Speech Evaluation for Patients with Cleft Palate

Ann W. Kummer, PhD, CCC-SLP

KEYWORDS

• Velopharyngeal insufficiency • Velopharyngeal incompetence • Velopharyngeal mislearning
• Velopharyngeal dysfunction • Hypernasality • Nasal emission • Nasopharyngoscopy • Nasometry

KEY POINTS

- Resonance disorders are common in children with a history of cleft palate. There may be hypernasality caused by velopharyngeal insufficiency (VPI). There may also be hyponasality or cul-de-sac resonance caused by obstruction in the vocal tract.
- Speech disorders are common in children with a history of cleft palate. There may be compensatory articulation productions caused by VPI or even caused by malocclusion if there was also a cleft of the primary palate.
- Differential diagnosis of the cause of hypernasality and/or nasal emission and also of abnormal speech sound production is critical in determining appropriate treatment (eg, surgery, speech therapy, or both).
- VPI is a structural abnormality and therefore requires surgical management.
- Velopharyngeal mislearning (including the use of compensatory productions caused by VPI or a history of VPI) is a functional disorder that requires speech therapy.

Videos of a speech sample, evaluation of nasal emission using a straw, oral examination, nasometry, and nasopharyngoscopy accompany this article

ANATOMY AND PHYSIOLOGY OF THE VELOPHARYNGEAL VALVE

The velopharyngeal valve consists of the velum (soft palate), the lateral pharyngeal walls, and the posterior pharyngeal wall. These structures work in concert to open and close the velopharyngeal valve during speech.

During nasal breathing, the velopharyngeal valve is open. The velum rests against the base of the tongue and the lateral pharyngeal walls are wide apart (**Fig. 1**). This arrangement provides a patent upper airway for unobstructed nasal breathing. During oral speech, the velum moves in a superior and posterior direction to close firmly against the posterior pharyngeal wall (or adenoids in young children) (**Fig. 2**). At the same time, the lateral pharyngeal walls move medially to close against the velum, or in some cases just behind the velum. Complete closure of the velopharyngeal valve is required for all vowels and most consonants. The exception is with the production of nasal sounds (m, n, ng), for which the velopharyngeal valve is completely open to allow nasal resonance. In connected speech, the velopharyngeal valve therefore opens and closes throughout an utterance based on the type of speech sound (oral or nasal) that is produced.

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Division of Speech-Language Pathology, Cincinnati Children's Hospital Medical Center, MLC 4011, 3333 Burnet Avenue, Cincinnati, OH 45229-3039, USA
E-mail address: ann.kummer@cchmc.org

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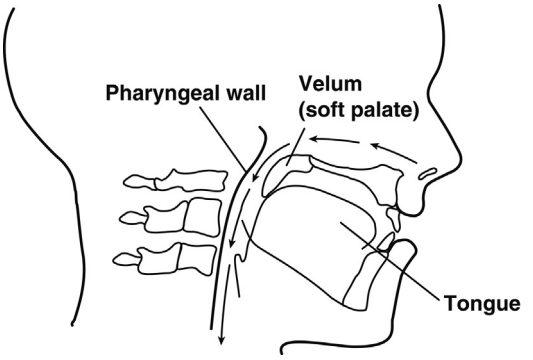

Fig. 1. Normal velar position during nasal breathing. (*From* Kummer AW. Cleft Palate & Craniofacial Anomalies, 3E. © 2014 Delmar Learning, a part of Cengage Learning, Inc. Reproduced by permission.)

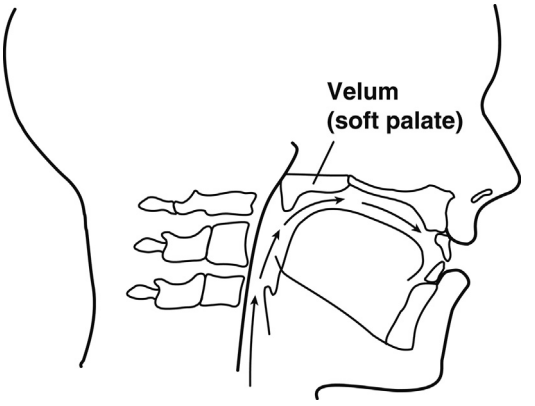

Fig. 2. Normal velopharyngeal function during oral speech. (*From* Kummer AW. Cleft Palate & Craniofacial Anomalies, 3E. © 2014 Delmar Learning, a part of Cengage Learning, Inc. Reproduced by permission.)

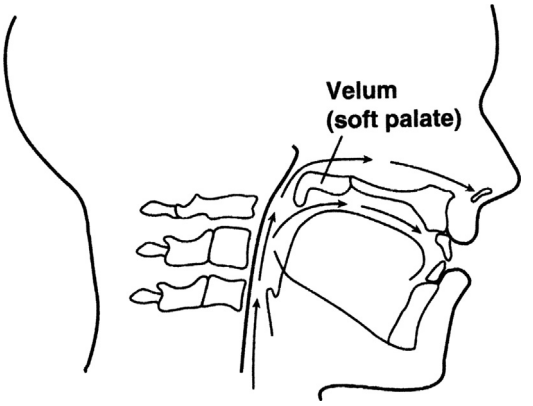

Fig. 3. Velopharyngeal insufficiency. Velopharyngeal insufficiency is caused by a structural cause. In this case, the velum has normal movement, but is too short to achieve velopharyngeal closure. (*From* Kummer AW. Cleft Palate & Craniofacial Anomalies, 3E. © 2014 Delmar Learning, a part of Cengage Learning, Inc. Reproduced by permission.)

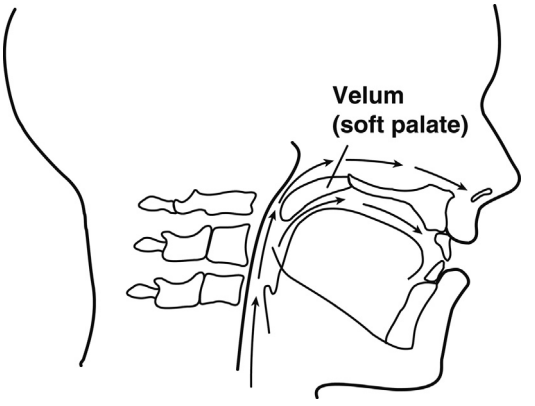

Fig. 4. Velopharyngeal incompetence. Velopharyngeal incompetence is caused by a neuromotor disorder. In this case, the velum is normal in structure, but does not move well enough to achieve velopharyngeal closure. (*From* Kummer AW. Cleft Palate & Craniofacial Anomalies, 3E. © 2014 Delmar Learning, a part of Cengage Learning, Inc. Reproduced by permission.)

VELOPHARYNGEAL DYSFUNCTION

Normal velopharyngeal function depends on 3 basic components: normal structure (anatomy), normal movement (neurophysiology), and normal articulation learning.[1]

When the velopharyngeal valve does not close consistently or completely during the production of oral sounds, this is often called velopharyngeal dysfunction (VPD). VPD is used as a general term that encompasses disorders of any of the 3 basic components of velopharyngeal function (structure, function, and learning).[1,2] Other terms are used for more specificity as to the type and causation of VPD.[1–5] For example, velopharyngeal insufficiency (VPI) is most often used to describe a structural defect that prevents complete velopharyngeal closure (**Fig. 3**). Velopharyngeal insufficiency is the most common type of VPD because it can be caused by a history of cleft palate or submucous cleft. In contrast, velopharyngeal incompetence (also abbreviated as VPI) is used to refer to a neurophysiologic disorder in which poor movement of the velopharyngeal structures results in incomplete velopharyngeal closure (**Fig. 4**). Finally, velopharyngeal mislearning refers to an articulation disorder in which speech sounds are inappropriately produced in the pharynx. As a result of this