Evaluation of Speech Disorders Associated with Cleft Palate and Velopharyngeal Dysfunction Transcript

Hello. My name is Imani Gilbert, and I'm excited to share this poster presentation developed by the Special Interest Group 5: Craniofacial and Velopharyngeal Disorders.

This presentation focuses on the evaluation of speech disorders associated with cleft palate and velopharyngeal dysfunction or VPD. Our overall goal is to provide a practical review of assessment and management approaches that support accurate diagnosis and effective collaboration between community speech language pathologists and cleft palate or VPD specialty teams.

Speech disorders associated with cleft palette and velopharyngeal dysfunction are complex involving both structural and learned components. Before we get started on understanding the nuances of speech disorders associated with VPD or cleft palate, I want to first start by reviewing the pertinent anatomy and physiology.

The velopharyngeal mechanism functions as a muscular valve made up of the soft palate or velum, and the lateral and posterior pharyngeal walls. During speech, muscles within these structures contract to create velopharyngeal closure, which is needed for speech and swallowing. When an individual is at rest, producing nasal consonants, or engaging in nasal breathing, the velum is maintained in a lowered position. However, during oral speech production and swallowing, the velum elevates to create a tight seal to separate the nasal cavity and the oral cavity.

Velopharyngeal dysfunction or VPD refers broadly to a failure of the velopharyngeal mechanism to achieve consistent and complete closure during oral speech tasks. This umbrella term includes three main subtypes, velopharyngeal insufficiency, velopharyngeal incompetence, and velopharyngeal mislearning. Understanding these distinctions is essential for determining whether a child's speech differences require surgical, prosthetic, or behavioral management.

In children, VPD can present differently across developmental stages. For instance, nasal regurgitation or feeding difficulties in infancy, limited consonant inventories around the first word stage, and hypernasality or compensatory articulation errors by school age. Normal resonance relies on an appropriate balance of sound energy between the oral and nasal cavities. When this balance is disrupted, a resonance disorder occurs, which may manifest as hypernasality, which is excessive nasal resonance, hyponasality, too little nasal resonance, cul-de-sac resonance, which results in a muffled quality or a mixed resonance pattern. Each of these carries different diagnostic implications, and correct identification guides appropriate referral or intervention.

To evaluate these patterns, clinicians must first distinguish between obligatory features and compensatory articulation errors. Obligatory features are passive in nature, meaning they result directly from structural differences or anatomic causes. These include hypernasality, hyponasality, audible nasal error emission, and weak pressure consonants. Because these features reflect structure rather than learned behavior, children showing obligatory features should be referred to a cleft palate or VPD team, and imaging may be warranted. In contrast, compensatory articulation

errors are active behaviors, meaning they are learned speech patterns that arise in response to structural limitations, but persist even after structural repair. These might include glottal stops, pharyngeal fricatives, or nasal substitutions. When compensatory errors are identified, targeted speech therapy is the first line of intervention. I will encourage you to see the associated SIG 5 handout for a detailed description of each type of compensatory error.

A comprehensive evaluation of speech and resonance in this population requires multiple complementary procedures. The assessment protocol can be conceptualized in six key steps. First, perceptual judgment, this is when the clinician rates resonance, nasal emission and speech acceptability using established perceptual scales. This remains the cornerstone of differential diagnosis. Clinical assessment of velopharyngeal function. This involves using simple low-tech tools such as straws, nasal mirrors or a See-Scape that can help detect air escape and assess the integrity of the velopharyngeal valve. Also want to include an articulation evaluation both during connected speech and structured speech tasks, and these are going to be used to transcribe compensatory, developmental and obligatory ears. An oral examination is also needed in order to inspect the lip, tongue, jaw, palate, and dentition. It's also important to check for the presence of fistula or signs of a submucous cleft palate, which often can be indicated by a bifid uvula, a bony notch at the junction of the hard and soft palate, a zona pellucida or tenting during phonation. It is important to note that scarring related to surgical history may be present. Instrumentation is also a cornerstone of assessment. You would want to use tools such as the nasometer which can objectively quantify oral versus nasal acoustic energy and lastly, imaging, which is often used for more complex or persistent cases, and it involves imaging techniques like nasopharyngoscopy, videofluoroscopy, and MRI, which all allow for visualization of velopharyngeal closure patterns, opening size, and tissue contributions. MRI also allows for direct visualization of important velopharyngeal musculature. Together, these methods provide both perceptual and physiological evidence needed to distinguish between structural versus learned causes of resonance disorders.

Now that we have an understanding of the assessment process, let's review the three primary diagnostic categories more closely so that we can understand the differential diagnosis process.

Velopharyngeal insufficiency is due to a structural cause such as cleft palate, residual openings after cleft palate repair, or an adenoidectomy. In these cases, articulator placement is accurate, but the mechanism cannot close adequately. Diagnostic techniques like nasal flutter testing or the nasal mirror can help confirm consistent air escape. These children are typically candidates for surgical or prosthetic management.

Velopharyngeal incompetence results from neuromotor dysfunction as seen in TBI patients, stroke patients, those with dysarthria, cerebral palsy, or apraxia of speech. Management may involve surgery, prosthesis, or behavioral therapy depending on the degree of muscular control.

Finally, velopharyngeal mislearning involves inaccurate articulatory placement or airflow direction, thus producing phoneme specific nasal emissions or compensatory errors. Unlike insufficiency, mislearning is inconsistent across sounds and is best treated through speech therapy.

It's important to remember that insufficiency and mislearning can co-occur, requiring collaboration between medical and behavioral providers for optimal outcomes. There are also some considerations to consider as several clinical factors influence the diagnostic process.

First, conditions like nasal congestion or dysphonia can temporarily mask or exaggerate symptoms of VPD.

Second, children must be behaviorally mature enough, generally at least three years of age and capable of producing pressure consonants reliably in order to participate in instrumental imaging. If their speech output is limited, initial therapy may be necessary before further diagnostic testing.

Additionally, some errors such as glottal stops will not show perceptual differences even with nasal occlusion, thus underscoring the importance of using multiple assessment tools during the diagnostic process.

The overall referral and intervention hierarchy follows a structured decision path. When resonance disorders or obligatory features are observed, such as consistent hypernasality or nasal error omission, clinicians should refer to a cleft palate or VPD team for imaging and surgical consultation. When compensatory articulation errors or phoneme specific nasal emissions are identified, clinicians should begin speech therapy focused on accurate oral placement and airflow direction. If therapy progress is limited or resonance issues persist, referral for instrumental assessment should follow up. This tiered approach ensures that children receive both appropriate medical management and evidence-based speech therapy without unnecessary delays.

In summary, evaluation of speech disorders associated with cleft palate and velopharyngeal dysfunction requires an integrated understanding of anatomy, physiology, and learned behavior. Differentiating between structural insufficiency, neuromotor incompetence and mislearning allows for more accurate referrals and individualized treatment plans.

Community clinicians play a vital role in early detection and in providing ongoing therapy, while specialty teams contribute advanced imaging, surgical intervention, and interdisciplinary expertise. SIG 5 aims to bridge those connections, equipping speech language pathologists with clear evidence informed strategies to identify, assess and manage resonance and articulation disorders related to cleft palate and VPD.

Thank you for listening and for your commitment to supporting children with complex communication needs.

For further details, please refer to the SIG 5 handout on therapy techniques for speech sound disorders associated with repaired cleft palate.