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Cleft Palate Speech and Feeding *Train the Trainer*

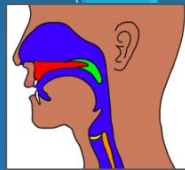




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Module 2.1:

- How Speech Sounds are Made



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Categories of sounds in English

- **Nasals**- can be produced with or without cleft palate (e.g. *m, n, ng*)
- **High pressure**- usually cannot be produced with an open palate, most difficult for children with cleft palate to learn (e.g. *p, b, t, d, k, g, sh, ch, j, f, v, s, z*, etc.)
- **Low pressure sounds**- easier for a child with a cleft palate to produce (e.g. *r, w, l, h*)

 **Your turn!**

Turn to your partner and explain the reason that making nasal sounds, like “m” and “ng”, is possible for a child with a cleft palate, but producing high pressure sounds, such as “s” and “p”, is not.

Be prepared to share your answer with the group!

 **Answer**

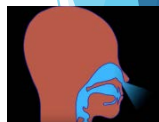
Nasal sounds are possible because their production involves air escaping through the nose, which is what is always going on if the child has an opening between the oral and nasal cavities (cleft palate). However, high pressure sounds require a build up of air pressure in the mouth. With an opening in the palate, the intraoral air pressure is not sufficient to create oral sounds like “p”, “b”, “t”, “d”, “k”, “g”, “s”, “z”, “sh”, “ch”, etc.

How do we make the sound /m/?

Typically acquired by **3 years** of age.

• **Production of /m/**

- **Placement:** Bilabial
- **Manner:** Nasal
 - *Velum is lowered*
 - *Air flows through nasal cavity*
- **Voicing:** Voiced
 - *Lips, nose, and vocal cords vibrate*



m

As in “me”

How do we make the sound /n/?

Typically acquired by 3 years of age.

- **Production of /n/**
 - **Placement:** Alveolar
 - **Manner:** Nasal
 - Velum is lowered
 - Air flows through nasal cavity
 - **Voicing:** Voiced
 - Nose and vocal cords vibrate



n

As in "no"

How do we make the sound /ŋ/?

Typically acquired between 7 and 9 years of age.

- **Production of /ŋ/**
 - **Placement:** Velar
 - **Manner:** Nasal
 - Velum is lowered
 - Air flows through nasal cavity
 - **Voicing:** Voiced
 - Nose and vocal cords vibrate

"ng"

As in "ring"

Your turn!

Take one minute to feel how your nose vibrates when you make nasal sounds like "m", "n" and "ng", and how it does not vibrate when you make oral sounds like "s" and "f". Try it now!

Tactile cues for oral vs. nasal airflow become important when we talk about treatment strategies!

How do we make the sound /w/?

Typically acquired by 3 years of age.

- Production of /w/
 - **Placement:** Bilabial
 - **Manner:** Glide
 - Lips are rounded and then mouth opens
 - Tongue does not touch articulators
 - Velum is partially raised
 - **Voicing:** Voiced
 - Vocal cords vibrate



W

As in "water"

How do we make the sound /l/?

Typically acquired by 5-7 years of age.

- Production of /l/
 - **Placement:** Alveolar
 - Lips are separated
 - Tip of the tongue touches the alveolar ridge (behind the top teeth)
 - **Manner:** Liquid
 - Velum is partially raised
 - **Voicing:** Voiced
 - Vocal folds vibrate



l

As in "lily"

How do we make the sound /j/?

Typically acquired by 4-5 years of age.

- Production of /j/
 - **Placement:** Palatal
 - **Manner:** Glide
 - Tongue glides from high-front to a more open position
 - Velum is partially raised
 - **Voicing:** Voiced
 - Vocal folds vibrate

y

As in "you"

How do we make the sound /r/?

Typically acquired by 8 years of age.

- **Production of /r/**
 - **Placement:** Post-alveolar
 - Tongue is elevated towards the hard palate
 - **Manner:** Liquid
 - Velum is partially raised
 - **Voicing:** Voiced
 - Vocal folds vibrate

r

As in "red"

How do we make the sound /p/?

Typically acquired by 3 years of age.

- **Production of /p/**
 - **Placement:** Bilabial
 - **Manner:** Stop
 - Velum is raised
 - Air is constricted at the lips and released in a burst of air
 - **Voicing:** Voiceless
 - Vocal folds are not vibrating



p

As in "pop"

How do we make the sound /b/?

Typically acquired by 3 years of age.

- **Production of /b/**
 - **Placement:** Bilabial
 - **Manner:** Stop
 - Velum is raised
 - Air is constricted at the lips and released in a burst of air
 - **Voicing:** Voiced
 - Vocal folds are vibrating



b

As in "baby"

How do we make the sound /t/?

Typically acquired by 4 years of age.

- **Production of /t/**
 - **Placement:** Alveolar
 - **Manner:** Stop
 - Velum is raised
 - Air is constricted between the tip of the tongue and the alveolar ridge, and then released as a burst of air
 - **Voicing:** Voiceless
 - Vocal folds are not vibrating



t

As in "top"

How do we make the sound /d/?

Typically acquired by 4 years of age.

- **Production of /d/**
 - **Placement:** Alveolar
 - **Manner:** Stop
 - Velum is raised
 - Air is constricted between the tip of the tongue and the alveolar ridge, and then released as a burst of air
 - **Voicing:** Voiced
 - Vocal folds are vibrating



d

As in "dog"

How do we make the sound /k/?

Typically acquired by 3 or 4 years of age.

- **Production of /k/**
 - **Placement:** Velar
 - **Manner:** Stop
 - Tongue dorsum raised to articulate hard palate
 - Velum is raised
 - **Voicing:** Voiceless
 - Vocal folds are not vibrating



k

As in "cat"

How do we make the sound /g/?

Typically acquired by 4 years of age.



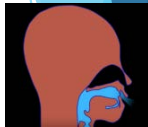
- **Production of /g/**
 - **Placement:** Velar
 - **Manner:** Stop
 - Tongue dorsum raised to articulate hard palate
 - Velum is raised
 - **Voicing:** Voiced
 - Vocal folds vibrate

g

As in "girl"

How do we make the sound /f/?

Typically acquired by 4 years of age.



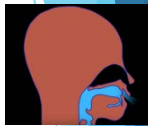
- **Production of /f/**
 - **Placement:** Labiodental
 - **Manner:** Fricative
 - Upper teeth create constriction with bottom lip; air flows continuously through the narrow constriction, creating turbulence
 - Velum is raised
 - **Voicing:** Voiceless
 - Vocal folds do not vibrate

f

As in "food"

How do we make the sound /v/?

Typically acquired by about 6 years of age.



- **Production of /v/**
 - **Placement:** Labiodental
 - **Manner:** Fricative
 - Upper teeth create constriction with bottom lip; air flows continuously through the narrow constriction, creating turbulence
 - Velum is raised
 - **Voicing:** Voiced
 - Vocal folds and lower lip vibrate

v

As in "van"

How do we make the sound /s/?

Typically acquired between 7 - 9 years of age.

- **Production of /s/**
 - **Placement:** Alveolar
 - **Manner:** Fricative
 - Blade of the tongue is raised, close to the alveolar ridge, creating a narrow constriction for continuous air to flow.
 - Narrow constriction creates turbulence.
 - Velum is raised
 - **Voicing:** Voiceless
 - Vocal folds do not vibrate

S

As in "sit"

How do we make the sound /z/?

Typically acquired between 7 - 9 years of age.

- **Production of /z/**
 - **Placement:** Alveolar
 - **Manner:** Fricative
 - Blade of the tongue is raised, close to the alveolar ridge, creating a narrow constriction for continuous air to flow.
 - Narrow constriction creates turbulence.
 - Velum is raised
 - **Voicing:** Voiced
 - Vocal folds vibrate

Z

As in "zoo"

How do we make the sound /tʃ/?

Typically acquired by 7 years of age.

- **Production of /tʃ/**
 - **Placement:** Alveolar
 - **Manner:** Affricate
 - Front, sides of tongue raised toward alveolar ridge
 - Air is first completely obstructed behind constriction
 - Then air flow continuously through narrow opening, creating turbulence
 - Velum is raised
 - **Voicing:** Voiceless
 - Vocal folds do not vibrate

"ch"

As in "child"

How do we make the sound /dʒ/?

Typically acquired by 7 years of age.

• Production of /dʒ/

- **Placement:** Alveolar
- **Manner:** Affricate
 - Front, sides of tongue raised toward alveolar ridge
 - Air is first completely obstructed behind constriction
 - Then air flow continuously through narrow opening, creating turbulence
 - Velum is raised
- **Voicing:** Voiced
 - Vocal folds vibrate

dʒ

As in "juice"

How do we make the sound /ʃ/?

Typically acquired by 7 years of age.

• Production of /ʃ/

- **Placement:** Palatal
- **Manner:** Fricative
 - Front of the tongue is raised to articulate the sides of the palate and teeth
 - Air flows continuously through a narrow constriction, creating turbulent air
 - Velum is raised
- **Voicing:** Voiceless
 - Vocal folds do not vibrate

ʃ

How Typical Speech Sounds Are Made

Play Video #2 entitled
"How Typical Speech Sounds Are Made"

Recommended ages of acquisition (years: months) for phonemes and clusters, based generally on 90% levels of acquisition

High Pressure Sounds	Females	Males
/p/	3;0	3;0
/b/	3;0	3;0
/t/	4;0	3;6
/d/	3;0	3;6
/k/	3;6	3;6
/g/	3;6	4;0
/tʃ/ tʃ-/	3;6	3;6
/dʒ/	5;6	5;6
/v/	5;6	5;6
/θ/	6;0	8;0
/ð-/	4;6	7;0
/s/	7;0-9;0	7;0-9;0
/z/	7;0-9;0	7;0-9;0
/ʃ/	6;0	7;0
/ʒ/	6;0	7;0
/dʒ/	6;0	7;0

We must be able to differentiate between developmentally-appropriate errors and cleft palate errors that require therapy to resolve.

Smit, A. B., Hand, L., Freilinger, J. J., Bernthal, J. E., & Hird, A. (1990). The Iowa Articulation Norms Project and its Nebraska replication. *Journal of Speech and Hearing Disorders, 55*, 779-798.

Your turn!

You are assessing a 4-year-old patient who was referred to you after receiving a surgery to repair her palate. Her parents and surgeon ask you to assess whether she needs another surgery to resolve her speech issues. During your evaluation, she produces the sentence, "My pencil is red". All sounds were correct, except the /t/, which she produced like a /w/ ("wed" instead of "red"). Her /s/ from "pencil" also sounded slightly distorted. Resonance was within normal limits.

What are your initial thoughts?

Answer!

- If the patient's "p" in "pencil" was indeed a high pressure plosive sound produced without nasal airflow, it is a good sign that she is able to build intraoral air pressure for oral sounds and does not need another surgery for speech.
- Her /s/ and /t/ are not of particular concern, since these are later-developing sounds and are not expected to be fully acquired by 4 years of age.
- Was the /s/ distortion due to nasal airflow or was it a developmental distortion? Nasal airflow could indicate either (1) a compensatory error *or* (2) a structural issue that may indicate a need for surgery.



Module 2.2: • Resonance



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Resonance in Cleft Palate Speech

- Any change in *size or shape of the chamber* in which the sound vibrates can result in a change in resonance.
- For example, a hole between the oral and nasal cavity will increase the size of the chamber and result in a change in the quality of the sound.
- A speaker with **hypernasal resonance** sounds high-pitched and nasal, like the voice of a young child.
- A speaker with **hyponasal resonance** sounds lower, like the voice of someone with congestion or a cold.

Resonance Disorders: Hypernasality

- Hypernasality is usually due to velopharyngeal insufficiency/incompetence or an oronasal fistula (or hole)
- Voiced oral consonants become nasalized (b/m, d/n, ng/g) which are obligatory distortions
- Other phoneme-specific consonants may be substituted by nasals (e.g., n/s)
- Severity depends on the size of the opening, the etiology, and even articulation

Resonance Disorders: Hyponasality and Denasality

- Due to blockage in the nasopharynx from cold, swollen adenoids or tonsils
- Not enough resonance on nasal sounds (m, n, ng)
- Nasal sounds end up sounding similar to their oral cognates (b/m, d/n, gng/g)
- Also noted on vowels
- Hyponasality characteristics may be present in apraxia of speech in that the velum does not lower fast enough for nasal phonemes once it has been raised for oral sounds

Assessing resonance

- Hypernasality: Assess with oral-only sentences (no nasals), loaded with high vowels and low pressure voiced consonants.
- Hyponasality: Assess with sentences loaded with nasal consonants.

How to distinguish hypernasality from hyponasality? KUMMER TEST

- If /m/ sounds like /b/, it is hyponasal.
 - “By bobby bakes bilk” for My Mommy makes milk.
- If /b/ sounds like /m/, it is hypernasal.
 - “My mamy a mike” for Buy baby a bike.

**How to distinguish hypernasality from
hyponasality?
KUMMER TEST**

Play Video #3 entitled
"Resonance"

*While you watch the video, listen for the difference
between hypernasal and hyponasal resonance.*

 **Your turn!**

Turn to the person next to you and practice saying the Kummer Test sentences "Buy Bobby a Bike" (with hypernasal resonance) and "My Mommy Makes Milk" (with hyponasal resonance).

Your partner should identify from your speech whether you are speaking with a hypernasal or hyponasal resonance quality. Then, switch roles and listen to your partner's speech. Is it hyper- or hyponasal? How do you know?

Credits

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