

# Resonance Disorders

## What is normal resonance?

Resonance is the voice quality that results from sound vibrations in the pharynx (throat), oral cavity (mouth) and nasal cavity (nose). The balance of sound vibration in these areas determines the quality of the speech and voice.

For normal resonance, the nose and the mouth must be closed off from each other during speech. This occurs when the velum (soft palate) raises and contacts the back wall of the pharynx (throat) during speech. This is called “velopharyngeal closure.” Velopharyngeal closure allows the child to build up air pressure and sound in the mouth in order to produce various speech sounds.



## What is a resonance disorder?

There are three types of resonance disorders: hypernasality, hyponasality and cul-de-sac resonance.

**Hypernasality** occurs when too much sound resonates (vibrates) in the nasal cavity (nose) during speech. This type of resonance makes the patient sound as if he or she is talking through the nose. When there is severe hypernasality, other abnormal speech characteristic can occur. For example, nasal air emission (air that escapes out of nose) can be heard during production of certain consonants (such as /p/, /t/, /k/, /s/, /sh/, and /ch/). When there is nasal emission, the consonants become weak or omitted. In addition, the child may use abnormal speech sounds (such as a hard "uh" instead of the consonant sound /g/) because of the lack of air pressure in the mouth.

Hypernasality is due to an abnormal opening between the nose and the mouth during speech. This is usually due to a form of velopharyngeal dysfunction (velopharyngeal insufficiency or velopharyngeal incompetence). Common causes include a history of cleft palate or submucous cleft palate. Hypernasality can occur after adenoidectomy in some cases. Some neurological problems can cause poor movement of the velopharyngeal structures, resulting in hypernasality.

**Hyponasality** occurs when there is not enough sound resonating in the nasal cavity (nose) during speech. This type of resonance makes the patient sound "stopped up." This can be due to blockage or congestion in the throat or nose. Enlarged tonsils or adenoids are often the cause.

**Cul-de-sac resonance** occurs when sound resonates in the throat or nose, and is trapped in that area with no outlet. The speech may sound muffled as a result. It may also seem as if the child is “mumbling” or not speaking up. The cause of cul-de-sac resonance can vary, but it is usually due to an area of blockage somewhere in the throat or nose.

## What other speech problems are associated with resonance disorders?

Hypernasality, in particular, can occur with other types of abnormal speech characteristics.

**Nasal air emission** (including a nasal rustle or nasal snort) is commonly associated with hypernasality. Nasal air emission refers to the audible release of the air through the nose during speech. Sometimes the sound of nasal air escape is soft, and other times it is very loud and distracting (nasal rustle).

**Weak consonants and short utterance length** are also common characteristics with hypernasality, particularly if there is significant nasal emission. The loss of air pressure through the nose reduces the air pressure in the mouth. This causes the consonants to be weak. In addition, the patient has to take frequent breaths during speaking to replace the lost air.

**Abnormal articulation** (speech sound production) is also common in patients with resonance disorders. If the child loses sound and air pressure through the nose, he or she may be unable to produce sounds normally in the mouth. Therefore, the child may learn to produce sounds in an alternate way (compensatory articulation) by using the air pressure in the throat for speech.

## What is the treatment for a resonance disorder?

The treatment of a resonance disorder or velopharyngeal dysfunction depends on the type and cause of the problem. Therefore, an evaluation by an experienced speech-language pathologist is necessary. An interdisciplinary team approach to assessment and intervention is often needed.

Treatment may include speech therapy and/or surgical intervention, such as a tonsillectomy, pharyngeal flap, sphincter pharyngoplasty, or posterior pharyngeal wall implant. Prosthetic devices can also be used on a temporary or permanent basis in some cases.

Although surgery is often needed to correct the structure, the surgery does not change the way the child has already learned to talk. Therefore, postoperative speech therapy is usually required to help the child learn how to use the corrected structure and produce sounds correctly. (**Note:** Contrary to previous beliefs, blowing, sucking, and oral-motor exercises are *not* effective in improving velopharyngeal closure or abnormal resonance.)

## What can parents do to help?

Parents should be active members of the child's treatment team. They can help in the following ways:

- Follow-up on recommendations from the surgeon and speech-language pathologist.
- If surgery has been performed, the child may need to learn how to use his or her new structure. This is done through speech therapy.
- It is important that the parent work with the child daily on activities suggested by the speech-language pathologist.
- Several short practice sessions each day are the most effective in helping the child to make progress.

## Websites on resonance disorders:

- Cincinnati Children's Hospital Medical Center – Resonance Disorders: <http://www.cincinnatichildrens.org/health/s/speech-disorder/>
- Cincinnati Children's Hospital Medical Center – Velopharyngeal Dysfunction: <http://www.cincinnatichildrens.org/health/v/velopharyngeal/>
- Cleft Palate Foundation: <http://www.cleftline.org/>

For more information, please contact the Division of Speech Pathology at (513) 636-4341 or visit our website at [www.cincinnatichildrens.org/speech](http://www.cincinnatichildrens.org/speech).