



Speech and Swallowing in KD: Soup to Nuts

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Disclosures

- I will not be speaking on off-label use of medications
- I have no relevant financial disclosures.



Disclaimer

- I am not a speech pathologist!
- I am not a researcher with expertise in Kennedy's Disease.

....so if I make a mistatement or offend anyone please forgive me.



Objectives

- To explore the determinants of voice that could be affected by KD
- To explore the aspects of speech that could be affected by KD
- To explore the mechanics of swallowing that could be affected by KD
- To have fun



20 Questions



“Not Quite” 20 Questions



Voice and KD



Question 0

Survey:

How many individuals with
Kennedy's Disease are there in
the audience?

...friends, family, loved ones?



Question 1

Survey:

How many individuals with Kennedy's Disease have noticed a significant change in their voices over time?



Question 2

Survey:

How many individuals with
Kennedy's Disease have
mentioned voice changes to
their healthcare providers?

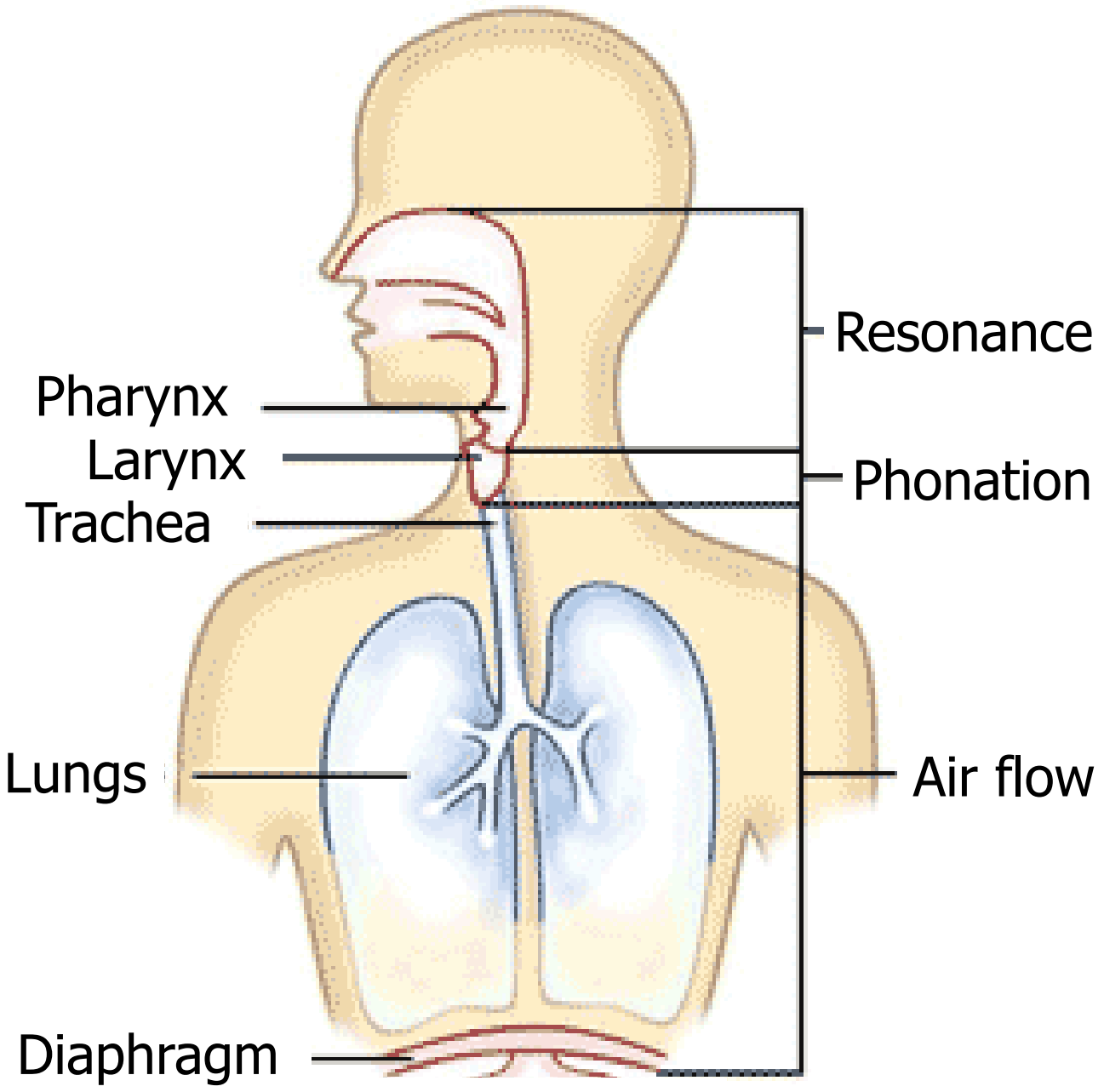


Background: Voice



Question 3

What are the physical determinants of one's voice?



Elements Of Voice Production



Normal Voice Production

- Diaphragm – provides the force behind the air flow
- Larynx (voice box) – provides the vibration or sound
- Pharynx (throat)– affects the sound quality
 - Oropharynx
 - Nasopharynx



Voice and KD



Question 4

How are the various contributors
to voice production affected by
KD?



Voice Production and KD

- Diaphragm
- Larynx – voice box
- Pharynx
 - Oropharynx
 - Nasopharynx



Diaphragm and KD

- Neuronal loss within the phrenic nerves may lead to decreased power in the diaphragm, causing decreased air flow, and decreased loudness of the voice



Larynx and KD

- Spasm (laryngospasm) of the laryngeal muscles can cut off one's voice



Pharynx and KD

- Muscle weakness in the pharynx or throat (i.e. bulbar weakness) is a common feature of KD
- Palatal weakness leads to the typical nasal speech characteristic of lower motor neuron disorders



Question 5

Inquiry:

What are people's personal experiences with voice changes?



Question 6

Reflection:

How do personal experiences compare with predicted changes based on our understanding of KD?



Voice Production and KD

- Diaphragmatic weakness should impair maximal loudness
- Laryngospasm may cause interruptions in speech
- Palatal weakness should cause nasal speech*



Question 7

Are there any treatments or techniques for voice problems with KD?



Voice Therapy in KD

- Pharmacological measures
 - None
- Behavioral measures
 - Speech therapy can help to reinforce the importance of enunciation and projection



Speech and KD



Question 8

What are the determinants of normal speech?



Normal Speech

- Articulation is determined by fine coordination of the muscles of the...
 - Lips – “ma”
 - Face – “wa”
 - Tongue - “la”
 - Throat (pharynx) “ga”



Question 9

How are the various determinants of speech affected by KD?



Speech Production and KD

- Facial weakness can lead to dysarthria (impaired speech)
- Tongue weakness can lead to a lingual dysarthria
- Palatal weakness can lead to a nasal dysarthria
- Throat weakness can lead to guttural speech



Question 10

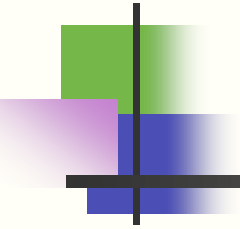
Are there any treatments for the dysarthria associated with KD?



Dysarthria Treatment in KD

- Pharmacological measures
 - None
- Behavioral measures
 - Speech therapy can help to reinforce the importance of enunciation.

Questions on Voice and Speech?





Swallowing and KD



Question 11

Survey:

How many individuals with KD
have had swallowing problems?



Question 12

Survey:

How many individuals with KD
have had talked to their doctors
about swallowing problems?



Background: Swallowing



Question 13

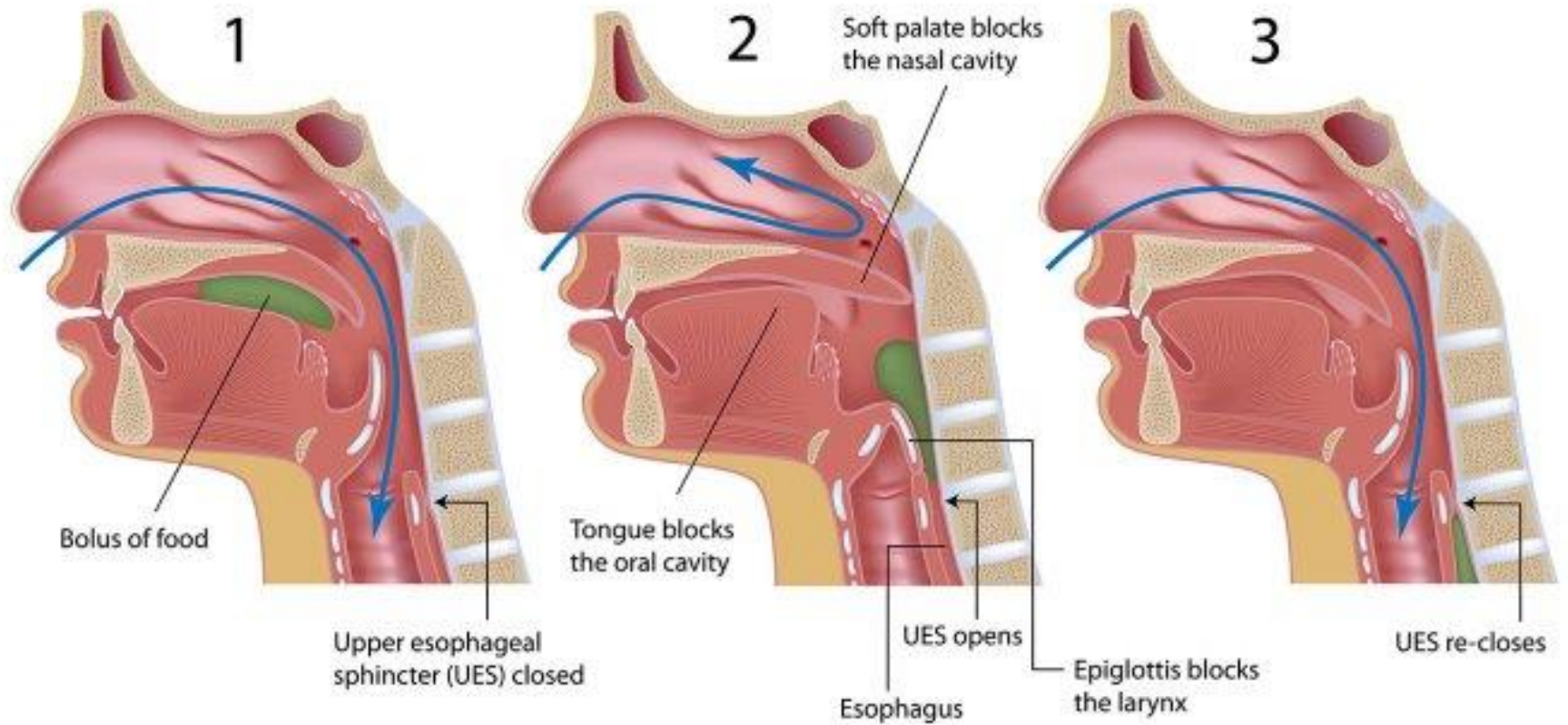
What is required for normal swallowing?



Normal swallowing

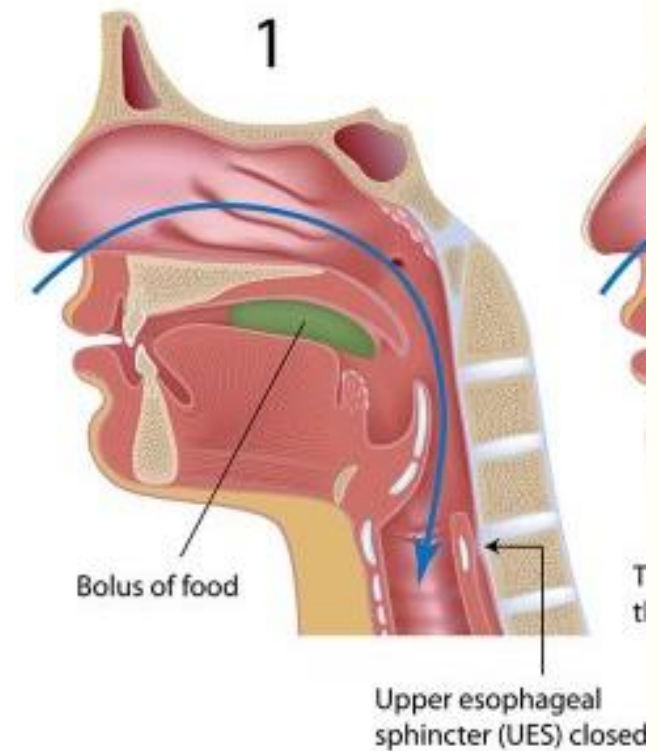
- Oral phase
- Pharyngeal phase
- Esophageal phase

Swallowing



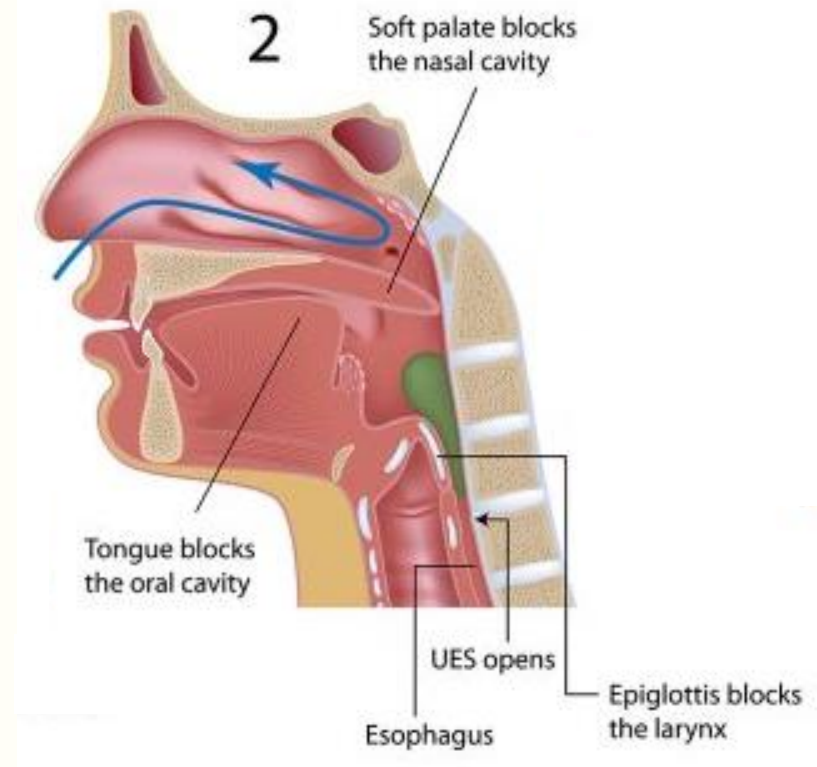
Normal swallowing

- Oral phase (voluntary)
 - Bolus of food is prepared by chewing and moistening
 - Lips come together
 - The tongue pushes the food back to the throat
 - Wind pipe and nasopharynx are open



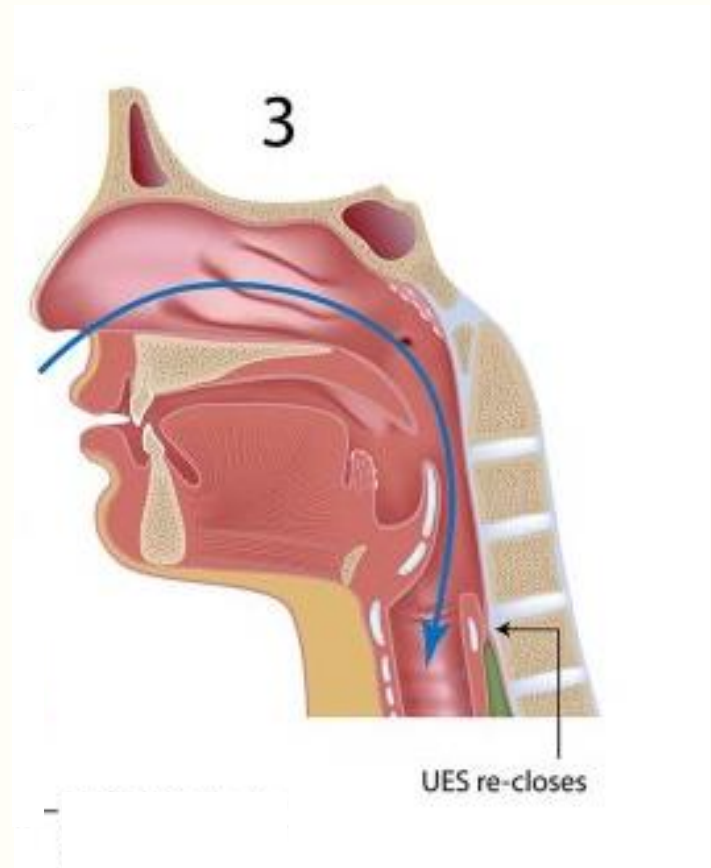
Normal swallowing

- Pharyngeal phase (reflexive)
 - The soft palate closes off the nasopharynx
 - The epiglottis covers the wind pipe
 - The vocal cords close
 - The tongue blocks off the mouth



Normal swallowing

- Esophageal phase (reflexive)
 - The upper esophageal sphincter closes
 - Food is propelled down the esophagus
 - Nasopharynx and wind pipe are open





Question 14

How does KD affect swallowing?

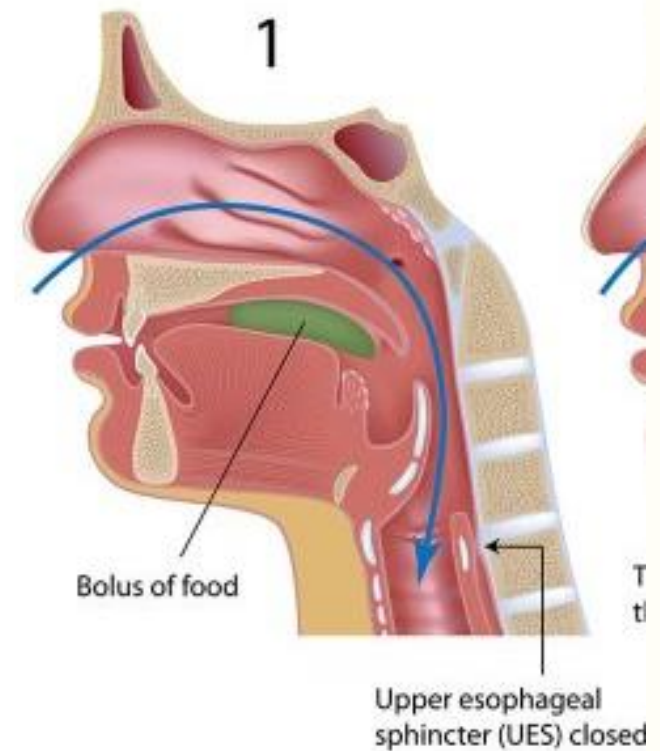


Swallowing and KD

- **Dysphagia**, or impaired swallowing can occur due to impaired
 - Oral phase
 - Pharyngeal phase
 - Esophageal phase

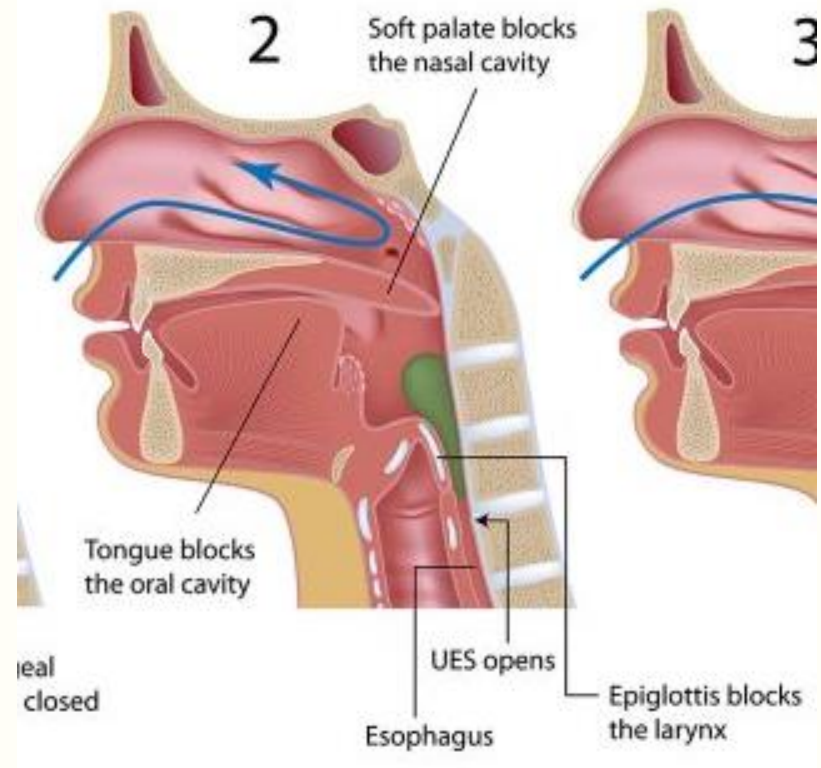
Swallowing and KD

- Oral phase (voluntary)
 - Tongue weakness and atrophy may inhibit propulsion of food backwards



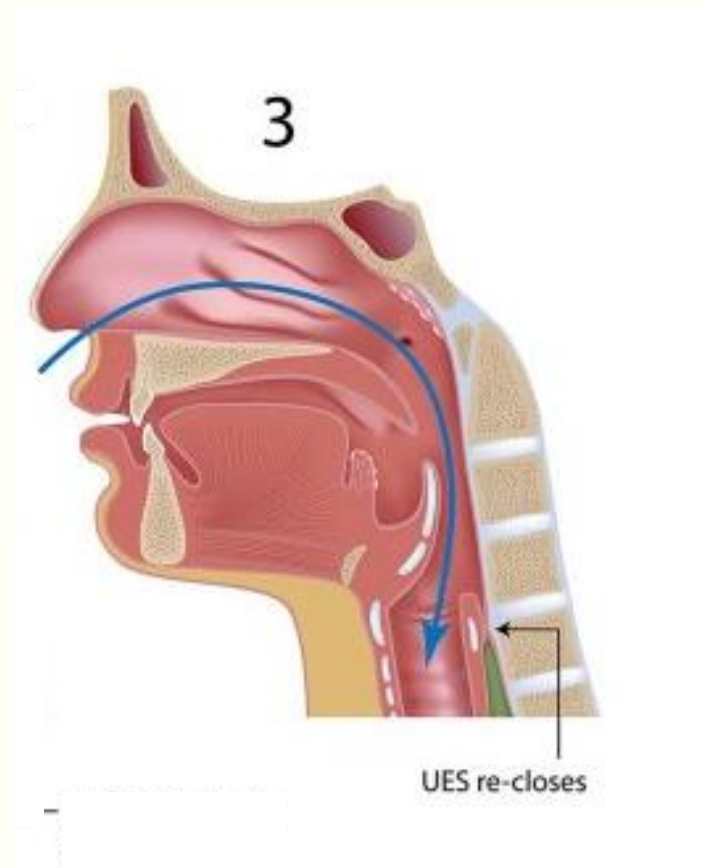
Swallowing and KD

- Pharyngeal phase (reflexive)
 - Weakness of soft palate allows food and liquid into nose
 - Epiglottis does not fully cover wind pipe
 - Vocal cords may not close fully
 - Muscle spasms may prevent food passage



Swallowing and KD

- Esophageal phase (reflexive)
 - Upper esophageal sphincter may not close fully, allowing back flow
 - Muscle weakness may impede propulsion of food down the esophagus
 - Cramps may cause food to get stuck





Treatment



Question 15

Are there any treatments or techniques for swallowing problems with KD?



Dysphagia Treatment in KD

- Pharmacological measures
 - None
- Behavioral measures
 - Speech therapy can help to reinforce techniques to lessen some of the disturbances caused by KD and thereby reduce the risk of aspiration (food and liquids entering the wind pipe).



Summary



Summary

- KD affects vocal quality
- KD affects speech clarity
- KD affects swallowing
 - ... all in a multifactorial fashion
- Treatment consists of speech therapy



Questions and Discussion

Thank you for your hospitality
and understanding!