



Demystifying Cleft Palate Speech Disorders: *A User-Friendly Guide to Assessment & Treatment*

Ana Claudia Harten & Marissa Habeshy
MSHA Conference
Muskegon, MI
4/18/2024

ANA CLAUDIA HARTEN
Ph.D., CCC-SLP



MARISSA HABESHY
MS, CCC-SLP



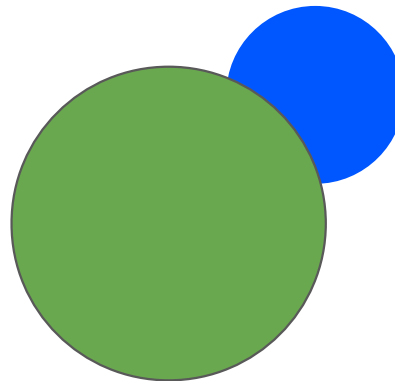
About the Presenters/Disclosures

M



Marissa Habeshy, M.S. CCC-SLP
Speech Language Pathologist
with the Craniofacial Anomalies
Program at University of
Michigan Health

E



Ana Claudia Harten, Ph.D., CCC-SLP
Professor, EMU CSD program
VP MSHA Healthcare Committee

THE PROBLEM

Why have this conversation?







Cleft palate and resonance are rare incidence disorders



Multitude of difficulties associated with cleft palate (e.g., feeding, speech & resonance disorders, hearing loss, academic difficulties) (Lancaster et al., 2021)



SLPs receive limited training during their graduate programs (Mills & Hardin-Jones, 2019)



Most SLPs do not feel well-equipped to treat these individuals (Baigorri, Crowley, & Sommer, 2020)



The Solution is Simpler Than You Think

Any SLP can work with his population...they just need to train their ears

Therapy plans must be adapted to meet the specific needs of this population



M

E

BASIC OVERVIEW

What is a cleft?

Opening in the upper lip and/or palate.

How does it occur?

Not something that is formed, but rather something that does not form.



DEFINING DIFFERENT TYPES OF CLEFTS

Cleft severity is defined by the length, depth, and width

Structure/Side	Incomplete	Complete
(Length & Depth)		
Lip	Separation of skin tissue of lip	Lip separation runs up into nostril & alveolus
Palate	Soft palate/velum	Soft & Hard palate
Bilateral vs. Unilateral (Width)		

DEFINING DIFFERENT TYPES OF CLEFTS

Incomplete Lip



Complete Lip



DEFINING DIFFERENT TYPES OF CLEFTS

Incomplete Palate



Complete Palate



DEFINING DIFFERENT TYPES OF CLEFTS

Complete, Unilateral Cleft
Lip & Palate



Complete, Bilateral Cleft
Lip & Palate



Let's Practice

A



B



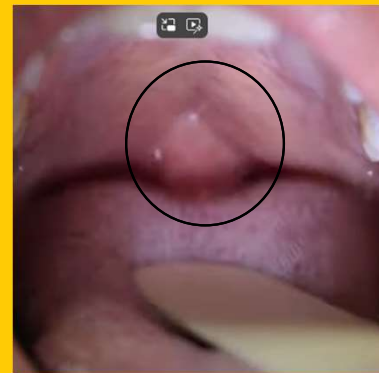
C



Submucous Cleft

Look for:

- Bifid uvula
- Zona pellucida (bluish area)
- Notch in the posterior board of the hard palate,
- Velum may appear an inverted V, especially during phonation



Palatal Fistula

Look for:

- Fistulas



Approximately 15-20% of children with a cleft palate also have a genetic syndrome

Additional considerations should be made in regards to airway, cognitive development, hearing loss, vision, and language development.

22q11.2 deletion syndrome (DiGeorge/Velocardiofacial)

Pierre Robin Sequence

Stickler Syndrome

Treacher Collins Syndrome

Van der Woude Syndrome

M

E

THE CLEFT PALATE TEAM

Comprehensive care requires a team approach!

Medical:

- Surgeon
- Nurse or Nurse Practitioner
- Dentist
- Orthodontist
- Speech Language Pathologist
- Dietician
- Audiologist
- Neuropsychologist
- Social Worker
- Team Coordinator

Community:

School/Private Practice SLPs, Teachers, & Pediatricians

M

E

TIMELINE OF CARE

3 - 6 months: *Lip Repair (may be two stage)*

9-12 months: Palate Repair

2+ years: Lip, Nasal, Palatal Revisions

4+ years: Speech Surgery ($\frac{1}{4}$ - $\frac{1}{3}$ of individuals)

7-10 years: *Alveolar Bone Graft*

16+ years: Maxillary Advancement

Children often wear **palatal expander** prior to bone graft

M

E

Ethical Considerations

1

Making a differential diagnosis between VPD and VP mislearning

3

Setting appropriate parent expectations

2

Maintaining patient autonomy during surgical decision-making



0 -12 Months - Feeding

Children with CL: may drink from a **standard bottle** or breastfeed

Children with CP: require assistance from a **specialty feeding system**

WHY?

- They cannot generate oral suction
- System expresses milk through **compression** (one-way valve)

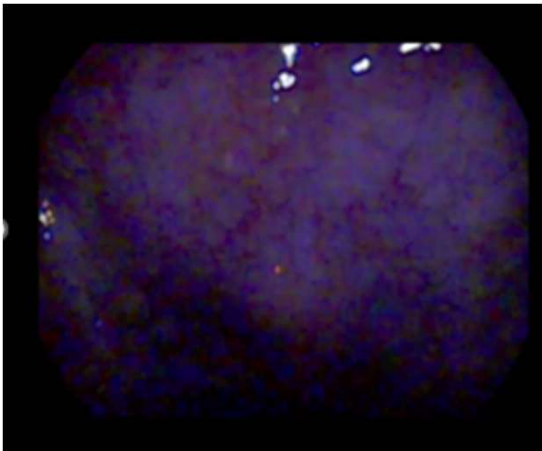
Specialty bottles available:

- ❖ **Dr. Brown's Specialty Bottle**
- ❖ Medela Special Needs Feeder
- ❖ Pigeon Cleft Palate Feeder



What else can be impacted?

- Velopharyngeal Dysfunction - Insufficiency (VPI)
- Structural problem that hinders closure of the VP port



What is Normal Resonance?

ASHA.ORG

Normal resonance is achieved through an appropriate balance of oral and nasal energy, based on the intended speech sound. What is considered “normal” varies by vowel, consonant, and even language/dialect.

The VP mechanism is the biggest contributor to balancing resonance





HYPERNASALITY occurs when there is sound energy in the nasal cavity during production of voiced, oral sounds.

HYPONASALITY occurs when there is not enough nasal resonance on nasal sounds due to a blockage in the nasopharynx or nasal cavity.

Nasal Air Escape:

- Occurs as a characteristic of oral **consonant** production.
- Air leaks out of the nose when the palate attempts to make closure during word production.
- **Turbulent** nasal escape is usually associated with a small VP opening.

Face grimace



Resonance Rating Scales

Hypernasality:

- 0 – Absent hypernasality
- 1 – Borderline/minimal: some perceptible increase in nasal resonance
- 2 – Mild: hypernasality is evident on high vowels
- 3 – Moderate: hypernasality is evident on all vowels
- 4 – Severe: increased nasal resonance on vowels and voiced consonants

Hyponasality:

- 0 – Absent hyponasality
- 1 – Mild: partial denasalization of voiced consonants
- 2 – Marked: denasalization of nasal consonants and adjacent vowel



Let's Practice: How Would You Classify the Resonance?

M

E

VPI Impact

Sounds most often affected:

*/p/, /b/, /t/, /d/, /k/, /g/,
/s/, /z/, /f/, /v/, /ʃ/, /ʒ/, /tʃ/,
/dʒ/, /θ/, /ð/*

(HIGH PRESSURE)

Sounds least often affected:

/w/, /h/, /j/, /l/, /r/

(LOW PRESSURE)

Easiest sounds/very rarely affected:

/m/, /n/, /ŋ/

(NASAL CONSONANTS)

M

E

Obligatory vs. Compensatory

OBLIGATORY ERRORS Weak oral consonants

- Nasalization of vowels and consonants
- Audible nasal air escape (for all consonants)



Surgical
Intervention

COMPENSATORY ERRORS

Placement of articulation is pharyngeal, laryngeal, or nasal

May occur on select pressure consonants, but not all

Ex. Phoneme-specific nasal emission (nasal fricatives)



Therapeutic
Intervention

Compensatory Misarticulations

Children with cleft palate are predisposed to develop maladaptive/compensatory articulation patterns:

GLOTTAL STOPS

NASAL FRICATIVES

PHARYNGEAL FRICATIVES

NASAL FOR ORAL SUBSTITUTIONS
(although, these may be also be obligatory)

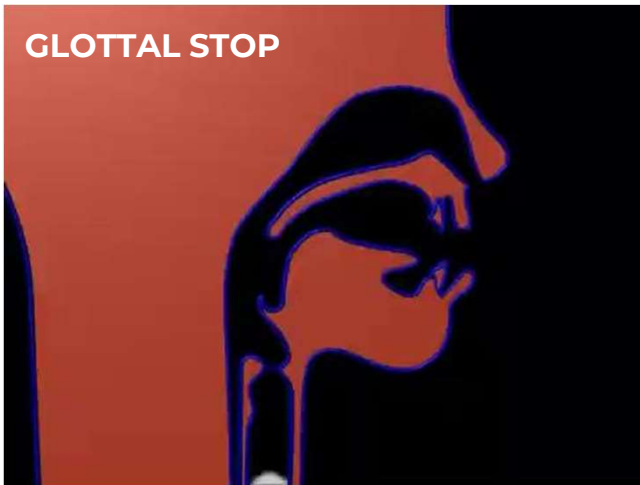
LARYNGEALIZATION (/h/)



Differential Diagnosis

Compensatory/maladaptive errors are not phonological or due to muscle weakness. These occur when individuals are constricting airflow at inappropriate locations within their vocal tract.

GLOTTAL STOP



GLOTTAL STOP COARTICULATION



NASAL FRICATIVE



Total Glottal Stop Substitution

- Note the degree of reduced intelligibility.
- Without context, can you understand what he is saying?

Phoneme-Specific Nasal Emission

Listen for /s/

Glottal Stop Coarticulation

Pharyngeal Fricative

Listen for /s/

Obligatory Errors

- Weak oral pressure
- Consistent, audible nasal air escape

SLP ROLE IN CLEFT CARE

• STAGES •



What SLPs Need To Know

- Compensatory errors continue after surgical correction of the VPI
 - Child's articulation pattern has become habituated
- Hypernasality and nasal emission may continue until the child "learns" to use the repaired structures
 - Changing the structure does not "change" the function
- Speech therapy is usually required to prevent and/or change those abnormal speech patterns

What SLPs Need To Know

- Differentiate between compensatory/errors and phonological disorder/apraxia of speech/dysarthria

- Formulate the most appropriate treatment plan

- If no known history of cleft is present, these errors can be the first way to identify the presence of:

- Submucous cleft
- Non-cleft VPI

- Understand which articulation errors warrant speech therapy and which errors warrant surgical intervention (e.g. obligatory errors)

- Specific treatment strategies that eliminate maladaptive placement

Differential Diagnosis for Resonance Disorders and Velopharyngeal Dysfunction

M

E

- ❖ Formal and informal speech sample
- ❖ Resonance Rating
- ❖ Nasal Air Escape Testing

Perceptual Assessment

Can be done by any SLP!

Obtaining a Speech Sample

- Single word
 - Picture naming task (informal or formal)
 - Word repetition task
- Sentence Repetition
 - Americleft sentences, GFTA
- Conversational sample



Tools for Nasal Air Escape

• Ears

• Straw

• Mirror



• See-scape

• Airflow

• Feel

0-12 months - Prelinguistic

- Children with cleft palate are more likely to be delayed in reaching the milestone of canonical babbling, which typically occurs between 6-9 months of age.
- The majority of children with cleft palate have eustachian tube dysfunction and a build up middle ear fluid, which impacts their ability to adequately perceive language.
- **Prior to the palate repair**, children's vocalizations may consist of vowels, nasal consonants, and low pressure consonants. **Oral consonants will be absent.**



1-3 Years - Early Speech/Language

This is a crucial period!!!

- Palate repair occurs between 9-12 months of age

• **Early Intervention Goals**

- Stimulate and teach the child to produce age-appropriate oral consonants (e.g. /p/, /b/, /t/, /d/, /k/, /g/)
- Children with cleft palate often have a smaller vocabulary size compared to their peers without cleft. Traditional language stimulation strategies are still beneficial.



1-3 Years - Early Speech/Language

- Articulation therapy during this stage is crucial to prevent VP mislearning/maladaptive articulation errors
- 50-75% of children with cleft palate require speech therapy. (Grames, L.M., 2008)
- 26% of preschoolers with cleft palate exhibited compensatory errors. (Hardin-Jones & Jones, 2005)



1-3 Years - Early Speech/Language

- Merging articulation and language therapy
- **Identify activities that allow children practice high pressure oral consonants**

Songs:
Wheels on the **bus**, Row your **boat**, I like to eat **apples** and **bananas**

Books:
The **baby beebee bird**,
Ten apples up
on **top**, **Hop** on
pop, Four groovy
buttons

Bubbles: “bubbles,
pop, up”

Blocks: “top,
two, tall”

Cars: “go,
down, beep”

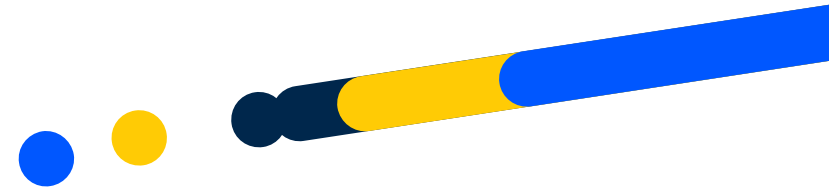


4-6 Years - Articulation Therapy and VPD Management

- Continue with more direct and targeted articulation therapy.
- More repetitions and trials will likely be able to be achieved.
- Consideration for a secondary speech surgery begins to happen at this time. Imaging will be obtained prior to surgical decision.



7-18 Years - Articulation Therapy and VPD Management



Sibilant distortions due to palatal expander and/or dental/occlusal abnormalities

Bone Graft Alveolar

Adenoid involution leading to development of VPD/hypernasality

VPD/Hypernasality following maxillary advancement surgery



TREATMENT STRATEGIES



Specific Therapeutic Strategies for Eliminating Compensatory Placement

1. Auditory Discrimination
2. Establishing Oral Airflow
3. Shaping
4. Removing Linguistic Context



Auditory Discrimination

- ★ Demonstrate the difference between compensatory error and oral, target sound.
- ★ Describe that we are “making sounds in the mouth” versus the throat or the nose.
- ★ Provide simple feedback, such as having child place their hand in front of their mouth to feel oral airflow.

Establishing Oral Airflow

If a child is stopping air inappropriately throughout their vocal tract (i.e. glottal stops), it is first necessary to teach them what appropriate airflow through the vocal folds feels like. This may be done through:

TEACH BLOWING

Note: Some individuals have “disordered blowing” in which they continue to restrict airflow through their vocal folds

UTILIZE NASAL OCCLUSION

USE AUDIO AND VISUAL FEEDBACK TOOLS

- a. Cotton balls, packing peanuts, pinwheels
- b. Bendable straws

Establish Appropriate Airflow Through Vocal Folds

Feedback tools:

Cotton balls

Packing peanuts

Tissues

Pinwheels

Have students pretend to blow on hot foods



Nasal Occlusion + Visual Feedback

Feedback tools:

Cotton balls

Packing peanuts

Tissues

Pinwheels

Have students pretend to blow on hot foods



More Practice...

IMPORTANT

Not an Oral-Motor Exercise

Using Bendable Straw for Auditory Feedback

Feedback tools:

Straw

Listening tube

Have students listen to themselves while producing plosive sounds



Shaping

In order to teach correct articulatory placement, it is useful to identify which sounds are successful and then use that successful sound to teach the target sound.

/s/ can be shaped by using a “long t” or starting with an interdental /s/ (“th”) and use this to teach alveolar placement

Using “ng” to shape /k/ and /g/

Using /m/ to shape /b/ or /p/



Shaping

Glottal stops:

Produce a /h/ sound before target sound:

/h/ → p

/h/ → g

/h/ → b

/h/ → d

/h/ → k

/h/ → t

/h/ → f

/h/ → s

- **Do not separate the /h/ from target**
- **Do not “plug” the nose**
- **Work on voiceless first**

Teaching /b/ using /m/



Teaching /k/ using /ŋ/

Removing Linguistic Context

- ★ Do not let the child know which sound or “letter” they are targeting.
- ★ You can say “let’s make try to make some silly sounds with our mouth” or something similar.
- ★ Describe target sounds as the “snake sound” (/s/), “quiet sound” (sh), or coughing sound (/k/).



The Importance of Appropriate Treatment

After a 6 month course of speech therapy, patient was referred for surgery.

Following surgery, progress accelerated and he achieved essentially normal speech.

VP Port Activation During Correct Articulation and During Compensatory Misarticulation



Case Studies

What would
you do?

Note:

- Resonance
- Articulation
- Develop
Treatment Plan



CASE A.

3 yr old w/ a repaired cleft palate

You perform a speech and language evaluation. Receptive and expressive language skills are normal. There is no history of speech therapy. Articulation testing reveals the following:

“Go get a cookie, go get a car, go get a cake”

How would you rate resonance?

How would describe articulation?



CASE A.

What are your recommendations?

- A. Delay speech therapy until they can be seen by the craniofacial team for VPI workup.
- A. Begin speech therapy. Refer patient to craniofacial team. Evaluate progress in speech therapy across a 3-6 month period.
- A. Recommend that patient return in 6-12 months for an updated speech and language evaluation.

M

E

CASE A.

Develop Your Plan of Care

- Patient produces the following sounds correctly: /m/, /n/, “ng”, /j/, /h/. There are glottal stop substitutions for all high pressure oral consonants. Developmental substitutions of “w/l” and “w/r” are observed.
- What are your goals?
- What treatment strategies would you use?

M

E

CASE A.

Continuing Care

After 6 months of speech therapy, patient has made limited progress. Although they are now producing /p/, /b/, /t/, and /k/ with normal articulation placement, there is nasal air escape with each production.

Refer to craniofacial team for velopharyngeal imaging and consideration for surgical intervention.

M

E

CASE B.

5 yr old w/ a repaired cleft palate

You perform a speech and language evaluation. Receptive and expressive language skills are normal. There is no history of speech therapy. Articulation testing reveals the following:

- How would you rate resonance?
- How would describe articulation?



CASE B.

What are your recommendations?

- A. Initiate speech therapy. Collaborate with craniofacial SLP for treatment suggestions.
- A. Patient likely needs a surgery. Defer treatment until they receive surgical intervention.
- A. Recommend that patient return in 6-12 months for an updated speech and language evaluation.

M

E

CASE B.

Develop Your Plan of Care

- What are your goals?
- What treatment strategies would you use?



CASE C.

4 year old s/p palatal revision

M

E

Communication with the Craniofacial Team is Key

If the child is not already part of a craniofacial team, encourage the family to establish care. This ensures that the child is receiving appropriate follow up care from multiple professionals (i.e. surgeons, dentists, orthodontists, SLPs, etc).



Online Resources

American Cleft Palate-Craniofacial Association (ACPA) Website:

Speech samples demonstrating varying degrees of hypernasality

Resources for feeding a baby with a cleft lip and palate

Locating an ACPA accredited team and professionals

Educational materials on cleft development

Letters for teachers explaining cleft



Online Resources

SMILE TRAIN/LEADERS PROJECT

www.smiletrain.org/patients-families/speech-resources

Multiple printouts of speech therapy games, practice books, and therapy handouts for parents and SLPs

LEADERS PROJECT www.leadersproject.org/ceu-courses-2/english-cleft-palate-speech-therapy-evaluation-and-treatment-asha-0-5-ceu-self-study-course/

Assessment Speech Sound and Stimulability:


[Speech Sound Assessment and Stimulability | LEADERSproject](#)

Online self-study course offering continuing education credits with ASHA




Practice materials available in many different languages!





Collaboration between the school and craniofacial team may be the most realistic way of implementing cleft and craniofacial instruction.



M
E

Conclusions

- **You've got this!**
- **Establish relationship with SLP CF team**
- **Differential diagnosis**
- **Does the individual really need surgery?**
- **Early intervention**
- **Take advantage of online resources available**
- **Non-speech oral-mech exercises are not effective**



References

ASHA Special Interest Group 5. Therapy techniques for speech sound disorders associated with repaired cleft palate. Handout to accompany Poster. Developed in 2014.

Bedwinek, A. P., Kummer, A. W., Rice, G. B., & Grames, L. M. (2010). Current training and continuing education needs of preschool and school-based speech-language pathologists regarding children with cleft lip/palate.

Bettens, K., Alighieri, C., Bruneel, L., De Meulemeester, L., & Van Lierde, K. (2020). Peer attitudes toward children with cleft (lip and) palate related to speech intelligibility, hypernasality and articulation. *Journal of Communication Disorders*, 85, 105991.

Chapman, K. L., Hardin-Jones, M., Schulte, J., & Halter, K. A. (2001). Vocal development of 9-month-old babies with cleft palate.

Donohue, C., Carnaby, G., & Garand, K. L. (2022). How to interpret and evaluate a meta-analysis in the field of speech language pathology: A tutorial for clinicians. *American Journal of Speech-Language Pathology*, 31

Douglas, N., Hinckley, J., Grandbois, K., Schliep, M., Wonkka, A., Oshita, J., & Feuerstein, J. (2023). How a Power Differential Between Clinicians and Researchers Contributes to the Research-to-Practice Gap. *American Journal of Speech-Language Pathology*, 32(2), 803-810.

Grames, L. M. (2004). Implementing treatment recommendations: Role of the craniofacial team speech-language pathologist in working with the client's speech-language pathologist. *Perspectives on Speech Science and Orofacial Disorders*, 14(2), 6-9.

Grames, L. M. (2008). Advancing into the 21st century: Care for individuals with cleft palate or craniofacial differences. *The ASHA Leader*, 13(6), 10-13.

Hardin-Jones, M., & Chapman, K. L. (2014). Early lexical characteristics of toddlers with cleft lip and palate. *The Cleft palate-craniofacial journal*, 51(6), 622-631.

References

- Hardin-Jones, M., Jones, D. L., & Dolezal, R. C. (2020). Opinions of speech-language pathologists regarding speech management for children with cleft lip and palate. *The Cleft Palate-Craniofacial Journal*, 57(1), 55-64.
- Kuehn, D. P., & Henne, L. J. (2003). Speech evaluation and treatment for patients with cleft palate.
- Lee, A., Gibbon, F. E., & Spivey, K. (2017). Children's attitudes toward peers with unintelligible speech associated with cleft lip and/or palate. *The Cleft palate-craniofacial journal*, 54(3), 262-268.
- Mills, B., & Hardin-Jones, M. (2019). Update on academic and clinical training in cleft palate/craniofacial anomalies for speech-language pathology students. *Perspectives of the ASHA Special Interest Groups*, 4(5), 870–877.
- Mason, K. N., Sypniewski, H., & Perry, J. L. (2020). Academic education of the speech-language pathologist: A comparative analysis on graduate education in two low-incidence disorder areas. *Perspectives of the ASHA Special Interest Groups*, 5(1), 164-172.
- Nyberg, J., & Havstam, C. (2016). Speech in 10-year-olds born with cleft lip and palate: what do peers say?. *The Cleft Palate-Craniofacial Journal*, 53(5), 516-526.
- Pannbacker, M. (2004). Velopharyngeal incompetence.
- Watterson, T., Mancini, M., Brancamp, T. U., & Lewis, K. E. (2013). Relationship between the perception of hypernasality and social judgments in school-aged children.
- Ruscello, D. M., & Vallino, L. D. (2020). The use of nonspeech oral motor exercises in the treatment of children with cleft palate: A re-examination of available evidence. *American Journal of Speech-Language Pathology*, 29(4), 1811-1820.
- Scherer, N. J., D'Antonio, L. L., & McGahey, H. (2008). Early intervention for speech impairment in children with cleft palate. *The Cleft palate-craniofacial journal*, 45(1), 18-31.
- Vallino, L. D., Lass, N. J., Bunnell, H. T., & Pannbacker, M. (2008). Academic and clinical training in cleft palate for speech-language pathologists. *The Cleft palate-craniofacial journal*, 45(4), 371-380.

Q&A

Ana Claudia Harten, Ph.D., CCC-SLP
aharten@umich.edu

MARISSA HABESHY MS, CCC-SLP
habeshy@med.umich.edu

