

# VPI (Velopharyngeal Insufficiency)

## Evaluating and treating VPI in your child

This handout covers questions about a common speech disorder called VPI. It explains how we test for VPI and how it is treated, both with and without surgery, at Seattle Children's Hospital.

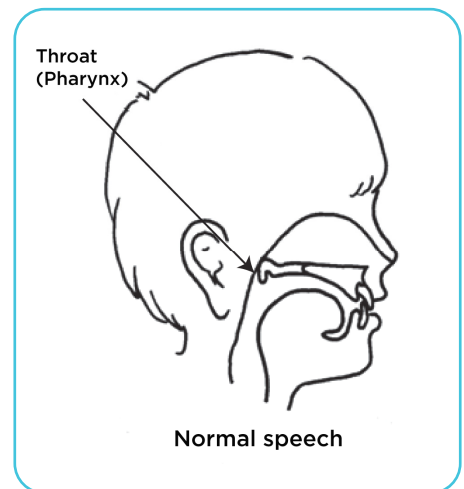
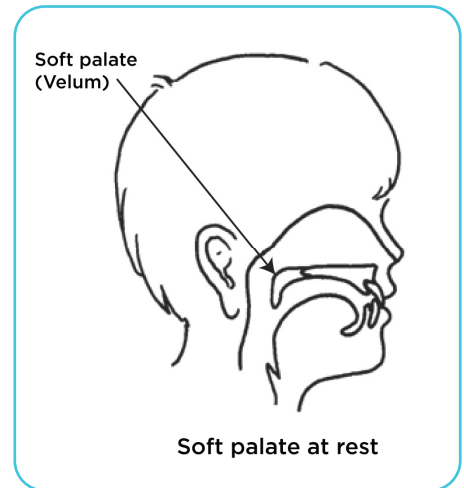
### What is VPI?

VPI stands for Velopharyngeal (pronounced vee-lo-fare-in-gee-al) Insufficiency. The "v" in "velo" refers to the velum, or soft palate. It's the part of the roof of the mouth that moves when you say "ah." The "p" in "pharyngeal" refers to the pharynx (pronounced fare-inks), or throat. During normal speech, the palate rises to touch the back of the throat so that air comes out of the mouth. With VPI, air escapes through the nose during speech.

VPI may be found in children who have:

- Cleft palate (about 20 percent to 30 percent of children who have cleft palate will still have VPI after the palate repair)
- Submucous cleft palate
- Certain syndromes, such as velocardiofacial syndrome
- Had previous adenoid removal
- Weak throat muscles
- Too much space between the palate and the throat

Some children have VPI from an unknown cause.



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Children may have other issues that affect their speech. In developing a treatment plan it is important to find out if your child has trouble with:

- Articulation (the way they make speech sounds with their mouth and tongue)
- Speech coordination (putting the sounds together)
- Weak speech muscles
- Voice (the sound that comes from the larynx, or voice box)
- Hearing

### What are the signs of VPI?

The two main signs of VPI are nasal speech and nasal air escape.

#### Nasal speech

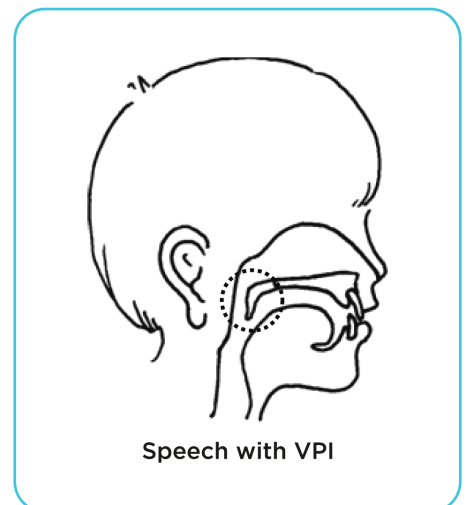
Nasal speech, called hypernasality or hypernasal resonance, is detected when making vowel sounds. In English, the nasal consonants (“m,” “n” and “ng”) are the only sounds that should resonate through the nose. Patients with VPI may also have hypernasal resonance on production of vowels and “h,” “w,” “y,” “l” and “r”.

#### Nasal air escape

Nasal air emission is heard when air escapes through the nose as your child makes pressure consonants. In English the pressure consonants are p, b, t, d, k, g, s, z, f, v, sh, zh, ch, dj, and th. These sounds are referred to as pressure consonants because they require a buildup of air pressure in the mouth. When a patient has VPI, the pressure consonants may sound soft or muffled. As air escapes through the nose, it may sound like puffs, squeaks or snorts.

#### Compensatory misarticulations

Your child may develop unusual speech sounds to compensate for VPI. A common one is called a glottal stop, the sound produced by stopping air with the vocal cords (as one would do when saying “uh oh”). Some other sounds are made by using the tongue or palate to stop or restrict air in the mouth or throat in unusual ways.



### **Can speech therapy decrease VPI?**

Speech therapy is not necessary for all children with VPI. Some children with VPI will develop atypical speech habits. Speech therapy will be required to correct the atypical habits. The goal of speech therapy in this situation is to establish accurate oral place of articulation and air flow, even in the presence of VPI. Speech therapy may also be required for speech problems that are not related to the palatal function. VPI speech symptoms cannot be treated by speech therapy alone.

### **Specialists who treat VPI at Children's**

A team of providers at Children's may be involved with the assessment and management of your child's VPI. The team may include:

- Speech-language pathologists (SLP). They identify VPI speech symptoms and assess for other speech problems. They also perform fluoroscopic (X-ray) tests to look at velopharyngeal closure during speech.
- Otolaryngologists (ear, nose and throat surgeons). They perform specialized endoscopic tests to assess velopharyngeal closure.
- Surgeons (ear, nose and throat or plastic surgeons). They perform surgeries on the palate or throat to treat VPI.
- Orthodontists. They work with speech-language pathologists to make speech appliances called obturators.

### **How is VPI evaluated?**

Several tests, most often in 2 or more separate appointments, are done to check for VPI in your child. First, a speech-language pathologist (SLP) will assess your child's speech. The speech test takes about 1 hour. During this visit, a pediatric speech-language pathologist will listen to your child's speech to determine whether or not your child has VPI. The SLP will also assess the other parts of speech production (articulation, oral motor function and voice).

Once we confirm that your child has VPI, we will recommend one or two other tests, depending upon how the soft palate looks. The two other tests that may be recommended are nasopharyngoscopy and speech videofluoroscopy.

An otolaryngologist (ear, nose and throat doctor) performs the nasopharyngoscopy in the ENT clinic with the speech therapist present. A flexible fiber-optic tube is inserted into the nose and your child is asked to speak. This lets the doctor see the back of the throat where the velopharyngeal muscles are trying to close.

The videofluoroscopic speech study is a special X-ray of your child's throat during speech. This test requires flavored drops to be placed into the nose so the palate and throat muscles can be seen clearly. A real-time moving X-ray (fluoroscopy) will be obtained while your child repeats several phrases. Both of these tests are recorded and will be reviewed with you.

Recommendations for VPI treatment will be based on the results of these tests.

## How is VPI treated at Children's?

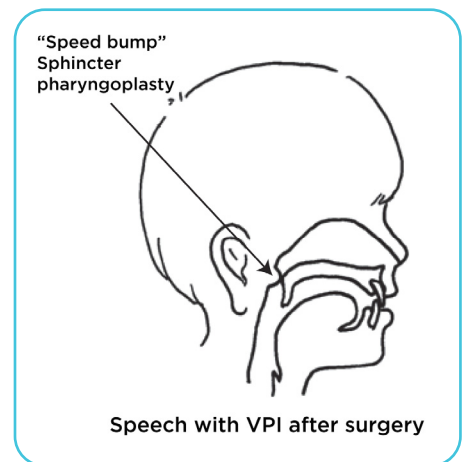
It is important that VPI be accurately identified. Children who have VPI may develop atypical speech habits (we call them compensatory misarticulations). If children have developed these speech habits, we need to treat these habits as well as the VPI. We recommend treating VPI as early as possible so that these atypical speech habits do not occur.

### Surgery

Speech surgeries are performed through the mouth under general anesthesia (your child is fully asleep). Children need to stay overnight in the hospital so that we can make sure they are breathing well and so that we can keep them comfortable throughout the night.

At Children's, the most commonly performed speech surgeries are Furlow palatoplasty and sphincter pharyngoplasty:

- Furlow palatoplasty brings the abnormally positioned muscles of the palate into a more normal position, which helps the palate move better.
- Sphincter pharyngoplasty is done when the palate is already moving as well as possible. The surgeon moves tissue from the back of the throat to the back of the nasopharynx. This will create a "speed bump" in the back of the nasopharynx allowing closure of the velopharynx when your child talks.



If it is decided that your child might benefit from speech surgery, your surgeon and the speech-language pathologist will recommend the type of surgery needed and when it should be performed. Your child's speech will be reevaluated after surgery. If your child still has VPI, further surgery may be recommended.

## Obturator — the speech appliance

Sometimes, an obturator is recommended to treat VPI. An obturator is like a dental retainer with a “speech bulb” attached to the back (see the illustration at right). The obturator is worn during the day and taken out at night while sleeping. It can be left in place when your child is eating.

The obturator is fit and adjusted by an orthodontist in the dental clinic over several appointments. The appliance is shaped to fit your child’s unique muscle movements. A speech-language pathologist helps with the final stages of fitting the obturator and monitors its ongoing effectiveness.

An obturator can be a short-term or long-term option for children with VPI. It can be used before or instead of surgery. Your child may start with an obturator and have surgery when your child is older or they may continue to use an obturator as an adult.



### Steps in making a speech bulb obturator

Before we make an obturator, we will check your child for two things. Your child’s mouth must be in a good state of health and your child must be willing to wear the obturator.

Obtulators are made in stages over a few months. Appointments are generally spaced two weeks apart to give your child time to get used to the changes.

**Step 1:** Orthodontic bands are placed on the upper-back molars, and an impression is made of the upper teeth.

**Step2:** A plastic retainer is made to fit your child’s mouth.

**Step 3** After your child wears the retainer for a few weeks, a small tail-shaped piece of plastic will be added. This tail will touch the soft palate.

**Step 4:** After a few more weeks, an extra length of tail is added.

**Step 5:** A mini-bulb is added. This is a small plastic bulb attached to a wire that loops behind the palate.

**Steps 6, 7 and 8:** These are the final steps in fitting the speech bulb. At these three appointments, the SLP and the orthodontist work together to decide how the size and shape of the bulb should be changed.

### To Learn More

- Speech and Language Services  
206-987-2104
- Ask your child's healthcare provider
- [www.seattlechildrens.org](http://www.seattlechildrens.org)

### Free Interpreter Services

- In the hospital, ask your child's nurse.
- From outside the hospital, call the toll-free Family Interpreting Line 1-866-583-1527. Tell the interpreter the name or extension you need.
- For Deaf and hard of hearing callers 206-987-2280 (TTY).

### Changes in speech

You usually do not notice any improvement in your child's speech while the obturator is being fitted and built. Once all the steps are completed and air escape is controlled, speech usually improves. Your child may still need speech therapy to improve some speech sounds.

### Final considerations

As speech develops, children form speech habits. It is hard to develop normal speech habits if air escapes through the nose. If atypical speech patterns persist, they are often hard to change. The longer a habit or pattern goes on, the harder it may be to change. The goal at Children's is to treat VPI as early as possible to allow your child to develop normal speech.