#### **RESONANCE DISORDERS**

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#### NORMAL VELOPHARYNGEAL FUNCTION

- Structures Active in VP Closure
- •Velum (Soft Palate)
- • Lateral Pharyngeal Walls (LPWs)
- • Posterior Pharyngeal Wall (PPW)

# Velum: Rest



# Velum (Soft Palate)

- Moves in a superior and posterior direction
- • Has a type of "knee" action
- • Moves toward the posterior pharyngeal wall

#### **Velum: During Speech**



## CONT

- Lateral Pharyngeal Walls (LPWs)
- • Move medially to close against the velum

- Posterior Pharyngeal Wall (PPW)
- • Moves anteriorly toward the velum

# **VP Valve during Speech**

- •Velopharyngeal valve is closed for oral sounds
- Velopharyngeal valve is open for nasal sounds (m, n, ŋ)
- Purpose of VP Valve

 Directs sound energy and air flow into the appropriate cavity (oral or nasal) during speech

# **Normal Velopharyngeal Function**

- Learning (Articulation)
- Physiology (Movement)
- Anatomy (Structure)

# **Velopharyngeal Dysfunction**

- Velopharyngeal Inadequacy
  - Anatomy(Velopharyngeal Insufficiency)

     (STRUCTURE)
  - Physiology(Velopharyngeal Incompetency) (FUNCTION)
- Articulation/Speech Learning(Velopharyngeal Mislearning)

## **Velopharyngeal Insufficiency**



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# **Causes of VP Insufficiency**

- • History of cleft palate
- • Submucous cleft
- Deep pharynx
- • Irregular adenoids
- • Tonsil in the pharynx
- Surgery (adenoidectomy, maxillary advancement, tumor removal)
- • Velum Traumas.

#### **Velopharyngeal Incompetence**



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# **Causes of VP Incompetence**

- •Head trauma/traumatic brain injury
- •Cerebral palsy
- •CVA/stroke
- •Neuromuscular disorders
- Myasthenia gravis, muscular dystrophy, myotonic dystrophy, mitochondrial disorders, etc.

# **Velopharyngeal Mislearning**

#### **Causes of VP Mislearning**

- Compensatory (pharyngeal) productions due to VPI
- • Mislearning (faulty articulation placement)

## NASALITY

- **D** Phoneme-Specific Hypernasality
  - Substitution of nasal consonants for oral consonants (i.e., n/l, n/r)
- Phoneme-Specific Nasal Emission (PSNE)

- Usually occurs on sibilants, particularly s/z
- • Child is usually stimulable

# **Velopharyngeal Dysfunction**

□ Can cause the following:

- • Hypernasality (resonance disorder)
- •Nasal air emission (speech disorder)
- • Dysphonia (voice disorder)

#### **Normal Resonance**

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# **Resonance for Speech**

- Resonance modification of sound produced by the larynx through selective enhancement of certain frequencies.
- The size and shape of the vocal tract has an impact on the individual's speech, resonance and overall voice quality
- Changes shape and size during speech due to the action of the hyoid muscle group
- Provides the *quality* of perceived sound during speech

# Cont.

- Effect on pitch (higher pitch the larynx raises to shorten the pharynx) lateral walls contract to create a very narrow pharyngeal tube (blowing across a bottle)
- Children with a short pharynx have higher resonating frequencies
- Males and females differ on oral cavity sizes and perception of vocal quality
- Anything that changes the length or shape of the resonating cavities affects the quality of the voice

# What determines resonance for speech

- 1. Size and shape of the **resonating cavities**
- pharyngeal cavity
- oral cavity
- nasal cavity
- 2. Function of the **velopharyngeal valve**

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#### Cont.

- Size and Shape of Cavities
- Shorter/smaller cavities: enhance higher formants
- •Longer/larger cavities: enhance lower formants.
- □ Resonance is determined by the following:
  - •Length and volume of pharynx
  - • Size and shape of oral cavity
  - Configuration of nasal cavity

#### Cont.

Differences between

- children and adults
- men and women
- •tall people and short people
- Makes voice quality unique to individual

## **Resonance and Vowels**

- Vowels are resonance sounds
- •They are produced by changing the size and shape of the oral (resonating) cavity.

