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Cleft Palate Speech and Feeding *Train the Trainer*





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Module 3.1:

- Oral Examination
- Speech Sound Assessment



Written by:

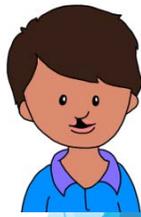
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With contributions by:

Casey Sheren, Sam Home, Marcos Sastre, Grace Fidos, & Julie Smith

Overview of the Oral Exam

- In this section, we will discuss different components of the oral examination.
 - 1 Look for fistulas
 - 2 Assess movement of soft palate
 - 3 Assess movement of articulators
 - 4 Look for signs of a submucous cleft
 - 5 Assess the state of dentition



Oral Exam

- Look for fistulas, including alveolar fistulas

What is a fistula?
An oronasal fistula is a hole between the oral cavity and the nasal cavity that may occur post-surgically, if the seams reopen. It can be asymptomatic or symptomatic. If symptomatic, it may lead to nasal air emissions, hyponasalality, or nasal regurgitation of liquids.



Fistulas



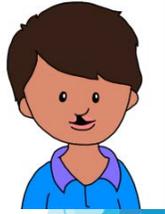
Alveolar Fistula



When there is a fistula, or hole, in the alveolar ridge or region, it is called an alveolar fistula. Remember to lift the lip to check for these during the oral exam. There is much variability in the size and type of fistula you may see during an oral examination.

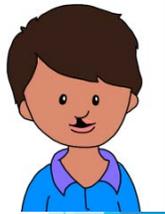
Oral Exam

- Notice the amount of space between the velum and the posterior pharyngeal wall



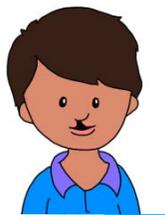
Oral Exam

- Assess movement of the soft palate
 - Have the patient say ah and observe the movement of the soft palate
 - Notice movement of the lateral pharyngeal walls
 - Have the patient say “Kah, kah, kah” and observe whether there is any inverted V



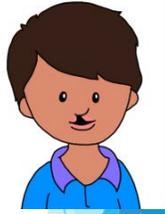
Oral Exam

- Assess mobility of the articulators
 - Can patient close his/her lips, protrude the tongue, touch the tongue behind the alveolar ridge, move the tongue from side to side, smile, purse the lips?
 - Is there symmetry in the movement of the articulators?
 - Any indications of paralysis or oral apraxia?
 - Presence of ankyloglossia (tongue tie) at affecting speech or feeding?
 - Does the position of the maxilla or mandible affect articulatory movements?



Oral Exam

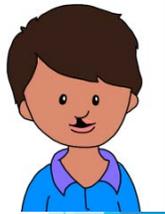
- Look for indicators of a submucous cleft
 - Such as bifid or small uvula, a bluish zone (zona pellucida), and a notch when the soft and hard palate meet



See Module 1.3 of the submucous cleft

Oral Mechanism Exam

- Notice how teeth are erupting (missing, rotated, and malaligned)
- Notice evidence of decay
- Is there a protruding maxilla (Class II malocclusion)
- Is there a retrusive maxilla (Class III malocclusion)





Your turn!

Now that we've discussed the components of an oral examination, it's time to try it yourself! Turn to the person next to you and inspect his/her oral cavity. Pay special attention to velar movement during production of high pressure sounds. Don't forget to assess movement of the articulators and look out for signs of submucous cleft!

Caution Clinicians! If you use the flashlight from your cellphone, make sure you don't shine your patient in the eyes!

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.

Speech Sound Assessment

Play Video #4 entitled
“Speech Sound Assessment”



Speech Sound Assessment

Count to 10.

Count 60 to 70

Listen carefully to the high pressure sounds when the child counts. Do they make the “t” in “two”? How about the “s” in “sixty” or “seventy”? What other high pressure sounds should you listen for? Observe for compensatory errors, nasal airflow, or atypical resonance quality.



Americleft sentences: Assessing nasals

- Nasal sounds are not typically affected when there is a cleft
 - /m/ mom Mom 'n Amy are home
 - /n/ no Anna knew no one
 - /ŋ/ hanging We are hanging on

Americleft sentences: Low pressure sounds

- These sounds are not likely to be affected:
 - /h/ Harry Hurry ahead Harry
 - /l/ Lilly Laura will wear a lily
 - /w/ We We were away
 - /r/ Ray Ray will arrive early

Americleft sentences: High pressure sounds

• Most likely to be affected

- /p/ puppy
- /b/ baby
- /t/ turtle
- /d/ dad
- /g/ give
- /s/ sissy
- /z/ zoey
- /θ/ three
- /ð/ other
- /ʃ/ dish
- /tʃ/ chew
- /dʒ/ George
- /f/ fly
- /v/ view

Puppy will pull a rope
 Buy baby a bib
 Your turtle ate a hat
 Do it today for dad
 Give Aggie a hug
 Sissy saw sally race
 Zoey has roses
 Thirty-two teeth
 The other feather
 She washed a dish
 Watch a choo-choo
 George saw Gigi
 A fly fell off a leaf
 I love every view

- First, elicit the sound **in isolation** (e.g. have the child repeat "p")
- Then, listen for the **sound in the sentence** (read the Americleft sentence for the child to repeat after you)

Americleft sentences: High pressure sounds

• Most likely to be affected

- /p/ puppy
- /b/ baby
- /t/ turtle
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- Listen for:
- **Placement-** Are the articulators in the right place?
 - **Manner-** Is it produced as a plosive or a continuant?
 - **Voicing-** Is it voiced? Voiceless?

What does it mean if the child can make some high pressure sounds, but not others?

If the child can make at least one high pressure sound, it is likely that the child's speech errors can be resolved with speech therapy and that another surgery may not be necessary. The ability to build intraoral air pressure for at least one high pressure sound indicates that the child is likely capable of building intraoral air pressure for other high pressure sounds.

You may be asking yourself why, then, is the child producing speech errors if he/she is capable of producing high pressure sounds?
 He/she may have **compensatory misarticulations**, or learned speech habits, that can be resolved in therapy!

Your turn!

Based on these speech sound assessment results, decide:

- (a) Whether this child's articulation errors are more likely due to a structural issue or compensatory mislearning.
- (b) Is the error observed an issue with placement or manner?
- (c) How would you explain the error to the child's parents?

Speech Sound	Assessment Results	
/p/	puppy	Puppy will pull a rope ✓
/b/	baby	Buy baby a bib ✓
/t/	turtle	Your turtle ate a hat ✓
/d/	dad	Do it today for dad ✓
/g/	give	Give Aggie a hug ✓
/s/	sissy	Sissy saw sally race ✗
/z/	zoey	Zoey has roses ✗

s and z were produced as pharyngeal fricatives, or continuant sounds made in the throat

Answer

- (a) Whether this child's articulation errors are more likely due to a structural issue or compensatory mislearning.

Because the child can produce many high pressure sounds without a problem (e.g. /p/, /b/, /t/, /d/, and /g/), you know that he/she has the anatomical structures in place to build intraoral air pressure. Therefore, this is likely *not* a structural issue. This child's misarticulations on /s/ and /z/ are likely due to compensatory mislearning.

Answer

- (b) Is the error observed an issue with placement or manner?

Because /s/ and /z/ are fricative (continuant) sounds and the child produced a continuant sound (pharyngeal fricative), the error is not due to incorrect manner. Rather, as you may recall, /s/ and /z/ are supposed to be produced with the tongue tip articulating the alveolar ridge. However, this child produced these sounds in the throat. This is a common cleft palate speech error relating to mislearned articulatory placement.

 **Answer**

(c) How would you explain the error to the child's parents?

You would explain that the child likely does not need a speech surgery now, but that he/she does need therapy. This is because he/she has developed an incorrect habit for some sounds, particularly the /s/ and the /z/. Explain that the child did not do anything wrong, that this happens commonly in children with cleft palate, and that you can teach them some easy strategies to practice correcting the error at home.



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Module 3.2:

- **Cleft Palate Speech Therapy Strategies**



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When we think about teaching production of speech sounds, we must consider:

- **Placement-** Are the articulators (tongue, lips) in the right place?
- **Manner-** Is air flowing the right way (Is it a stop? Is it a continuant sound?)
- **Voicing-** Is phonation occurring? (voiced vs. voiceless)



To teach placement, focus on correct sound production (not the error)



For example, if the child is not putting his/her lips together to make bilabial high pressure sounds like “p” and “b”, you would use a **placement strategy** to teach how the articulators should be placed (lips together) for correct production of those sounds.

Play Video #5 entitled “Tx Strategies- Placement”

Strategies to teach placement involve starting with the child CAN do in order to set the articulators up in the correct placement:

- /m/ → /b/, /m/ → /p/
- /n/ → /t/, /n/ → /d/
- /ng/ → /k/, /ng/ → /g/
- ttttt → sssss
- ch ch ch → sh sh sh
- Sh → sssss
- Sssss → sh

Caution Clinicians!

- NO space between the ttt→ and the /s/ sound
- The sound should be continuous
 - ttt → sss
 - shhh → sss

Teaching placement: Focusing on correct sound production (not the error)

Velar sounds:

- Gargle with back of throat
- The “lion sound”
- Push the back of tongue up using tongue depressor and make it jump
- See where the K sound is made. Use mirror and flashlight
- Sandwich tongue between teeth to go from ng to K

To teach manner, focus on whether the sound stops or flows

For example, if the child is producing a stop for a continuant sound, you want to emphasize that air should flow continuously through the mouth.

Play Video #6 entitled “Tx Strategies-Manner”

Teaching Manner: Focusing on Whether the Sound Stops or Flows

- A little ball of paper
- Tissue
- Flicking the tissue as a visual

If the child is stopping the sound rather than having it flow, you can use visual and tactile cues.



To teach voicing, focus on whether the sound is voiced or voiceless

Use a multi-sensory approach to teach that voiced sounds (e.g. “b”) are louder than voiceless sounds (e.g. “p”). The “motor” of the voice is turned on during voiced sounds and turned off during voiceless sounds.

Play Video #7 entitled “Tx Strategies- Voicing”

Teaching Voicing: Focusing on Whether the Sound is voiced or voiceless

- Turn the motor on
- Whisper the “b” (or any voiced sound)
- Make the “p” louder (or any voiceless sound louder, t→d, or k→g)

**Feel the vibration at the voice box/throat*

Multi-sensory tip! Have the child feel the “tickle” or “vibration” on your own neck or his/her neck when during a voiced vs. a voiceless sound



Module 3.3:
• Addressing Nasal Emissions

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Introduction to Types of Speech Errors

Play Video #8 entitled
"Introduction to Types of Speech Errors"

This video will introduce common speech errors observed in patients with cleft palate. In the next part of the course, we will discuss each of these errors and treatment strategies that you can use in therapy to address each type.

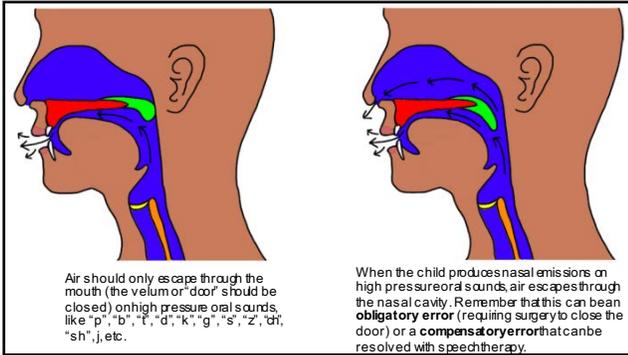
Effects of velopharyngeal dysfunction on speech

- ❖ **Nasal emissions**
Air exits through the nasal cavity when it should exit only through the oral cavity
- ❖ **Compensatory Misarticulations**
Errors that are learned from having a faulty mechanism and persist once the mechanism is repaired
- ❖ **Obligatory Misarticulations**
Speech errors caused by a structural or physiological issue
Require surgery for structural repair

Nasal Emissions

- **Inaudible**
 - Cannot hear them but may see mirror fog when holding a mirror under nose
- **Audible**
 - Can hear the turbulence of air through nasal cavity
- **Obligatory**
 - Caused by anatomical or physiological issue (e.g. oronasal fistula post-surgery), causing air to escape through the nasal cavity on oral sounds
- **Learned**
 - Prior to surgery, the child learned to make sounds through nose rather than mouth, leading to a habit. Can be addressed in speech therapy.





Strategies to Eliminate Compensatory Nasal Emissions

1. Use an illustration to show where airflow is supposed to occur

- If the child produces the oral sound correctly, you can say, "Good! That was a 'mouth sound!'" and point to the clown's mouth.
- If the child produces the sound incorrectly, you can say, "I think I heard a 'nose sound,'" pointing to the clown's nose.

Strategies to Eliminate Compensatory Nasal Emissions

2. Use a mirror to test for nasal emissions

- If the mirror fogs up, air is escaping out of the nose. Nasal sounds should fog up the mirror. For non-nasal sounds, air leaves through the mouth and the mirror should not fog up.
- Do the mirror test using sounds without the vowel
- hhh → p; hhh → s; hhh → t

Vowels may fog up the mirror, which can be confusing for the child! When using the mirror, practice the sounds in **isolation** (e.g. "p" instead of "pa").

Strategies to Eliminate Compensatory Nasal Emissions



3. Plug the nose so that the child can feel the air and sound flow out the mouth instead of the nose

Caution Clinicians!

This strategy is used to help the child learn the difference between an oral sound and a nasal sound, but you don't want the child to become reliant on it to make sounds correctly. Remember to fade out the strategy as the child becomes more aware of oral vs. nasal sounds by gradually moving your fingers upward and outward until the child doesn't need the cue anymore!

Strategies to Eliminate Compensatory Nasal Emissions

If the patient can make the /t/ but has nasal emissions on the /s/, use the /t/ to create the /s/

- Because /t/ is an oral sound that is produced with the tongue in roughly the same place as /s/, /t/ quickly helps set up the articulators for the oral continuant sound, /s/.

Caution Clinicians! Perform the strategy by producing /t/ repeatedly and then transition to /s/ without pausing! The strategy will not be as effective if you pause in between the sounds.

Multisensory Tip! You can gently tap your or the child's arm using your index finger to separate /t/ sounds and then slide your index finger down your arm to show a long, continuous /s/ sound. This helps cue the child to produce the sounds with the correct manner.



Your turn!

Turn to your partner and role-play this clinical scenario: **Person #1** is a 12-year-old boy who produces nasal emissions on /p/ and /b/ sounds.

Person #2 is a speech therapist who will teach Person #1 strategies to eliminate their compensatory speech error. (**HINT:** oral vs. nasal airflow)

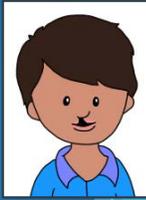
Begin!

Remember! The ability to make the cleft palate sound errors is important for therapy! Person #1 should demonstrate what it sounds like to produce nasal emissions on the /p/ and /b/ sounds.



Module 3.4:

• Strategies for Eliminating Glottal Stops



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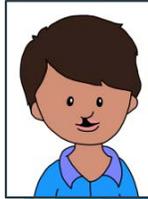
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Glottal Stops



- A glottal stop is a compensatory production produced in the glottis or vocal folds.
- Glottal stops give children the feel of a high pressure air explosion when they are unable to create this high pressure due to the open cleft. Instead, they produce this sound in the glottis.
- These compensatory errors often continue after surgical intervention.



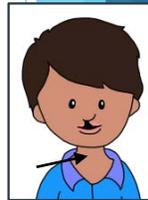
Glottal Stops

Typically used to substitute high pressure sounds

- Stops: p, b, t, d, k, g
- Sometimes fricatives and affricates

• Production of glottal stops

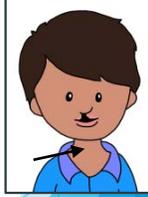
- At the level of the larynx



Glottal Stops are NOT speech sound omissions

- Often, speech therapists who do not know about cleft palate speech hear a glottal stop as an omission of sound.
- A glottal stop is *not* the omission of a sound. Rather, it is a sound that is produced at the level of the vocal cords.
- When you say “uh, oh”, for example, each word begins with a glottal stop. Try saying “uh oh” and feel the glottal stop production by gently touching your neck while you say it.

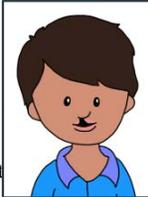
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Glottal Stop

- Voiced stop consonant
- Production in the larynx (glottal place of production)
- Generally substitutes for /b, p, t, d, k, g/ stop consonants, but may also substitute for any other high pressure consonants
- May be co-produced with any pressure consonant (usually stops)
 - “Looks” like correct placement, however production at the glottis or vocal folds

?



Co-articulation or Co-production

- Child produces the compensatory error (glottal stop) while at the same time having good placement
 - E.g., closed lips for /p/, but no air escaping out of the mouth because the air is being stopped at the glottis when the child makes a glottal stop.

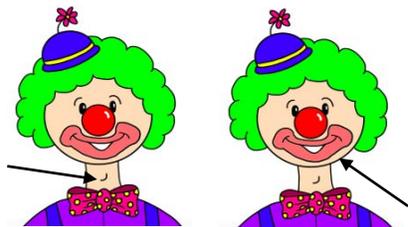
Assess discrimination for glottal stops

- Auditory
- Visual
- Tactile

“Throat sound” vs. “Mouth sound”

- Use schematic map to show placement
- Explain that the child is making a “throat sound” and we want to hear a “mouth sound”





“Throat sound” vs. “Mouth sound”

Use a Mirror to Show Placement of Articulators

- This is important especially when eliminating **glottal stops**.
- The child must learn the correct placement of the articulators needed to make the target sound.



Use a Mirror to Show Placement of Articulators

- Show them lips are together for **bilabials** m, p, and b
- Show them lips are apart for the **alveolars** n, t, and d
- Show them tongue is up and back for **velars** ng, k, and g
- Teach them to “smile” for the **/s/ sound**



/h/ sound before target sound

- Produce a /h/ before the high pressure target to avoid glottal stop
 - /h/ → p /h/ → g
 - /h/ → b /h/ → d
 - /h/ → k /h/ → t
- Produce a /h/ before the high pressure target to avoid glottal stops
 - /h/ → f
 - /h/ → s

Caution Clinicians!

When using the /h/ to elicit the target sound:

- Do not separate the /h/ from the target sound; the sound should be elicited in one continuous motion
- Do not over exaggerate production of the high pressure sound as even gentle production will be challenging for the child

Caution Clinicians!

When eliminating Glottal Stops:

- Do not plug the nose
- The child will continue making the glottal stops even if the nose is plugged

Strategy to eliminate glottal stop compensatory production

- When teaching that air should be flow out of the mouth:
 - Have the patient attempt the target sound while placing a tissue in front of the mouth to show oral airflow
 - Use a small sheet of paper or a cotton ball on your hand to demonstrate airflow with the oral sound
 - Use your finger to flick the tissue as a visual cue
- Make sure to always pair this activity with the target sound**

Strategy to eliminate glottal stop compensatory production

- Pair the air flow strategy with other strategies such as:
 - mmm → p
 - nnn → t
 - ng → k
 - hhh → p
 - hhh → t

Make sure to always pair this activity with the target sound

Caution Clinicians!

- These are **NOT Oral Motor Exercises** as every activity is **paired with the target sound**. Rather, these activities demonstrate that there is airflow out of the mouth for the oral sound.
- Be sure the child is not just blowing the paper or ball. The child must be producing the sound during these activities.

With glottal stops, teach voiceless before voiced

- Teach voiceless before voiced
 - (e.g. “p” before “b”)
- This helps to prevent glottal stops

Teach placement:
Use nasals produced in the same location

- Use the /m/ sound to help production of the /p/ and /b/ sounds
- Use the /n/ sound to help production of the /t/ and /d/ sounds
- Use the /ng/ sound to help with production of the /k/ and /g/ sounds

 **Your turn!**

Turn to your partner and role-play this clinical scenario:
Person #1 is a 5-year-old girl who produces glottal stops on /t/ and /d/ sounds.
Person #2 is a speech therapist who will teach Person #1 strategies to eliminate their compensatory speech error.
 (HINT: throat vs. mouth sounds)

Begin!

Remember! The ability to make the cleft palate sound errors is important for therapy! Person #1 should demonstrate what it sounds like to produce glottal stops on the /t/ and /d/ sounds.

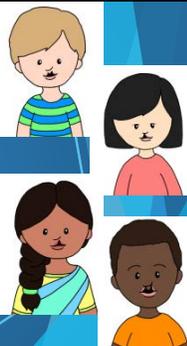
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Module 3.5:

- Strategies to Eliminate Pharyngeal Fricatives, Pharyngeal Stops, Mid-Dorsum Palatal Stops, and Nasal Rustles

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With contributions by:
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Pharyngeal Fricatives

Typically used to substitute:

- Fricatives: s, z, sh
- Sometimes affricates:
 - tʃ ("ch" as in "chair"), dʒ ("j" as in "juice")

• Production:

- Lingual base approximates the posterior pharyngeal wall, but not completely stopping airflow
- Can be voiced or voiceless
- Can be co-produced with fricatives or affricates



voiceless Voiced

Your turn!

After a demonstration from the Trainer, everyone should turn to the person next to them and count to 10, substituting pharyngeal fricatives for the /t/ and /s/ sounds.

This activity will get you thinking about how difficult it can be to change your speech habits...which is exactly what we do when we work with children with cleft palate speech errors! As you will explain to them and their parents, it's hard work and requires lots of practice!

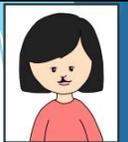
Pharyngeal Stops

Typically used to substitute:

- Stops: k, g

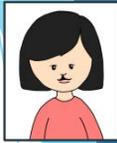
• Production:

- Tongue base makes contact with posterior pharyngeal wall somewhere along its length (linguapharyngeal contact)
- Can be voiced or voiceless
- Airflow is stopped and released



Strategies to eliminate pharyngeal stops

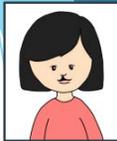
- The goal is to move the sound more anteriorly
- Start with placement of articulation and sound discrimination
- Try moving the sound even more forward than the velum—over-exaggerate the placement



voiceless Voiced

Strategies to eliminate pharyngeal stops

- Show where the sound is actually produced
 - Use a schematic or a drawing to demonstrate where the sound is made (ex. Profile illustration)
 - Touch the soft palate with a clean spoon or tongue depressor so they can feel where it goes
 - Make the sound with an open mouth so the child can see how it is produced



voiceless Voiced

Mid-dorsum Palatal Stops

Typically used to substitute:

- T, D, K, G

Production:

- The production is right in between the velar and the alveolar sound
- It is between the t/d and the k/g



voiceless Voiced

Strategies to eliminate mid-dorsum palatal stops

- Start with placement of articulation and sound discrimination

- Where we want to move the sound depends:
Posteriorly for K and G, anteriorly for T and D
- Use the L or N for placement for T and D. Use the “ng” for placement for K and G
- Try having the child exaggerate where the correct placement is



Strategies to eliminate mid-dorsum palatal stops

- Show where the sound is actually produced

- Use a schematic or a drawing to demonstrate where the sound is made (ex. Profile illustration)
- Touch the soft palate with a clean spoon or tongue depressor so child “feels” the place of production
- Make the sound with an open mouth to show how it is produced



Nasal Rustle

Nasal Rustle can occur due to a structural defect or misarticulation.

- ❖ **Structural defect.** Occurs inconsistently on all pressure-sensitive sounds including p, t, and k. Often increases with utterance length or fatigue.
- ❖ **Misarticulation.** Occurs consistently on certain phonemes, e.g., every time the child produces the s sound you hear it. Most common on sibilants particularly s/z.



Nasal Rustle

Typically used to substitute:

- High pressure sounds p, t, k

• Production:

- Instead of the typical airflow (air exiting the mouth) for high pressure sounds the air is going up in the back



Strategies to Eliminate Nasal Rustle

- Start with placement of articulation and sound discrimination
- Show where the nasal rustle is made. Contrast that with the correct placement of whatever sound is being focused on
- Work on air coming through the mouth rather than trapped in the nasopharynx
- Use a schematic or a drawing to demonstrate where the sound is made (e.g., Profile illustration)





Module 3.6:

- Speech Therapy Hierarchy



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Speech Therapy Hierarchy

1. Discrimination
2. Single sound (work on sound in isolation)
3. Syllables (Acevedo Spoke)
 - CV (Consonant vowel), VCV (Vowel consonant vowel), VC (Vowel consonant)
4. Words (use the target sound in words)
 - Sound in the initial, medial, and final positions
5. Phrases and Sentences
 - Target the sound in short phrases and then sentences
 - Use books on Leadersproject.org to target specific sound cognate pairs
6. Conversation
7. Begin hierarchy again with the next sound

Speech Therapy Hierarchy

Play Video #9 entitled
"Speech Therapy Hierarchy"

On www.LEADERSproject.org, you can find free downloadable therapy games to practice target sounds at the word level, as well as free downloadable books to practice target sounds at the phrase and sentence level.

Word Games

Available at www.LEADERSproject.org



English Cleft Palate Books
 Available at www.LEADERSproject.org

....other languages including Spanish, Mandarin, Amharic, French, Hindi, Igbo, Italian, Korean, Portuguese and Twi!

Caution Clinicians!

1. Always consider developmentally appropriate speech targets.
2. The child must be able to produce the sound with 100% accuracy at one stage on the hierarchy before moving to the next stage.
3. Voiceless cognate is generally targeted before the voiced sound of the same manner and place. E.g., target P (voiceless) before B (voiced).

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**All Cleft Palate Speech Therapy Resources
Available for FREE download
LEADERSProject.org**

Discrimination Clown Picture
Speech Sound Assessment and Stimulability
Acevedo Spoke
Therapy Word Games
Therapy Books for Phrases and Sentences



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