

**CLEFT PALATE AND/OR VELOPHARYNGEAL
DYSFUNCTION: ASSESSMENT AND TREATMENT**

Sponsored by the ASHA Special Interest Division 5: Speech
Science and Orofacial Anomalies-Education Committee

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On behalf of Division 5, I would like to extend an invitation to join this growing special interest group. Attached is a fact sheet regarding the focus of Division 5 along with an application if you are interested in joining. An important added benefit to the Division is the ability to earn CEU's via the Perspectives' articles. Feel free to contact me as needed regarding Division 5 activities and opportunities.

Cleft Palate and/or Velopharyngeal Dysfunction: Assessment and Treatment
ASHA Special Interest Division 5: Speech Science and Orofacial Anomalies-
Education Committee

*Assessment of Speech Disorders
associated with VPD*

RESONANCE:

-SLP should judge resonance as normal, hypernasal, hyponasal or mixed.
-SLP should assess if nasal emission and nasal turbulence exist.

Use connected speech, sentences with oral sounds, sentences with nasal sounds, low pressure sentences, and high pressure phonemic contexts.

ARTICULATION:

SLP should assess place and manner of production.
SLP should assess for any compensatory articulation behaviors.
Use single word productions and spontaneous speech

*Additional techniques for assessing
VPD:*

Auditory detection: Using listening tubes, straws, stethoscope, nose plugging (Cul de Sac test)

Tactile detection: Feeling the sides of nose for nasal turbulence

Visual detection: Using a mirror to observe nasal air emission

IMPORTANT: SLP must also monitor hearing acuity and middle ear disease for potential effects on speech and language

****IF VPD IS SUSPECTED---
ASSESSMENT USING
PROCEDURES IN CONJUNCTION
WITH THE CLEFT
PALATE/CRANIOFACIAL TEAM
SLP**

TEAM PROCEDURES:

*To assess function of velopharyngeal
mechanism*

NASOMETRY- a microcomputer that analyzes acoustic energy emitted through the oral cavity and nasal cavity during the production of speech

AERODYNAMIC ASSESSMENT - measures oral pressure and oral airflow during speech, capable of estimating size of VP gap/orifice

*To visualize velopharyngeal mechanism
and function*

NASOENDOSCOPY- using a flexible fiberoptic nasopharyngoscope to view the nasal surface of the velum and the velopharyngeal port during speech

VIDEOFLUOROSCOPY
-radiographic procedures
to assess velopharyngeal closure during speech

Therapy Approaches-General goals

1. Improve articulatory placement

- may eliminate compensatory errors, improve velopharyngeal function, and decrease the perception of hypernasality
- target voiceless sounds before voiced (w, h, p, t, etc)
- use visual cues as needed
- start with sounds in isolation, then progress to syllables, words, phrases, sentences
- use nasal occlusion to prevent development of nasal snorting or fricatives

2. Improve oral pressure/airflow, reduce nasal emissions, and increase oral resonance

- auditory feedback: listening tubes, straws, stethoscope
- tactile feedback: feeling the nose during oral and nasal speech
- visual feedback: using air paddles, See Scape, Nasometer
- increase articulatory effort: wider mouth opening, overarticulation, loudness
- increase awareness of oral and nasal airflow: negative practice, description exercises

PLEASE KEEP IN MIND!!!!

****SLPs work on changing articulation.*

****Blowing, sucking, gagging, and oral motor exercises do NOT improve velopharyngeal function for speech.*

****Speech therapy is appropriate for teaching proper articulatory placement prior to surgery for repair of a fistula or surgery to augment velopharyngeal function.*

PLEASE KEEP IN MIND!!!!

****If no true progress is seen within 6-8 weeks of speech therapy—referral back to Cleft Palate team for further assessment.*

****Significant VPD may need to be managed physically.*

Additional Resources

For SLP members and Cleft Palate-Craniofacial Teams

<http://www.acpa-cpf.org/>

Please consider joining ASHA Special Interest Division 5: Speech Science and Orofacial Anomalies

Suggested References

Golding-Kushner, K.J. (2001). Therapy Techniques for Cleft Palate Speech and Related Disorders. San Diego, CA: Singular.

Kummer, A. (2001). Cleft Palate and Craniofacial Anomalies: The Effects on Speech and Resonance. San Diego, CA: Singular.

Kummer, A. & Lee, L. (1996). Evaluation and Treatment of Resonance Disorders. LSHSS, 27, 271-281.

Peterson-Falzone, S.J., Hardin-Jones, M., & Karnell, M.P. (2001). Cleft Palate Speech, 3rd edition. St. Louis, MO: Mosby.

Peterson-Falzone, S.J., Trost-Cardamone, J.E., Karnell, M.P. & Hardin-Jones, M. (2006). The Clinician's Guide to Treating Cleft Palate Speech. St. Louis, MO: Mosby Elsevier

Trost-Cardamone, J. (1989). Coming to terms with VPI: a response to Loney and Bloom. CPJ 26: 68-70.

Resonance Disorders and Nasal Emission: Evaluation and Treatment using Low Tech and “No Tech” Procedures

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Resonance is the quality of the voice that is determined by the balance of sound vibration in the oral, nasal and pharyngeal cavities during speech. Abnormal resonance can occur if there is obstruction in one of the cavities, causing hyponasality or cul-de-sac resonance, or if there is velopharyngeal dysfunction (VPD), causing hypernasality and/or nasal emission.

The **velopharyngeal valve**, consisting of the velum (soft palate) and pharyngeal walls, is critically important for speech because it directs the transmission of air pressure and sound energy into the oral cavity during the production of most sounds. Normal velopharyngeal function results in normal oral resonance, adequate intra-oral air pressure for consonant production, and sufficient breath support for normal utterance length.

Causes of Velopharyngeal Dysfunction (VPD)

Velopharyngeal dysfunction can be due to a variety of causes. **Velopharyngeal insufficiency (VPI)** is when there is an anatomical or structural defect, such as a short velum following cleft palate repair, a submucous cleft, or a deep pharynx secondary to cranial base anomalies. Velopharyngeal insufficiency can also occur following an adenoidectomy in rare cases, but most commonly if there is a pre-existing submucous cleft. **Velopharyngeal incompetence (VPI)** is when there is a poor velopharyngeal movement due to a physiological cause. Velopharyngeal incompetence may be due to poor muscle function, pharyngeal hypotonia, velar paralysis or paresis, dysarthria, or even apraxia. **Velopharyngeal mislearning** is when there is hypernasality or nasal emission due to faulty articulation. This can occur due to pharyngeal or nasal articulation of certain sounds. Abnormal articulation can cause phoneme-specific nasal emission, usually on sibilant sounds.

Velocardiofacial syndrome (VCFS) is a common cause of hypernasality in children who have no history of cleft palate. These children often have distinctive facial characteristics, including

narrow eye slits, a bulbous nose, a long face, a thin upper lip, and a small jaw. They may have a history of minor cardiac anomalies, including heart murmur, and other medical problems. They are often short in stature, have long slender fingers, and have developmental delay or learning problems. Children with VCFS are often unidentified until the school-based speech-language pathologist makes a referral for abnormal resonance.

Evaluation of Resonance Disorders and Nasal Emission

Resonance is best determined by listening to connected speech. **Hypernasality** is too much oral resonance and is particularly noted on vowels and voice oral consonants. **Hyponasality** is too little nasal resonance and is noted primarily on nasal consonants (m, n, and ng). **Cul-de-sac resonance** is when the sound is trapped in the pharynx (due to large tonsils, for example) or in the nasal cavity (possibly due to a deviated septum or polyp). It is most important for the examiner to determine the type of resonance and whether there is nasal emission on pressure-sensitive sounds (plosives, fricatives and affricates) in order to determine appropriate recommendations. It is not as important to determine the severity of the resonance disorder because in practice, this usually will not affect the treatment decisions.

If the examiner is unsure about the resonance, there is a very simple test that can be done with a straw, preferably a bending straw. (A piece of tubing is even better.) The examiner should place one end of the straw at the entrance to the child's nose and the other end at the examiner's ear.

The child is then asked to produce the following types of speech samples:

- Prolongation of single vowels
- Repetition of syllables with pressure-sensitive phonemes, and high and low vowels (papapapa; pipipipi; sasasasa; sisisisi; etc.)
- Prolongation of /s/
- Sentences that are loaded with pressure-sensitive phonemes (Sissy sees the sun in the sky. She went shopping. I eat cherries and cheese. Etc.)
- Counting from 60-70
- Repetition of nasal consonants (mamamama; nananana)
- Prolongation of /m/

If sound is heard through the straw on vowels sounds or voiced plosives, this indicates hypernasality. If air is heard loudly through the straw on oral consonants, this indicates nasal emission. If there is not much sound coming through the straw on nasal consonants, this may indicate hyponasality or cul de sac resonance.

The examiner should also test articulation. When nasal emission is noted, the examiner should determine if it only occurs on certain sounds or is consistent on most pressure sounds. If consonants are weak in intensity and pressure, this may be due to a loss of air pressure through the nose. The production of pharyngeal sounds should be noted because this placement may cause nasal emission. If there is a structural defect, or one that was repaired, there could be compensatory articulation productions which are usually pharyngeal or glottal sounds. Finally, utterance length should be tested if there is significant nasal emission. This can be done by having the child count to 20 and noting if he has to take a breath in the middle.

An intra-oral exam can be done to determine if there are large tonsils (which can cause hyponasality or cul-de-sac resonance) or a submucous cleft. Have the child stick out his tongue

as far as possible and say “aaah” instead of “ahhh.” That way, you can usually see down to the tip of the uvula without using a tongue blade. If there is a bifid or hypoplastic uvula, a bluish color in the velum, or if the velum appears like an inverted “V” during phonation, a submucous cleft should be suspected. Unfortunately, you cannot assess velopharyngeal function through an oral exam because the velopharyngeal valve is above your level of view and behind the velum.

Treatment of Resonance Disorders and Nasal Emission

Speech therapy is rarely done for hypernasality or generalized nasal emission because these characteristics suggest a structural defect or physiological disorder which require surgical management. When these characteristics are noted, a referral should be made to a regional craniofacial or cleft palate team (even if there is no history of cleft) for further assessment and management. These teams consist of speech-language pathologists, plastic surgeons and otolaryngologists who specialize in this area and have the necessary knowledge and equipment to appropriately manage this population. On the other hand, hyponasality and cul-de-sac resonance suggest obstruction in the vocal tract. When this is noted, a referral can be made to the local otolaryngologist.

Although speech therapy does not correct abnormal structure, it does correct abnormal function. Therefore, therapy is appropriate for those children who demonstrate phoneme-specific nasality or nasal emission due to faulty articulation, and those children who use compensatory articulation productions due to a history of velopharyngeal dysfunction. In addition, speech therapy is often necessary after surgical management of velopharyngeal dysfunction to help the child to learn to make the best use of the new structures.

The treatment for these types of cases is done through standard articulation therapy. Blowing and sucking exercises should never be used to improvement velopharyngeal function. They are NOT effective because the physiology of these activities is different than that for speech.

When therapy is appropriate, there are some simple techniques that are usually effective. If there is nasal emission on sibilants only, have the child produce a /t/ sound with the teeth closed. Next, have the child prolong that sound. If the child has a normal velopharyngeal valve, this should result in a normal /s/ without nasal emission. This skill can then be transferred to the other sibilant sounds.

If the child co-articulates /ng/ for /l/ or /r/, or if the child has a high tongue position for vowels, it is often helpful to have the child co-articulate a yawn with the sounds. With a yawn, the back of the tongue goes down and the velum goes up.

If the child continues to demonstrate hypernasality or nasal emission after a few months of therapy, that child should be referred to a specialist for further assessment and consideration of physical management. No child should be kept in therapy and continually asked to perform a speech task that is physically impossible to do!

Summary

Although resonance disorders may be considered as a specialty area, any speech-language pathologist with a general practice, particularly those who are school based, are likely to see

these individuals on their caseloads. Therefore, a basic knowledge of how to evaluate, how to treat, and when to refer to a specialist is very important to ensure the best care for these children.

For further information:

Golding-Kushner, K. Therapy Techniques for Cleft Palate Speech and Related Disorders. Clifton Park, NY: Thomson Delmar Learning, 2000.

Kummer AW. (2001). Cleft Palate and Craniofacial Anomalies: Effects on Speech and Resonance. Clifton Park, NY: Thomson Delmar Learning.

Peterson-Falzone, S.J., Karnell, M.P., Hardin-Jones, M.A. Cleft Palate Speech. St. Louis, MO: Mosby, 2001.

Peterson-Falzone, S.J., Trost-Cardamone, J. E Karnell, M.P., Hardin-Jones, M.A. Treating Cleft Palate Speech. St. Louis, MO: Mosby, 2006.

1. Evaluation using a straw.



Reprinted from Kummer (2001). Cleft Palate and Craniofacial Anomalies: Effects on Speech and Resonance. Clifton Park, NY: Thomson Delmar Learning.

2. Evaluation using a “listening tube.”



Reprinted from Kummer (2001). Cleft Palate and Craniofacial Anomalies: Effects on Speech and Resonance. Clifton Park, NY: Thomson Delmar Learning.