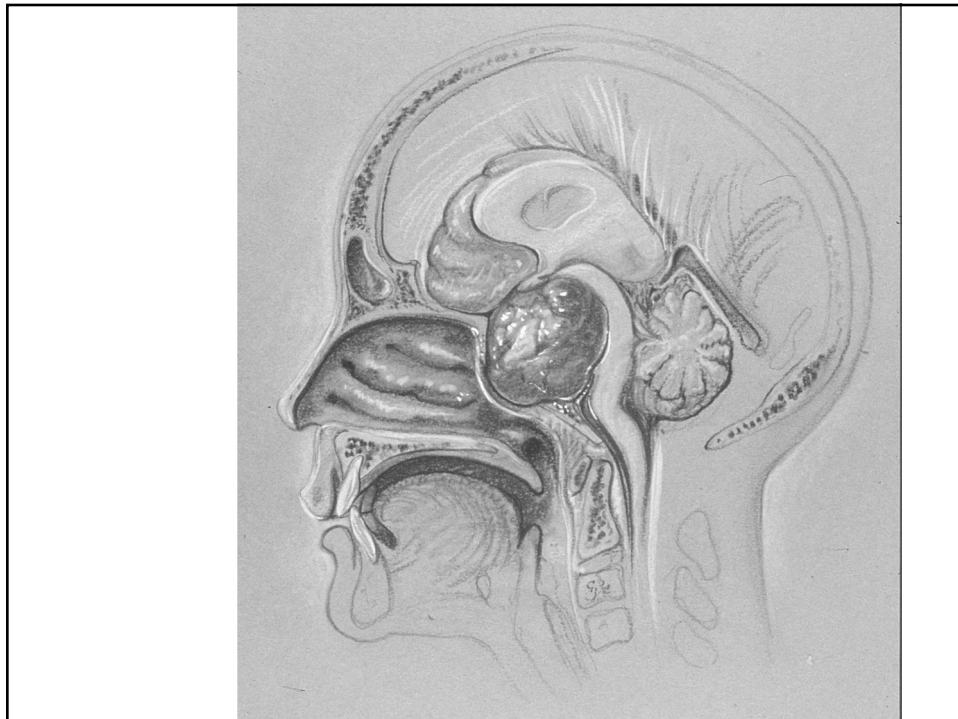
4

Anatomy



You have to start HERE!

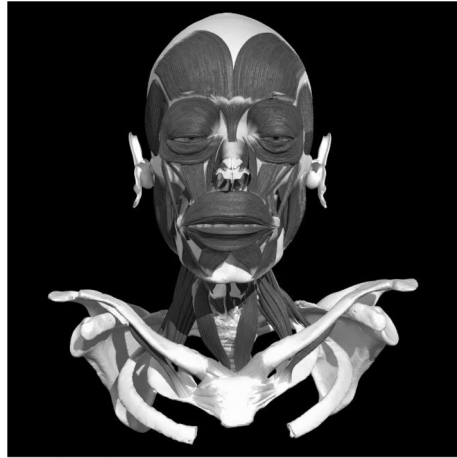
5



6

Lip Seal

- Action: Mouth closure
- Muscles: Orbicularis Oris
- Purpose: Close oral chamber to maintain pressures



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7

Lip Seal - Orbicularis Oris

- Action: Lip closure, protrusion, pursing
- Origin: spherical muscle with no definite origin/insertion
- Insertion: (see above)
- Innervation: CN VII – Buccal Branch (a little of the Mandibular branch) (red)



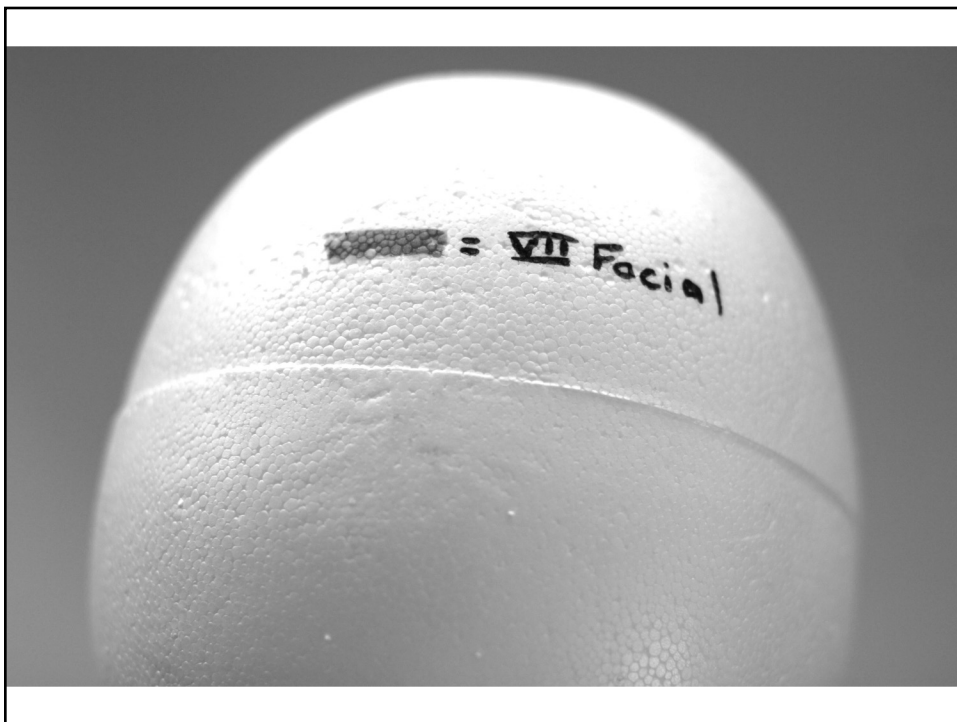
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8



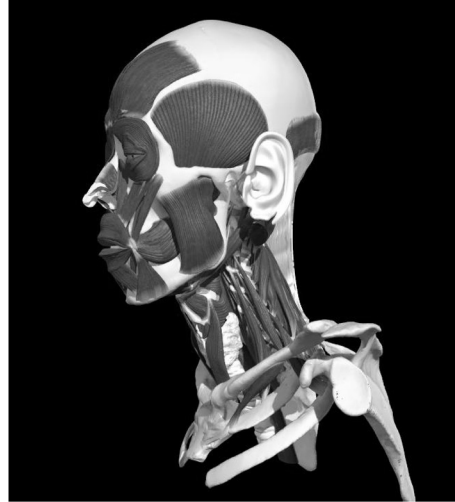
9



10

Oral Chamber

- Action: Muscle “sling” contraction and compression of chamber
- Muscles: Orbicularis Oris, Buccinator, Sup. pharyngeal constrictor
- Purpose: P+ in oral chamber



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Oral Chamber - Sling

Buccinator

- Action: Flattens cheek
- Origin:
 - a) pterygomandibular raphe (also Sup. Constr.)
 - b) alveolar margins of mandible and maxilla at the molars
- Insertion: Orbicularis Oris
- Innervation: CN VII – Buccal branch (red)



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Oral Chamber - Sling

Superior Pharyngeal Constrictor

- Action: Squeeze/contract pharynx
- Origin: Medial pterygoid plate; pterygomandibular ligament and raphe; mylohyoid ridge of mandible; mucous membrane of oral cavity; sides of tongue
- Insertion: Posterior median raphe of pharynx
- Innervation: CN X – Pharyngeal Plexus (blue)

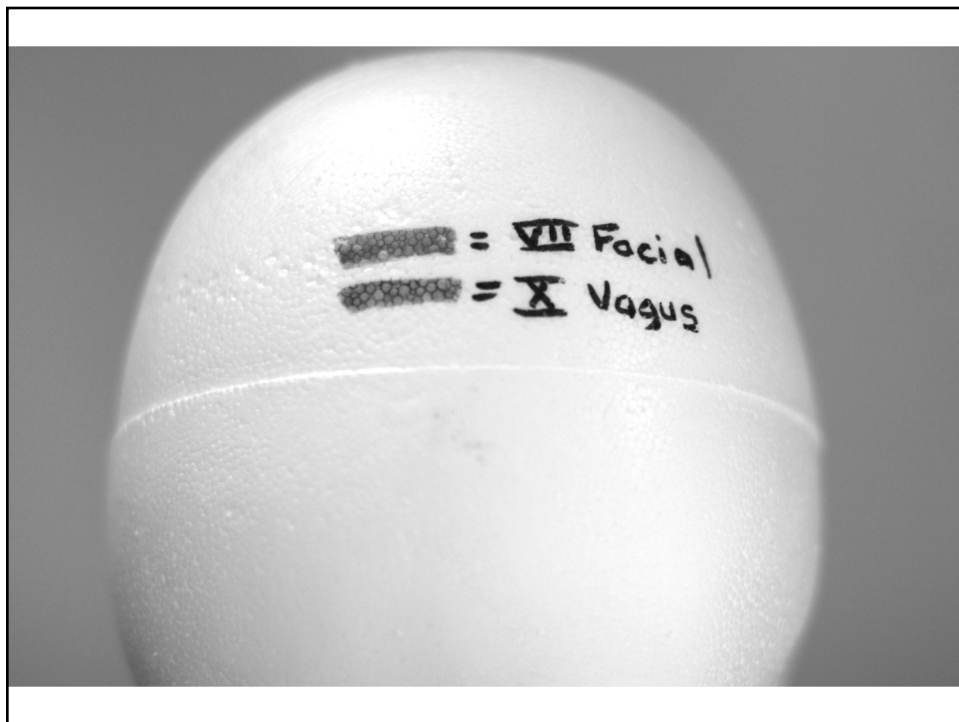


It is bigger than indicated by the green

14



15



16

Oral Chamber - Sling

*Buccinator attaching to
Superior Pharyngeal
Constrictor*



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17

Chewing - Temporalis

- Action: Jaw closure
- Origin: Temporal bone and fascia
- Insertion: Inside of Mandible
- Innervation: CN V – Mandibular branch (GREEN!!!)

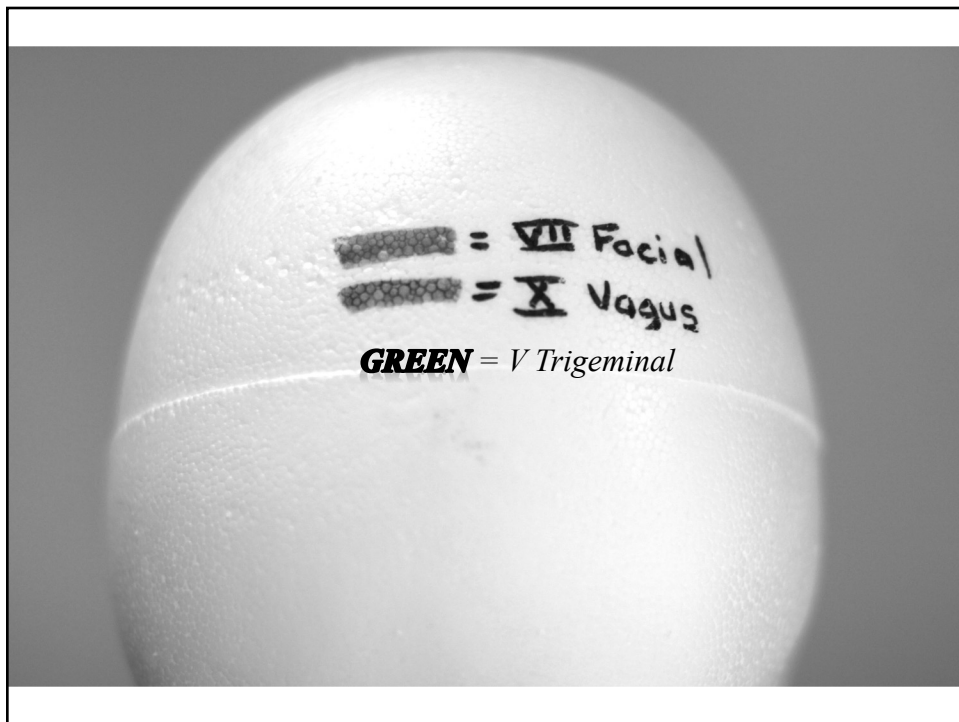


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19



20

Chew - Masseter

- Action: Jaw closure
- Origin: Both sides of the zygomatic arch
- Insertion: Ramus of the mandible
- Innervation: CN V – Mandibular branch (Green)



21

*Only
glue
down the
top
portion.*

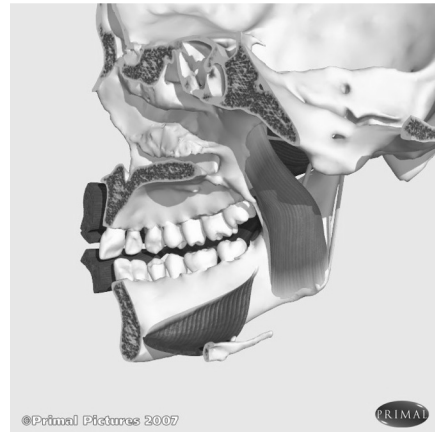


*Ignore the
other blue
muscles*

22

Chew – Medial Pterygoid

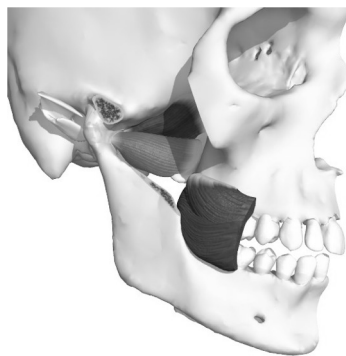
- Action: Close jaw, assist with jaw lateralization and protrusion
- Origin: Sphenoid
- Insertion: Inside mandible
- Innervation: CN V – Mandibular branch



23

Chew – Lateral Pterygoid

- Action: Open jaw, jaw lateralization and protrusion
- Origin: Sphenoid
- Insertion: TMJ
- Innervation: CN V
 - – Mandibular branch



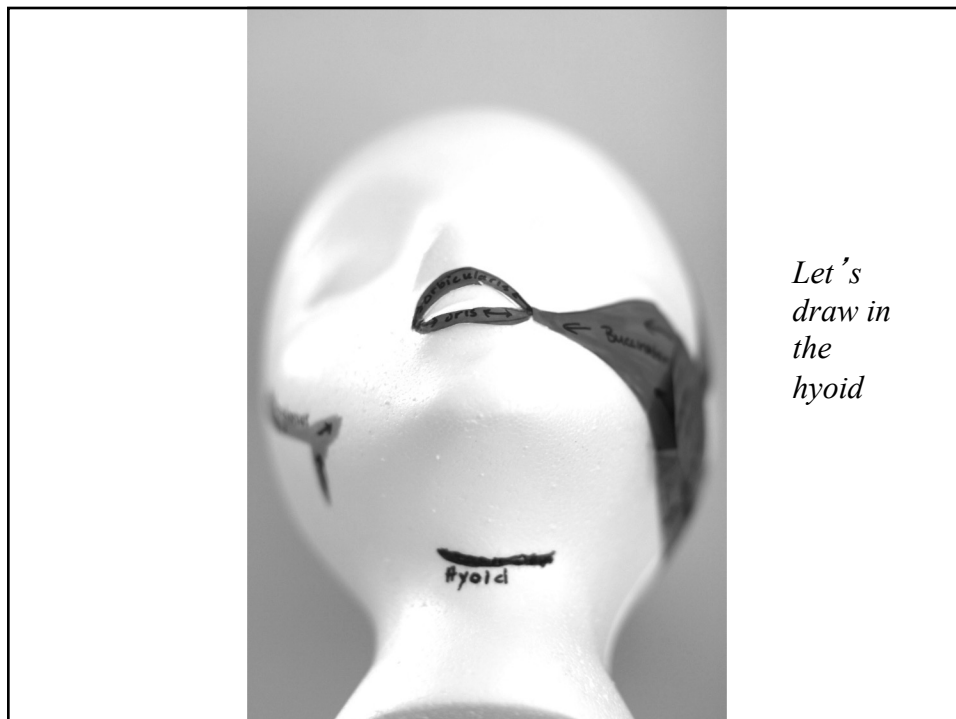
24

Tongue Base

- Action: Tongue Base Retraction
- Muscles: Styloglossus, Sup. pharyngeal constrictor, Hyoglossus, Palatoglossus
- Purpose: P+ in pharynx



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*Let's
draw in
the
hyoid*

26

Tongue Base

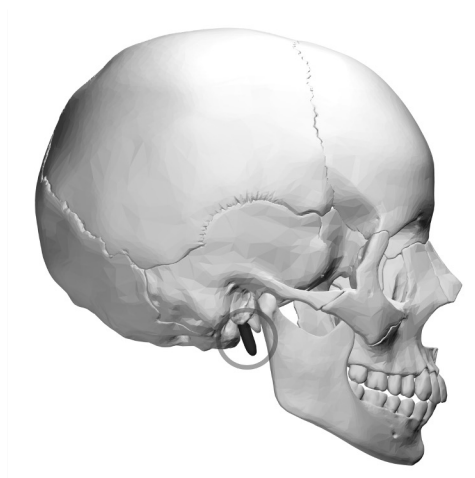
Styloglossus

- Action: Retract and elevate the tongue
- Origin: Styloid process of the temporal bone; hyoid
- Insertion: Lateral border of the tongue, blending with the Inferior Longitudinal muscle
- Innervation: CN XII (Hypoglossal) (orange)



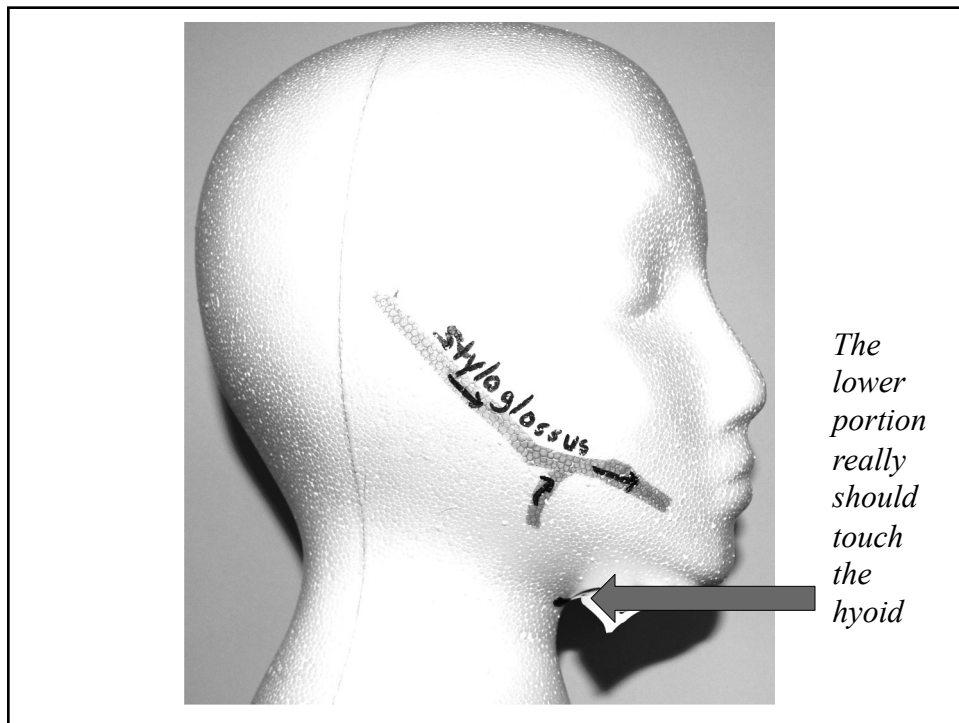
27

Styloid Process

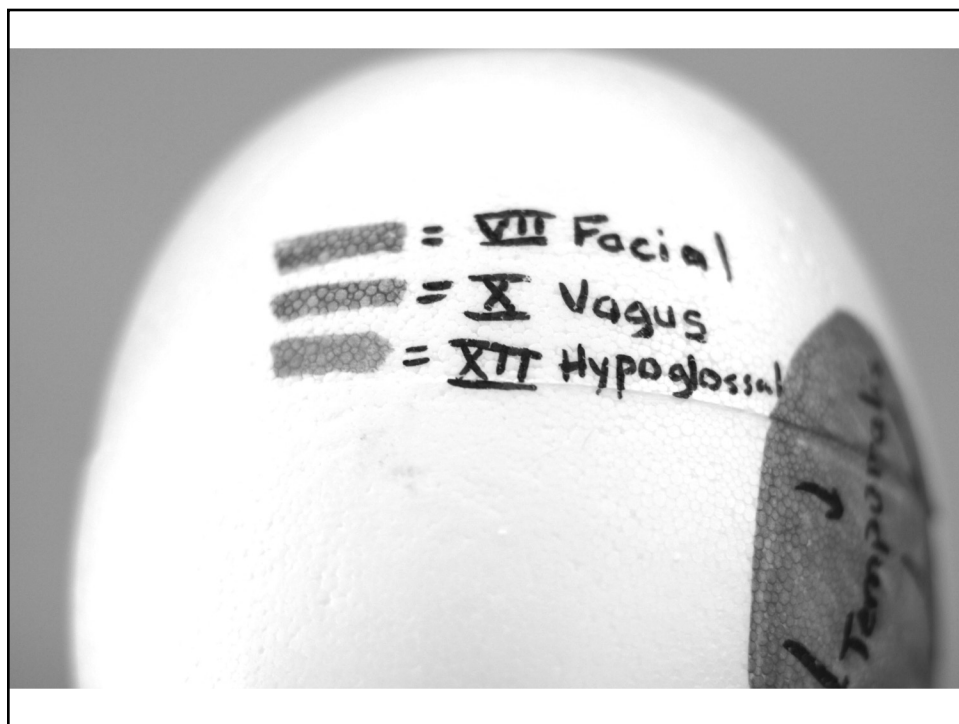


wikipedia

28



29



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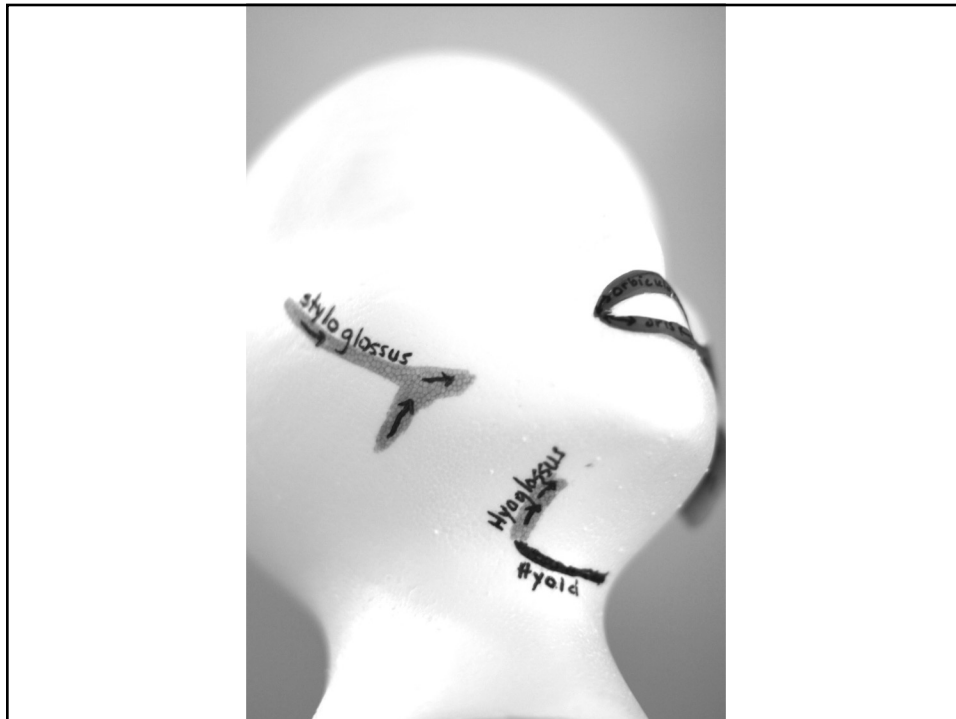
Tongue Base

Hyoglossus

- Action: Depresses the tongue
- Origin: Top part of the greater horn of the hyoid
- Insertion: Posterior half of the side of the tongue
- Innervation: CN XII (Hypoglossal) (orange)



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Tongue Base

Palatoglossus

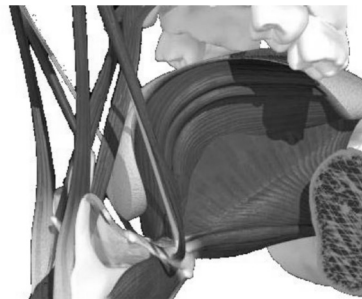
- Action: Elevate floor of mouth
- Origin: Palatine Aponeurosis (anterior surface of soft palate)
- Insertion: Side of tongue into Transverse
- (Located in Anterior Faucial Pillars)
- Innervation: CN XI (Accessory) and Pharyngeal Plexus of CN X (Only tongue muscle NOT innervated by XII)



33

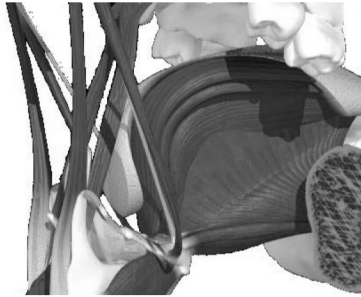
Oropharyngeal seal

- Action: Tongue seals off oropharyngeal opening
- Muscles: Intrinsic and Extrinsic tongue muscles, Palatoglossus
- Purpose: Close off oral cavity from pharynx to prevent pressure escape



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Oropharyngeal Seal: Intrinsic Tongue Muscles



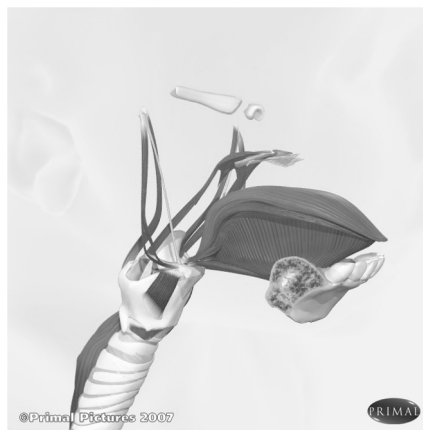
- Superior Longitudinal
- Verticalis
- Transverse
- Inferior Longitudinal

35

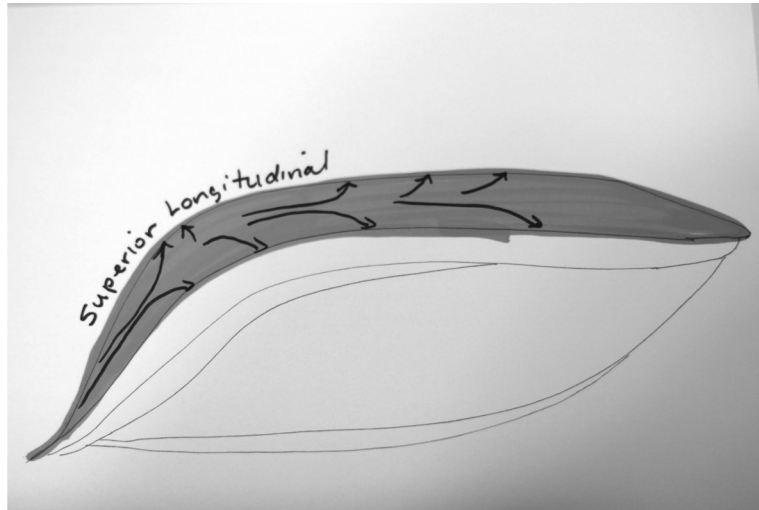
Oropharyngeal Seal: Intrinsic Tongue Muscles

Superior Longitudinal

- **Action:** Shortens; makes tongue concave; tip up
- **Origin:** Septum of tongue; submucosa near epiglottis
- **Insertion:** Sides of tongue
- **Innervation:** CN XII (Orange)



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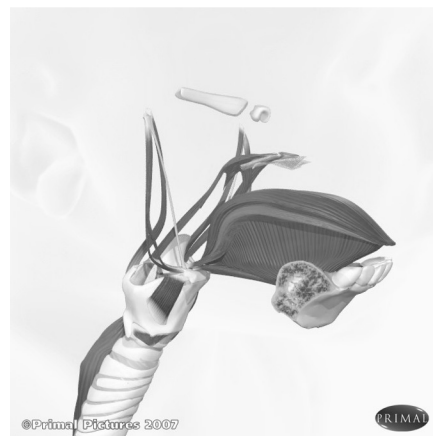
37

Oropharyngeal Seal: Intrinsic Tongue Muscles

Verticalis

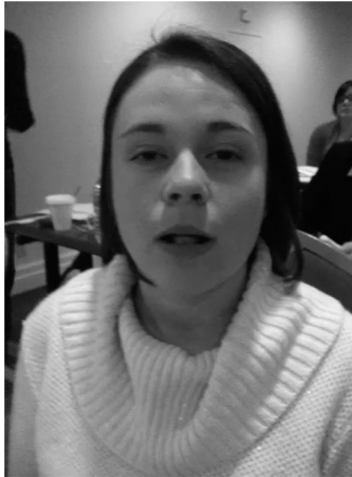
- Action: Widen and Flatten Tongue
- Origin: Superior surface of tongue
- Insertion: Inferior surface of tongue
- Innervation: CN XII (orange)

(Occupies same space as Transverse)

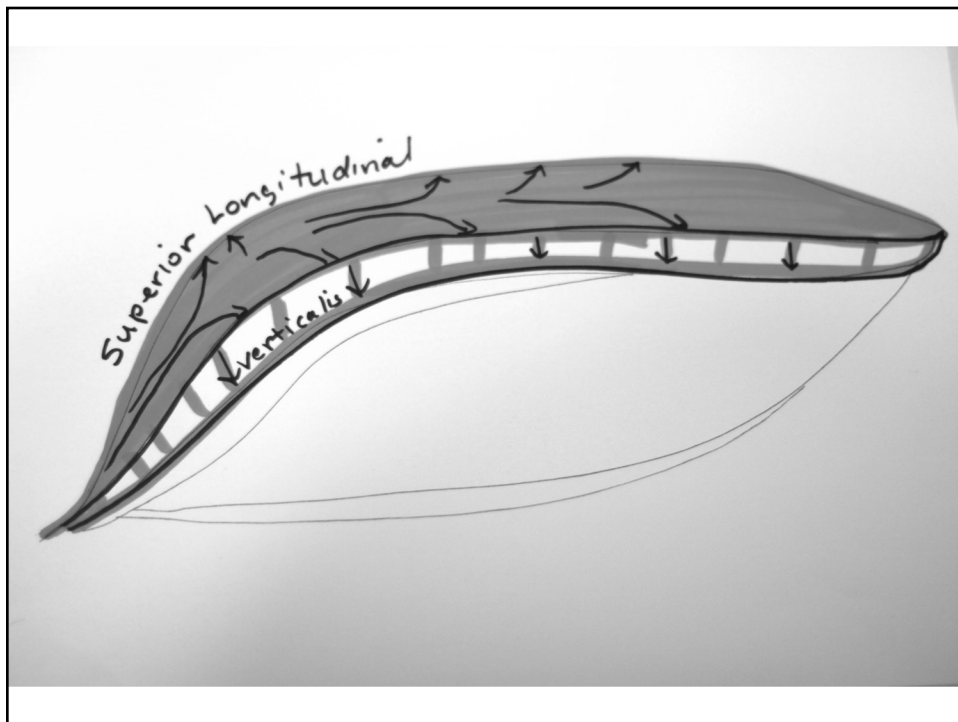


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Verticalis



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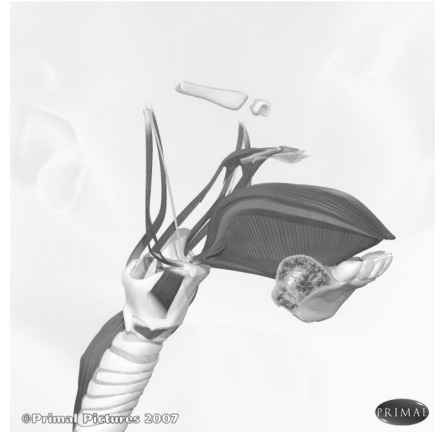


40

Oropharyngeal Seal: Intrinsic Tongue Muscles

Transverse

- Action: Elongate, narrow, thicken tongue; lift sides
- Origin: Tongue septum
- Insertion: Mucosa at sides of tongue
- Innervation: CN XII

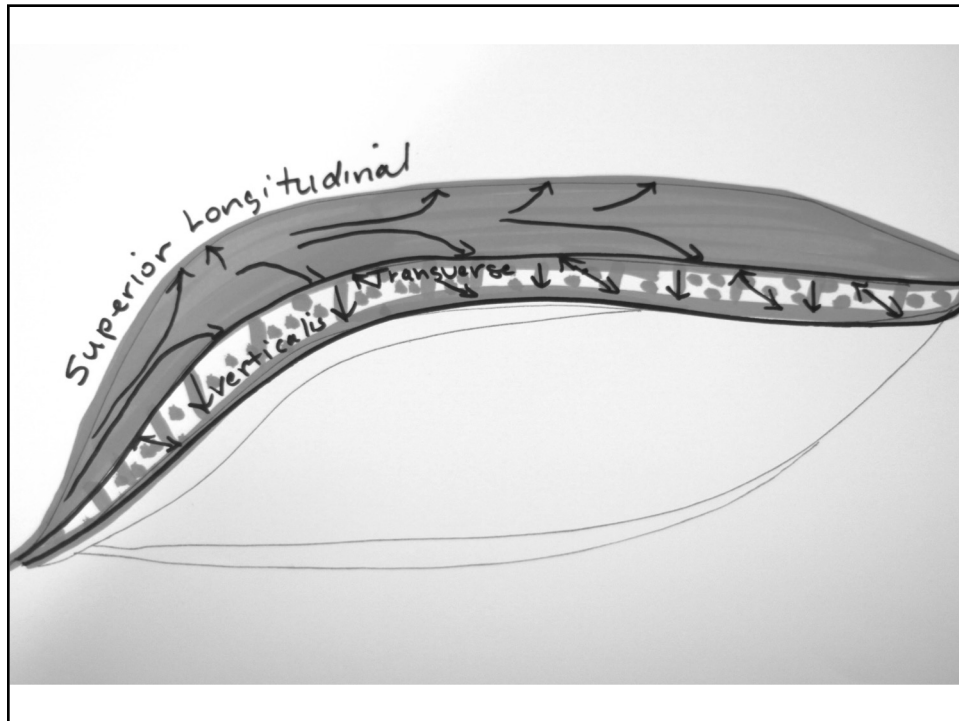


41

Transverse



42



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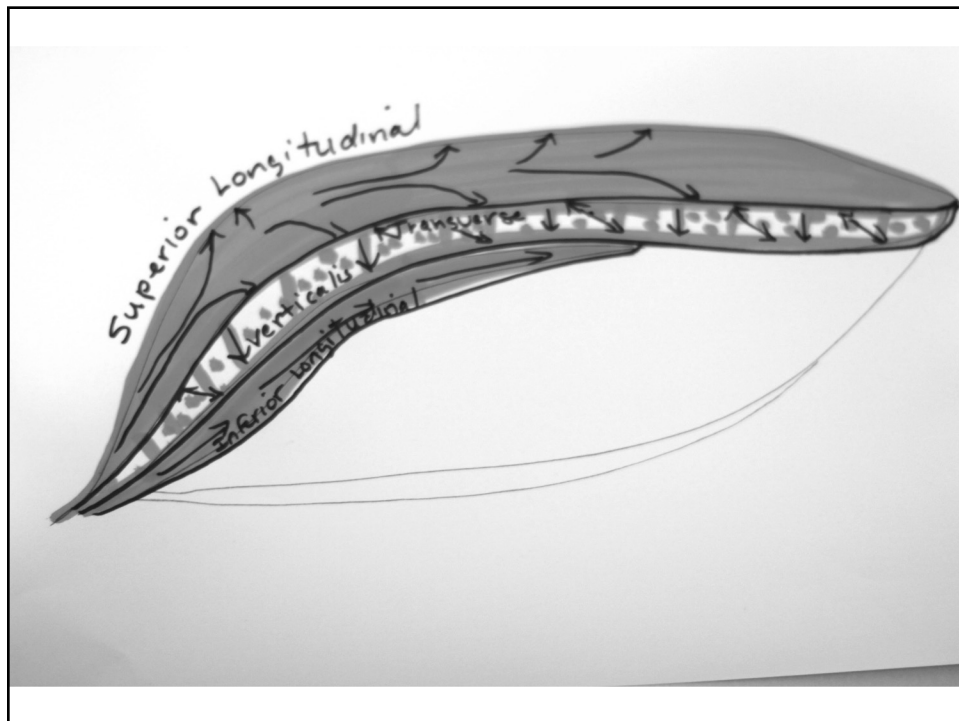
Oropharyngeal Seal: Intrinsic Tongue Muscles

Inferior Longitudinal

- Action: Shortens; makes tongue convex; tip down
- Origin: Lingual root; Hyoid
- Insertion: Apex of tongue
- Innervation: CN XII



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Extrinsic Tongue Muscles



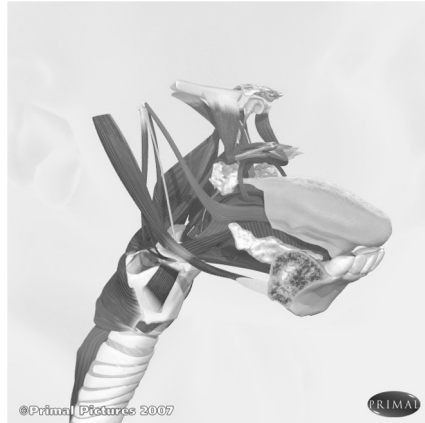
- Styloglossus
- Genioglossus
- Hyoglossus

46

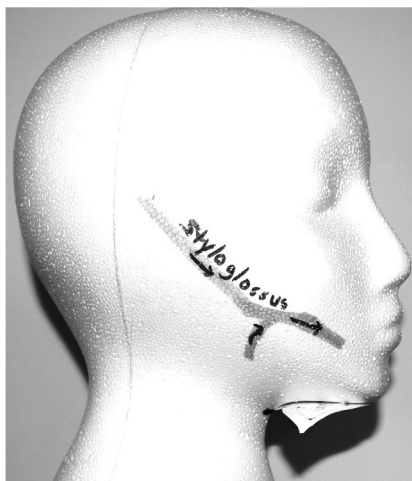
Oropharyngeal Seal: Extrinsic Tongue Muscles

Styloglossus

- Action: Retract and elevate the tongue
- Origin: Styloid process of the temporal bone
- Insertion: Lateral border of the tongue, blending with the Inferior Longitudinal muscle
- Innervation: CN XII (Hypoglossal) (orange)



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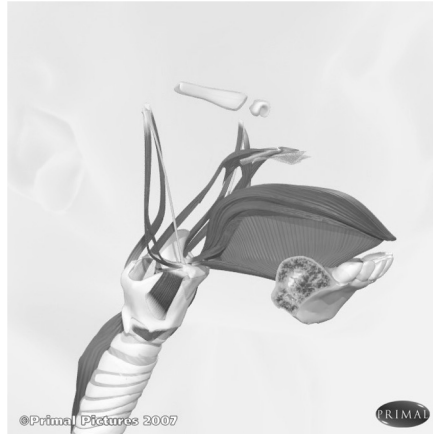
You've already done
this one

48

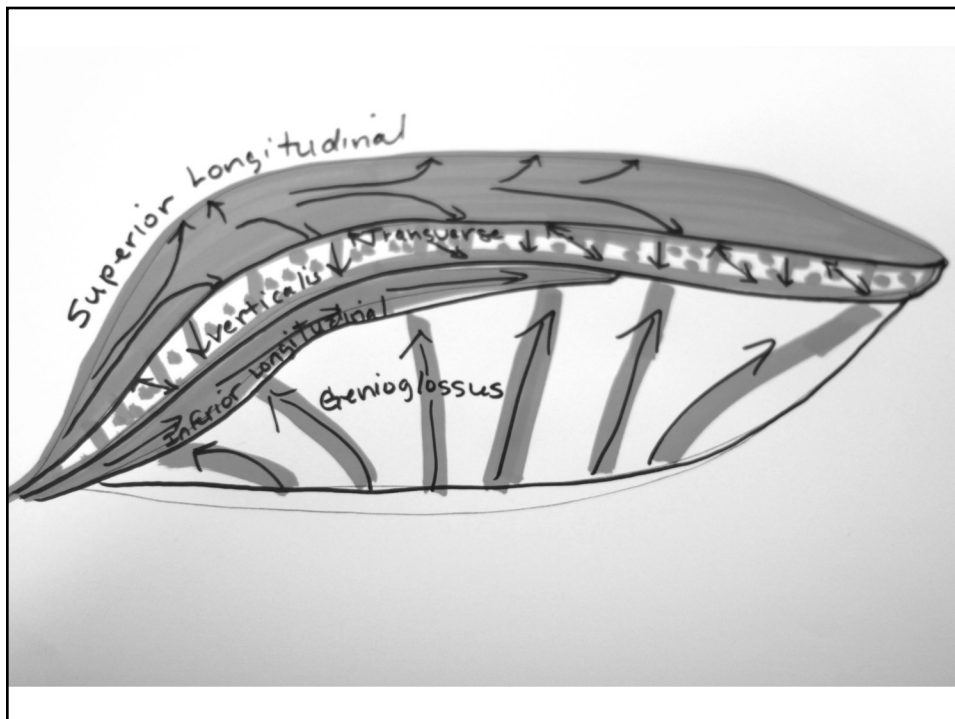
Oropharyngeal Seal: Extrinsic Tongue Muscles

Genioglossus

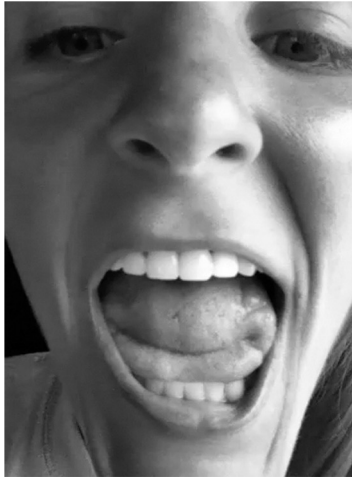
- Action: Depress; retract; protrude tongue
- Origin: Mental spine of mandible
- Insertion: Fans up and out to Dorsum of tongue to Hyoid
- Innervation: CN XII (orange)



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Oropharyngeal Seal: Extrinsic Tongue Muscles

Hyoglossus

- Action: Depresses the tongue
- Origin: Top part of the greater horn of the hyoid
- Insertion: Posterior half of the side of the tongue
- Innervation: CN XII (Hypoglossal) (orange)



52



You've got this one already too.

53

Oropharyngeal Seal:

Palatoglossus

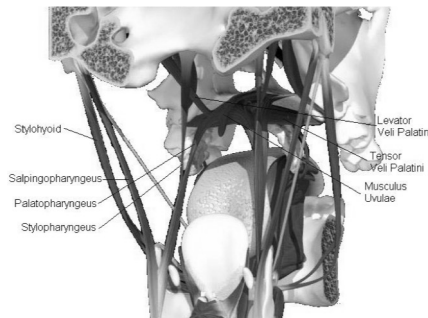
- Action: Elevate floor of mouth
- Origin: Palatine Aponeurosis (anterior surface of soft palate)
- Insertion: Side of tongue into Transverse
- (Located in Anterior Faucial Pillars)
- Innervation: CN XI (Accessory) and Pharyngeal Plexus of CN X (Only tongue muscle NOT innervated by XII)



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Velopharyngeal seal

- Action: Close VP port
- Muscles: Levator veli palatini, Superior pharyngeal constrictor
- Purpose: Close VP port to prevent pressure escape



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Velopharyngeal seal

Levator Veli Palatini

- Action: Velar elevation; dilate eustachian tube
- Origin: Temporal bone
- Insertion: Aponeurosis of the soft palate
- Innervation: CN X – pharyngeal plexus



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Velopharyngeal seal

Superior Pharyngeal Constrictor

- Action: Squeeze/contract pharynx
- Origin: Medial pterygoid plate; pterygomandibular ligament and raphe; mylohyoid ridge of mandible; mucous membrane of oral cavity; sides of tongue
- Insertion: Posterior median raphe of pharynx
- Innervation: CN X – Pharyngeal Plexus (blue)



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Pharyngeal Constrictors



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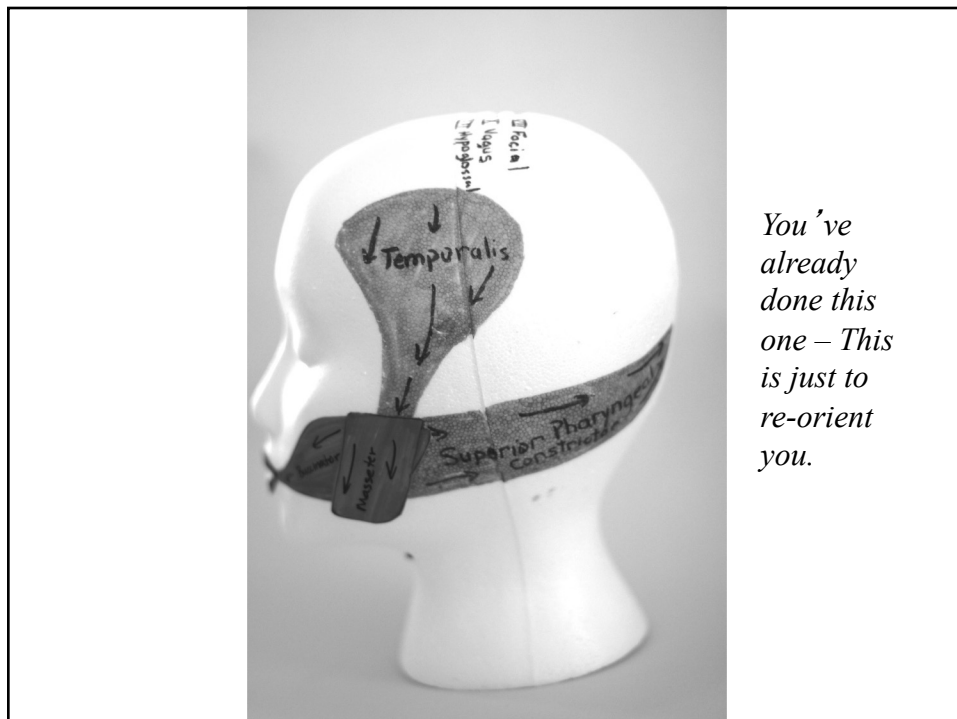
Pharyngeal Constrictors

Superior

- Action: Squeeze/contract pharynx
- Origin: Medial pterygoid plate; pterygomandibular ligament and raphe; mylohyoid ridge of mandible; mucous membrane of oral cavity; sides of tongue
- Insertion: Posterior median raphe of pharynx
- Innervation: CN X – Pharyngeal Plexus (Blue)



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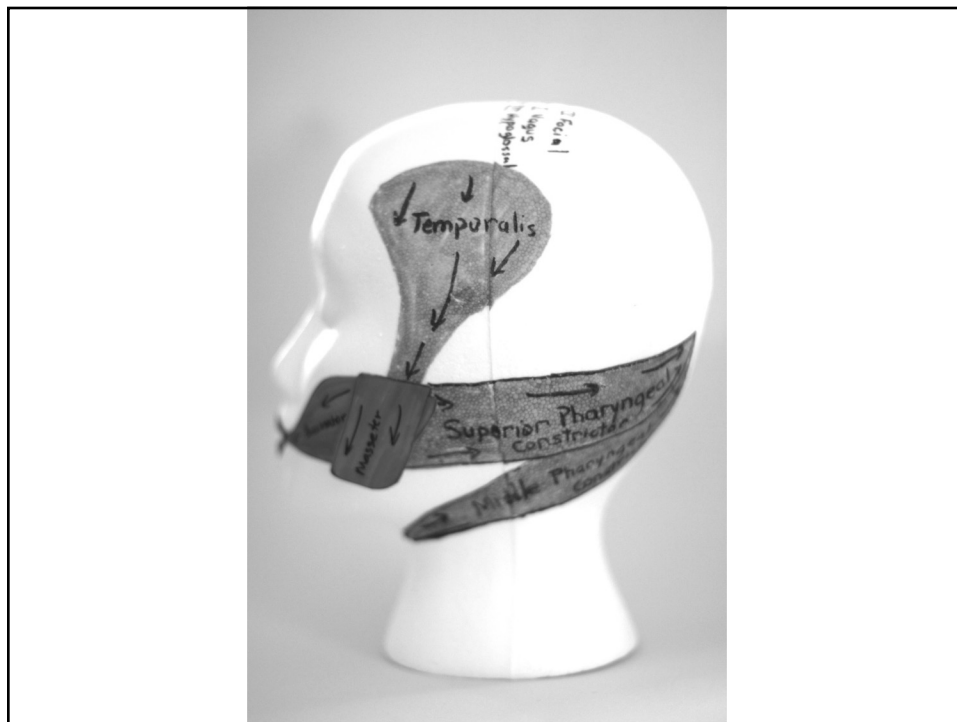
Pharyngeal Constrictors

Middle

- Action: Contracts pharynx
- Origin: Hyoid
- Insertion: Posterior median raphe
- Innervation: CN X – Pharyngeal Plexus (blue)



61



62

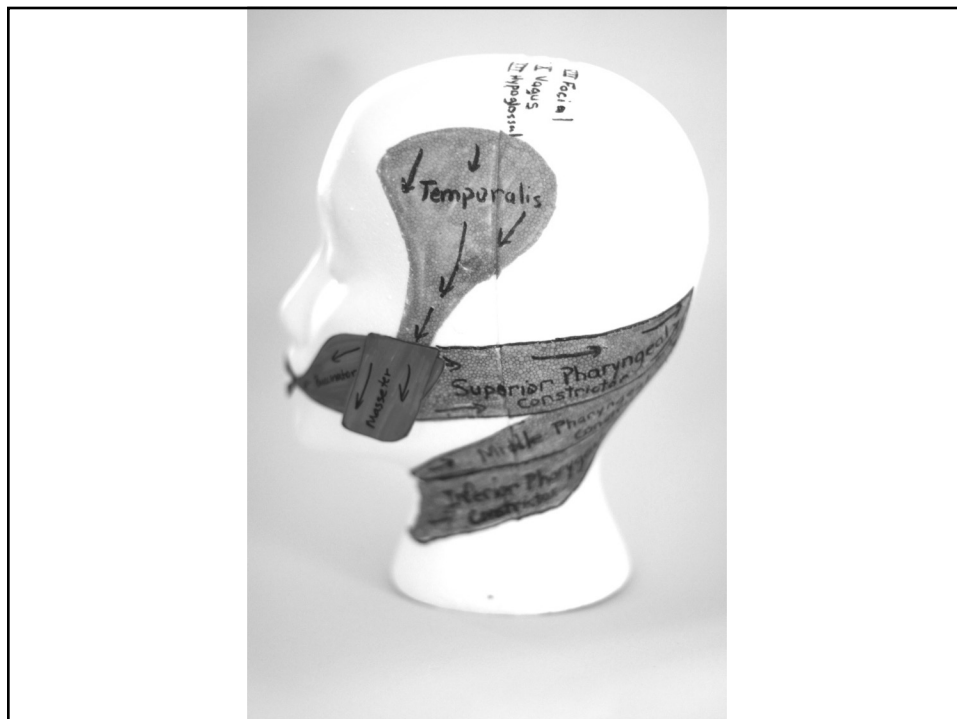
Pharyngeal Constrictors

Inferior

- Action: Contracts Pharynx
- Origin: Cricoid and thyroid cartilages
- Insertion: Posterior median raphe
- Innervation: CN X (Pharyngeal Plexus) (blue)



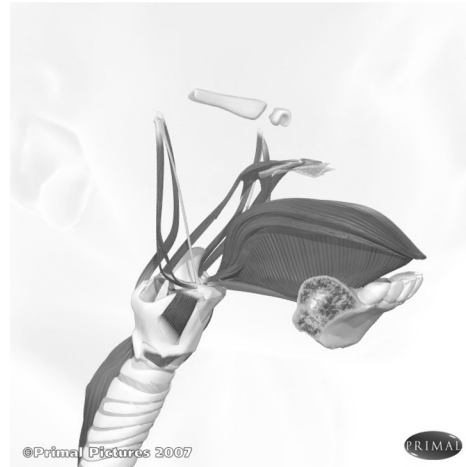
63



64

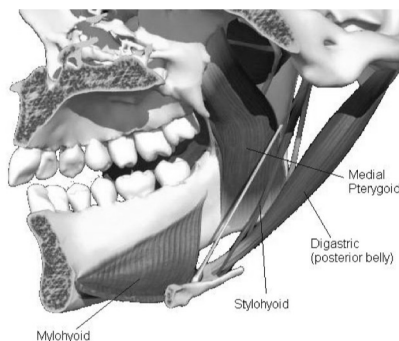
Laryngeal seal

- Action: Hyolaryngeal excursion, epiglottic inversion, TVF adduction
- Muscles: Suprahyoids, Thyrohyoid, Aryepiglottis, Thyroepiglottis, VF adductors
- Purpose: Close laryngeal vestibule for Airway protection



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Laryngeal Seal: Suprahyoids



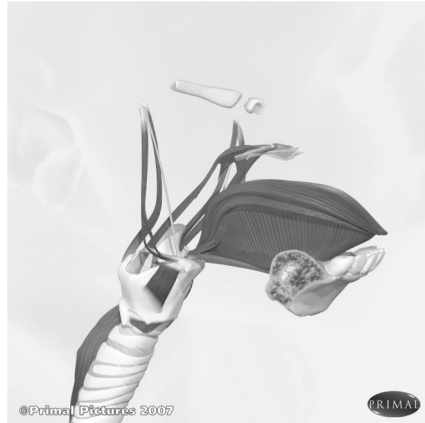
- Geniohyoid
- Mylohyoid
- Digastric
- Stylohyoid

66

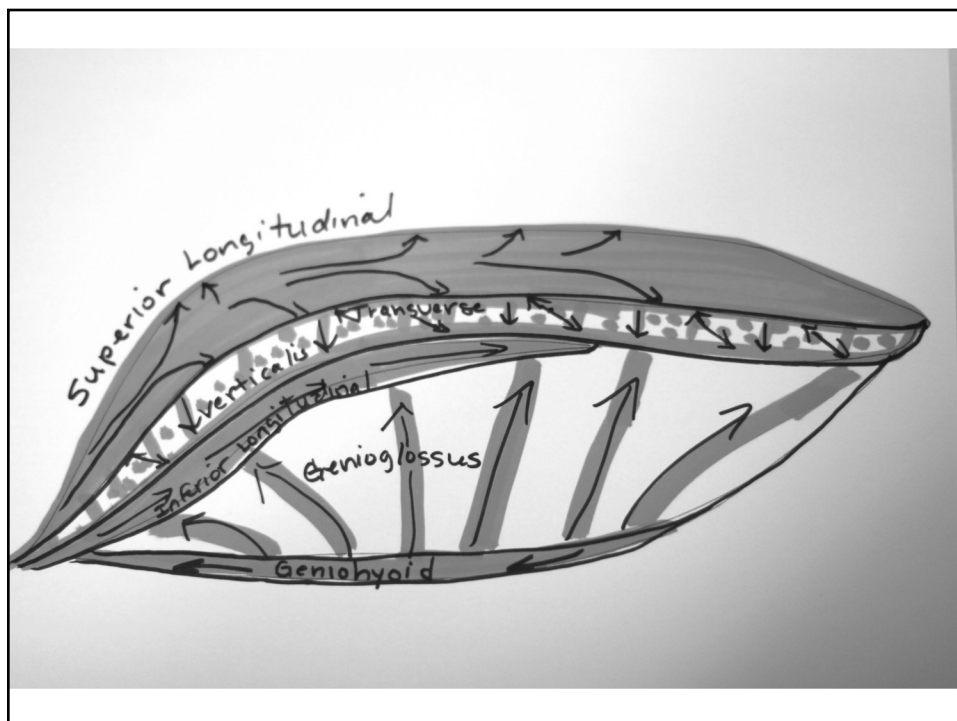
Laryngeal Seal: Suprahyoids

Geniohyoid

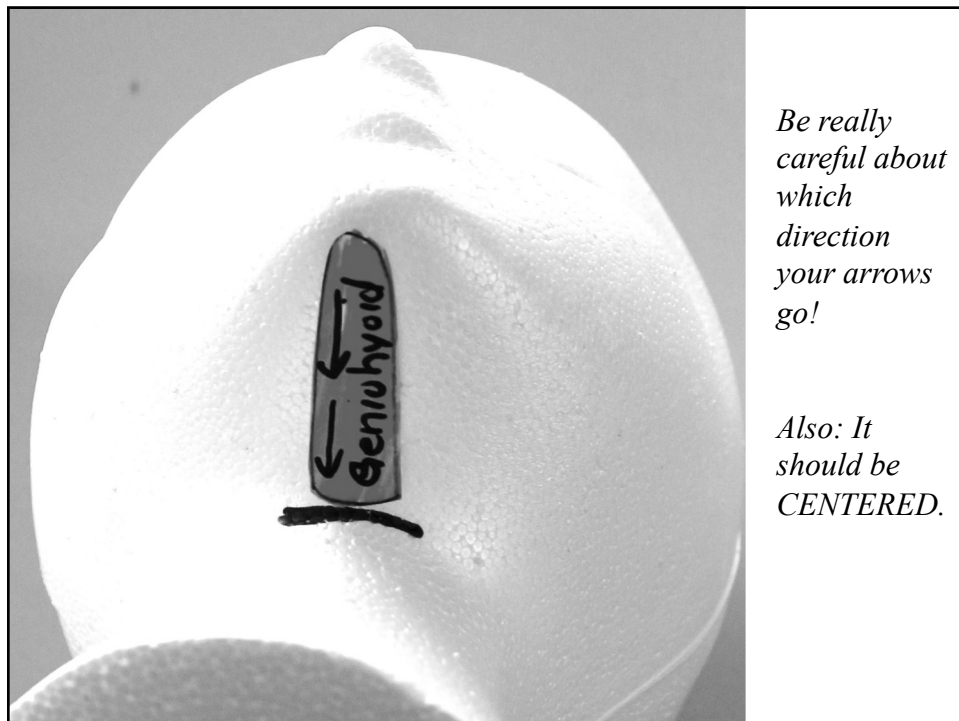
- Action: Draws tongue and hyoid forward
- Origin: Mandible
- Insertion: Hyoid
- Innervation: CN XII (orange)



67



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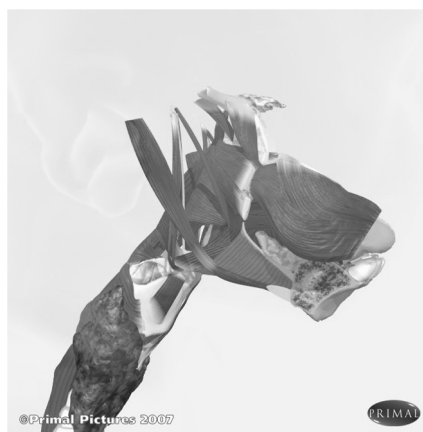


69

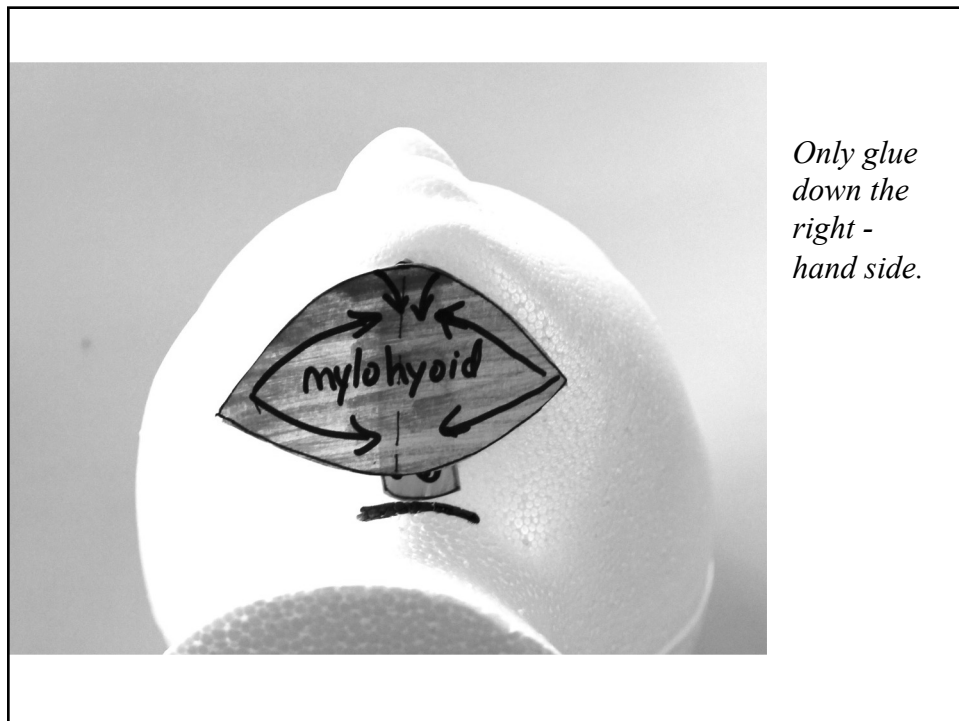
Laryngeal Seal: Suprahyoids

Mylohyoid

- Action: Hyoid elevation; Raises floor of mouth
- Origin: Mandible (mylohyoid ridge)
- Insertion: Hyoid and median raphe
- Innervation: CN V (green)



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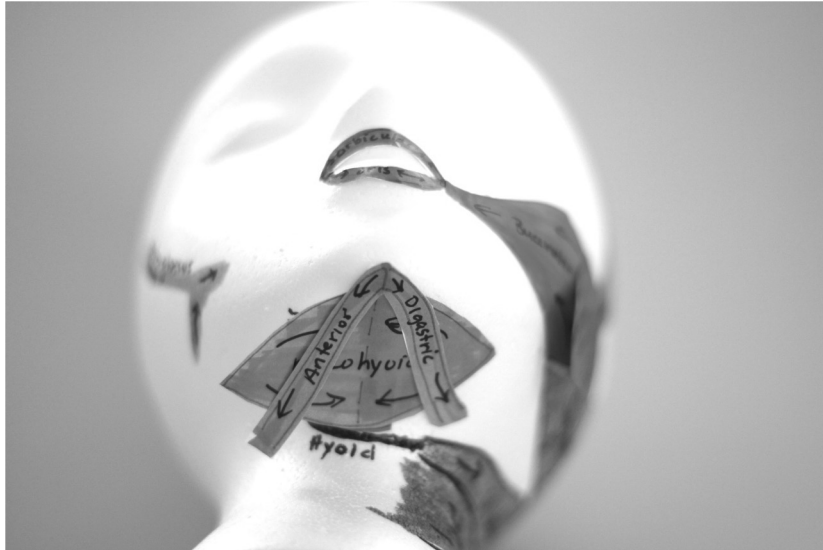
Laryngeal Seal: Suprahyoids

Anterior Digastric

- Action: Elevate hyoid; depress mandible
- Origin: Mandible
- Insertion: Hyoid
- Innervation: CN V (green);



72



73

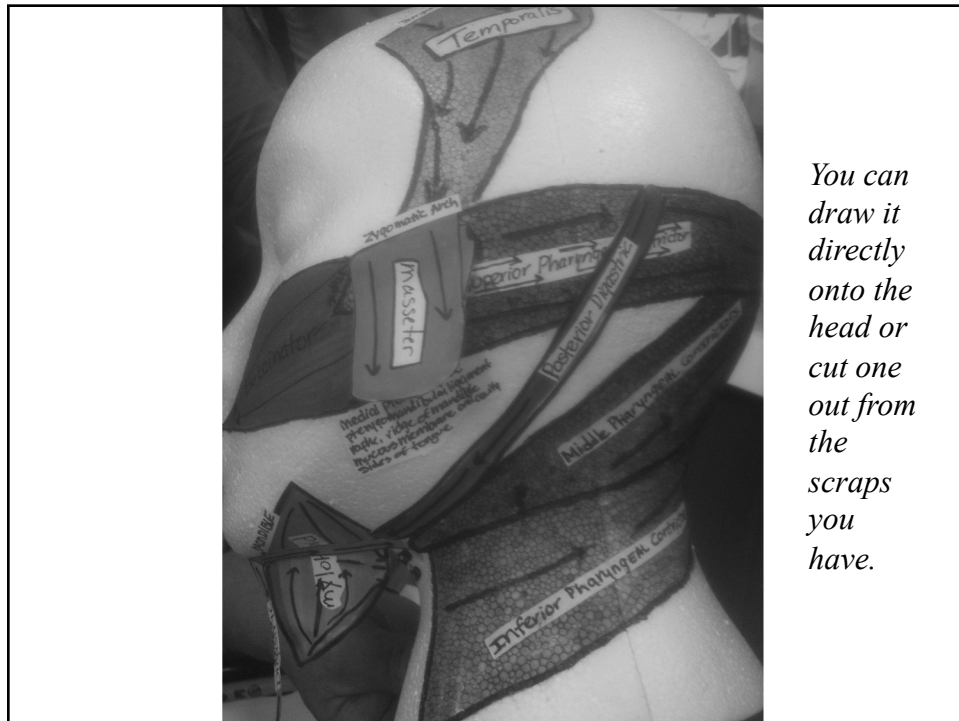
Laryngeal Seal: Suprahyoids

Posterior Digastric

- Action: Elevate hyoid; depress mandible
- Origin: Mastoid process
- Insertion: Hyoid
- Innervation: CN VII (red)



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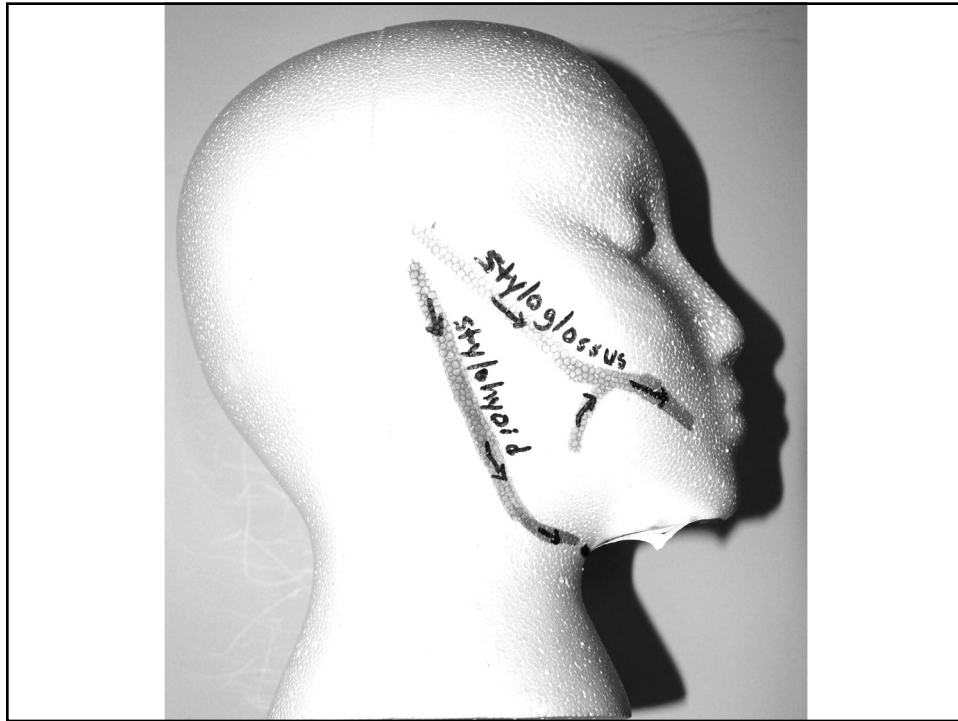
Laryngeal Seal: Suprahyoids

Stylohyoid

- Action: Elevates and draws hyoid backward
- Origin: Styloid process of Temporal bone
- Insertion: Hyoid
- Innervation: CN VII (red)

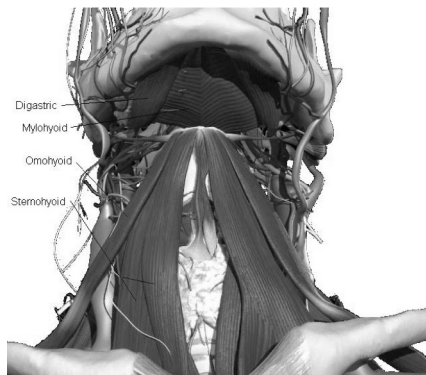


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Laryngeal Seal:Infrahyoids



- Sternothyroid
- Thyrohyoid
- Sternohyoid
- Omohyoid

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*Do the next two
together.
It will be easier.*

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Laryngeal Seal:Infrahyoids

Sternothyroid

- Action: Depress hyoid
- Origin: Sternum and cartilage of 1st rib
- Insertion: Thyroid cartilage
- Innervation: CN XII (orange)

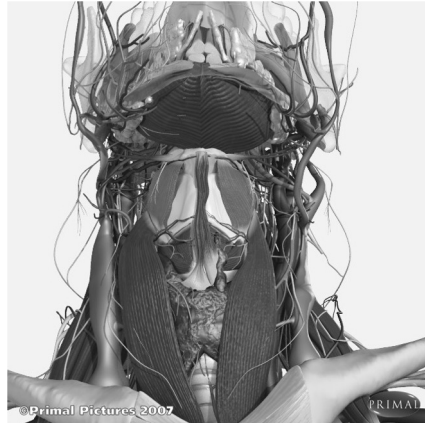


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Laryngeal Seal:Infrahyoids

Thyrohyoid

- Action: Depress hyoid; Raise larynx
- Origin: Thyroid cartilage
- Insertion: Hyoid
- Innervation: CN XII
- (orange)



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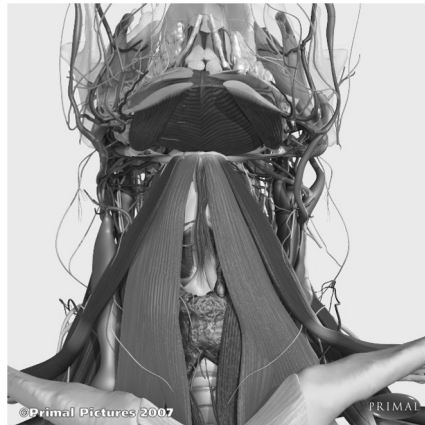


82

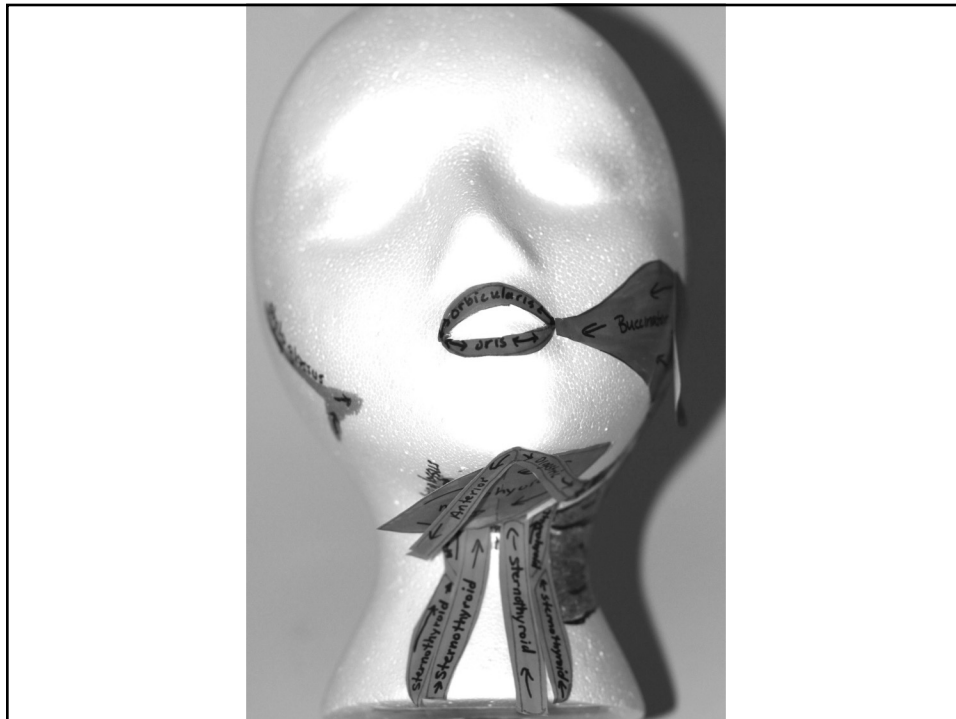
Laryngeal Seal:Infrahyoids

Sternohyoid

- Action: Depress hyoid
- Origin: Sternum and clavicle
- Insertion: Hyoid
- Innervation: CN XII (orange)



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Laryngeal Seal:Infrahyoids

Omohyoid

- Action: Depress and retract hyoid
- Origin: Scapula
- Insertion: Hyoid
- Innervation: CN XII (orange)



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Laryngeal Seal: Vocal Fold Adductors

Lateral

Cricoarytenoid

- Action: Adduct VF
- Origin: Cricoid
- Insertion: muscular process of ipsilateral arytenoid
- Innervation: CN X – Recurrent Laryngeal



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Laryngeal Seal: Vocal Fold Adductors

Transverse Arytenoids

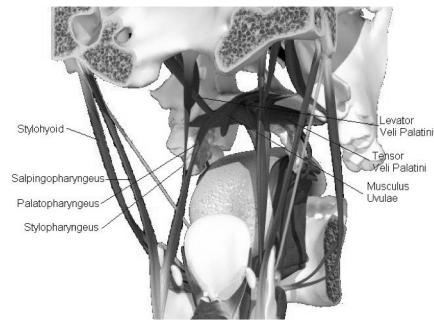
- Action: Adduct VF
- Origin: Posterior surface of arytenoids
- Insertion: Posterior surface of opposite arytenoid
- Innervation: CN X – Recurrent Laryngeal



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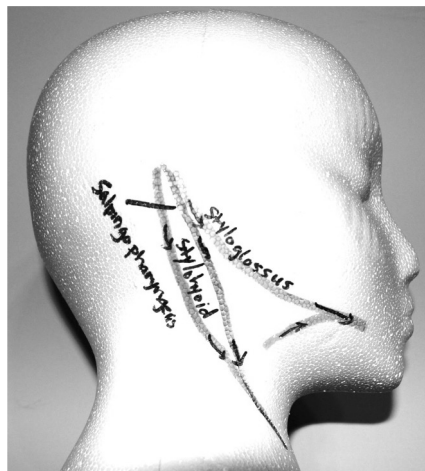
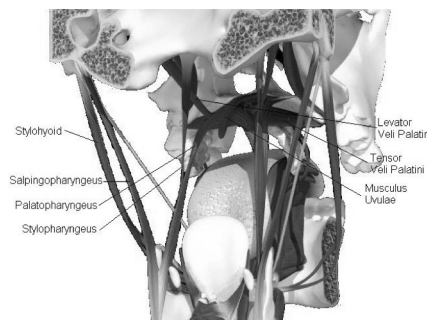
Compression of Pharyngeal Chamber

- Action: Pharynx squeezes laterally and P-A, and shortens
- Muscles: All Phar. constrictors (squeeze), Salpingopharyngeus (X)
Palatopharyngeus (X)
located in Post. Faucial Pillars
Stylopharyngeus, (IX)
(shorten by pulling up)
- Purpose: P+ in pharynx and open UES



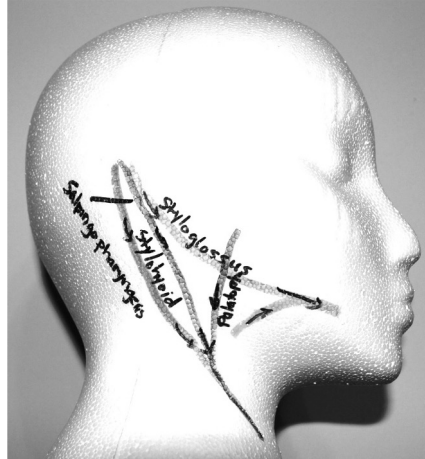
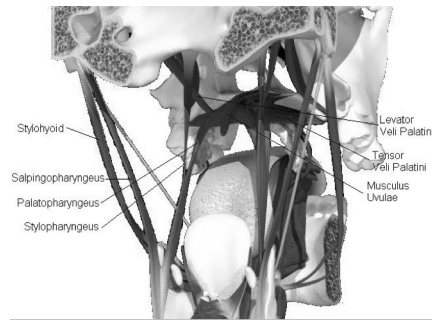
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Salpingopharyngeus (X)



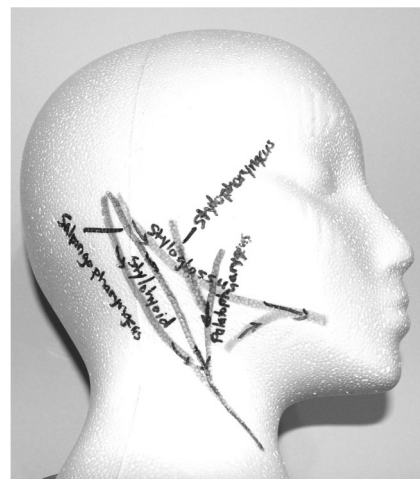
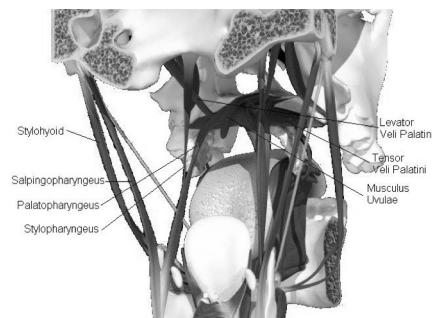
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Palatopharyngeus (X)



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Stylopharyngeus (IX)

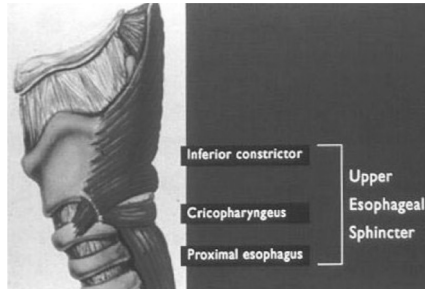


Use PURPLE – You might want to make it from a piece of paper and glue it on

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UES seal

- Action: UES relaxes, opens, then closes
- Muscles: Cricopharyngeus, Suprahyoids, Infrahyoids, pharyngeal shorteners (prev. slide)
- Purpose: Control access to esophagus



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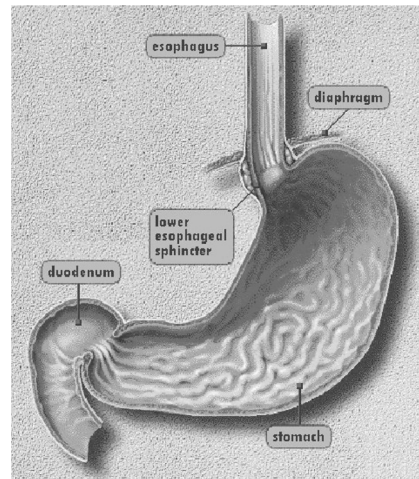
Compression of Esophageal Chamber

- Action: Peristaltic motion in esophagus
- Muscles: Esophageal constrictors
- Purpose: P+ to move bolus toward stomach

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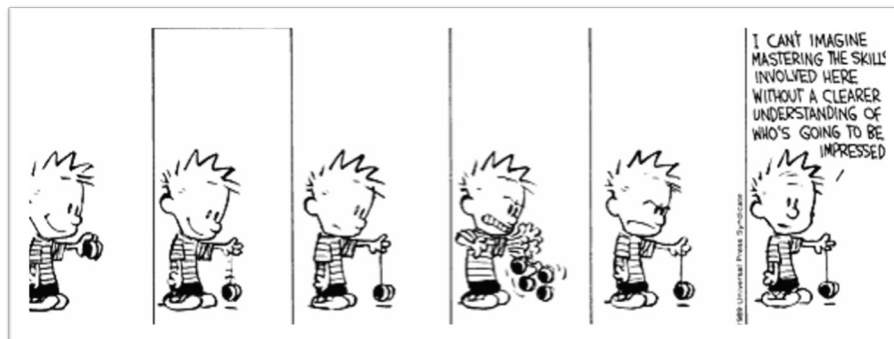
LES Seal

- Action: LES relaxes, opens, closes
- Muscles: LES
- Purpose: Control access to stomach



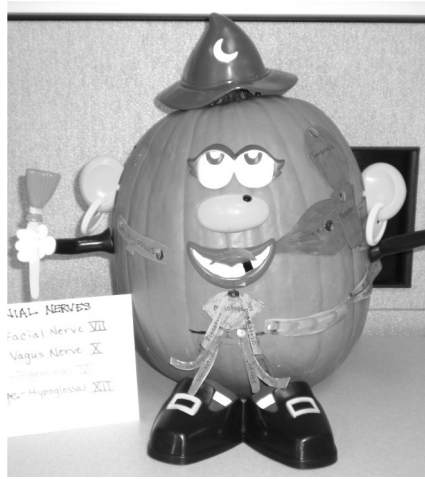
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How You Might Be Feeling About Now



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You Don't Learn What You Don't Have Fun With



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