
Cleft Lip and Cleft Palate: Considerations for Evaluation and Treatment

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Evaluation and Management of Cleft Lip and Palate

A DEVELOPMENTAL PERSPECTIVE

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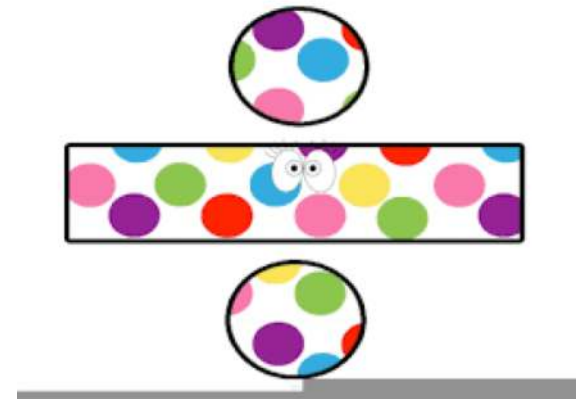


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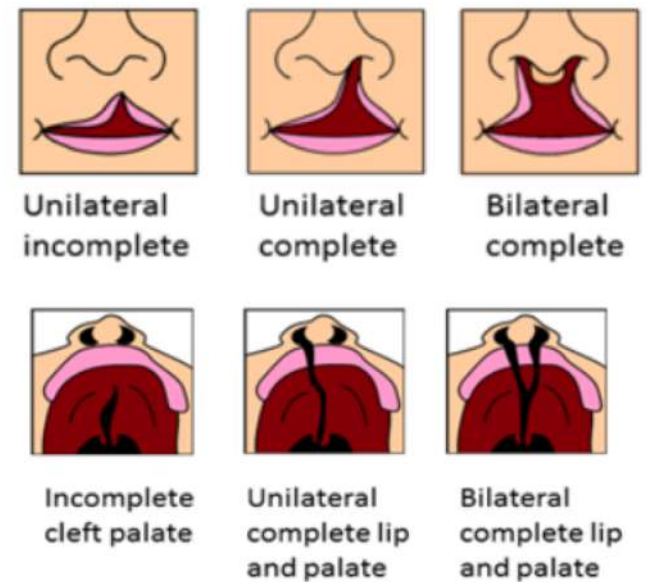
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Overview of Cleft Lip & Palate

- Three Types
 - Cleft Lip
 - Cleft Palate
 - Submucous Cleft Palate



- **Cleft Lip:** There is a separation of the sides of the upper lip. This separation often includes the bones of the upper jaw and/or gum (ASHA).
- **Cleft Palate:** A cleft palate is an opening in the roof of the mouth (called the "hard palate" and "soft palate") in which the two sides of the palate did not join in utero (ASHA).



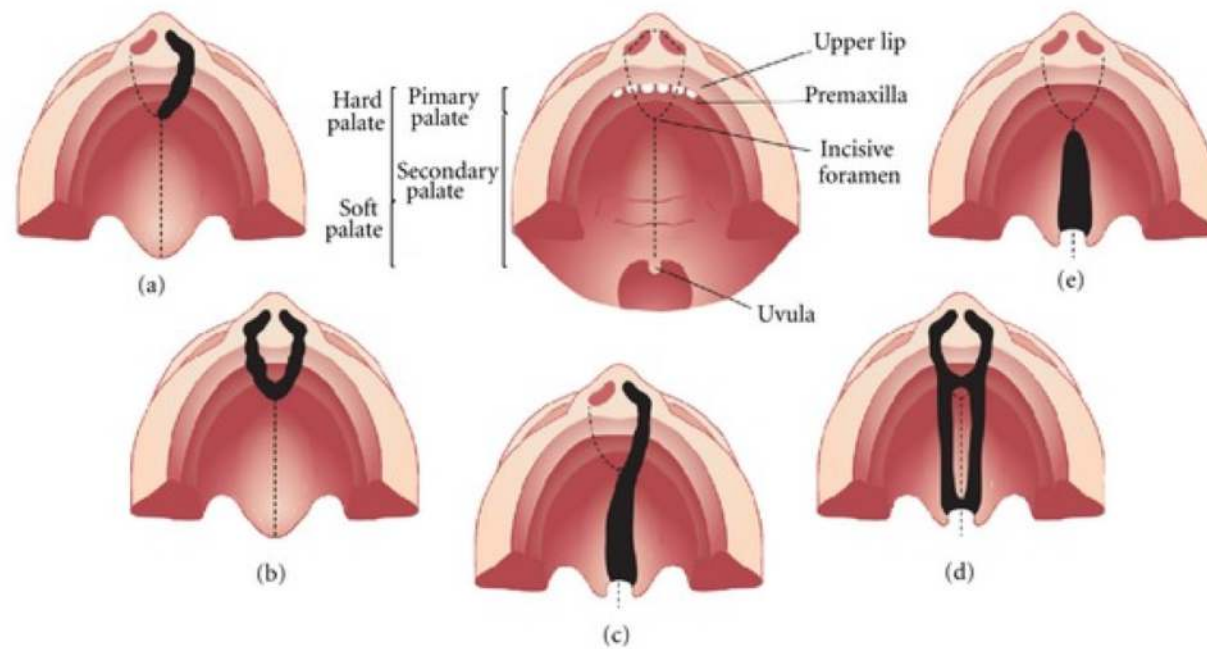
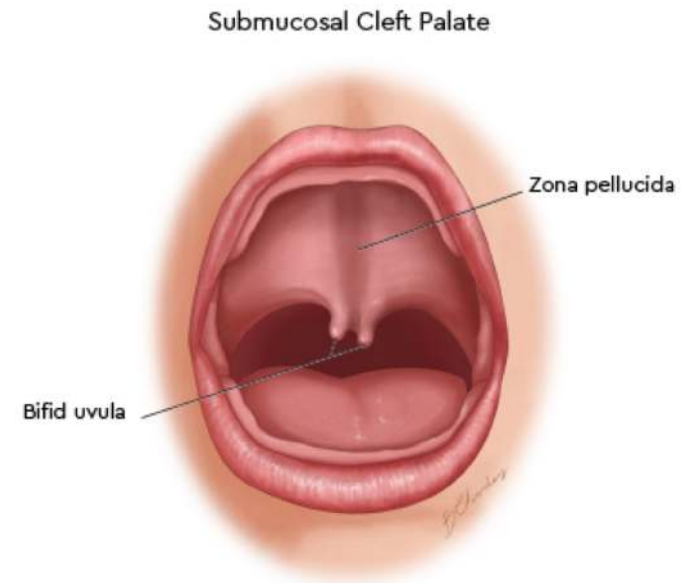


Figure 1: Representation of the most common types of cleft affecting the palate. (a) Unilateral cleft lip with alveolar involvement; (b) bilateral cleft lip with alveolar involvement; (c) unilateral cleft lip associated with cleft palate; (d) bilateral cleft lip and palate; (e) cleft palate only (© Copyright Brito, Meira, Kobayashi, & Passos-Bueno, 2012).

- **Submucous Cleft Palate:** Oral structures look intact, but the underlying velar musculature has failed to attach.
 - Three signs for a potential Submucous Cleft Palate
 - **Zona pellucida**—a blue discoloration due to levator veli palatini muscle diastasis (i.e., separation in the midline);
 - Bifid uvula
 - Palpable bony notch at the edge of the hard palate.



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Prevalence

- Cleft Lip/Palate can be nonsyndromic (not associated with a syndrome, an isolated abnormality) or as a feature of a syndrome
 - 22q11.2 deletion syndrome (DiGeorge Sequence)
 - Stickler Syndrome
 - Pierre Robin Sequence
 - In the United States, Cleft Lip with or without Cleft Palate is the second most common birth defect, occurring about one in every 940 births (Parker et al., 2010)
 - Worldwide, oral clefts in any form (i.e., cleft lip, cleft lip and palate, or isolated cleft palate) occur in about one in every 700 live births (World Health Organization [WHO], 2001).
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Impact of Cleft Lip & Palate on Communication and Function

Children born with Cleft Lip/Palate are at risk for...

- **Feeding problems**
- **Articulation errors**
- Aesthetic differences
- **Hearing loss**
- Dental abnormalities and malocclusion
- Airway obstruction
- **Velopharyngeal insufficiency**
- Frequent ear infections
- Psychosocial effects



Need for Multidisciplinary Care

- According to ASHA and American Cleft Palate-Craniofacial Association, a multidisciplinary team is essential in order to provide care that is coordinated, consistent and meets the patient's developmental, medical and psychological needs.
- Teams include as a minimum, a team coordinator and professionals from the Speech-Language Pathology, Plastic Surgery, and Orthodontics specialties.
 - May also include audiologist, dentist, geneticist, ENT, prosthodontist, psychologist, pulmonologist, social worker
 - Speciality Clinic at Ann & Robert H. Lurie Children's Hospital of Chicago



General Timeline

0-3 Months

Monitoring

Lip adhesion or a molding plate device might be recommended to help bring the parts of the lip closer together before the lip is fully repaired

3-6 Months

Repair of Cleft Lip

*Speech & Language
Milestones*

*Babbling
Moves eyes in
direction of sounds
Pays attention to
music*

9-12 Months

Repair of Cleft Palate

*Speech & Language
Milestones*

Babbles long strings of sounds
First Word
Understands words for common items
Uses sounds and gestures to get and keep attention

12+ Months

Continued Monitoring

As the child grows, secondary plastic surgery procedures may be required due to Velopharyngeal Insufficiency

For example: As the adenoid pad begins to disappear around age 5, Velopharyngeal Insufficiency may appear

Early Interventions with Feeding

- Depends on the extent of the cleft
 - Infant may be unable to generate negative pressure for suction
 - Infant may be unable to find a hard palatal surface for compression of the nipple
 - Infant may experience nasal regurgitation
 - May need to be burped more often due to taking in more air while feeding
- Breastfeeding
 - Breastfeeding trials should be supported
 - With cleft lip, breastfeeding is usually not a problem
 - With cleft palate, it is very challenging due to difficulties with compression and suction
- Options with cleft palate include
 - Supplemental nursing
 - Modified nipples/bottles



Linguistic Development

- Speech and language delays due to insufficient oral mechanism to support early speech and language productions
 - Babbling may be delayed
 - Babbling tends to consist of nasal sounds (/m,n/) and vowels especially before surgical repair
 - Despite limited consonant inventories, children with cleft lip/palate vocalize as frequently as non cleft children
 - If there is no other syndrome or diagnosis, children with cleft lip/palate will develop early communication acts (gestures, vocalizations, eye contact) similar to non cleft children
 - If there is no other syndrome or diagnosis, children with cleft lip/palate will follow receptive language milestones
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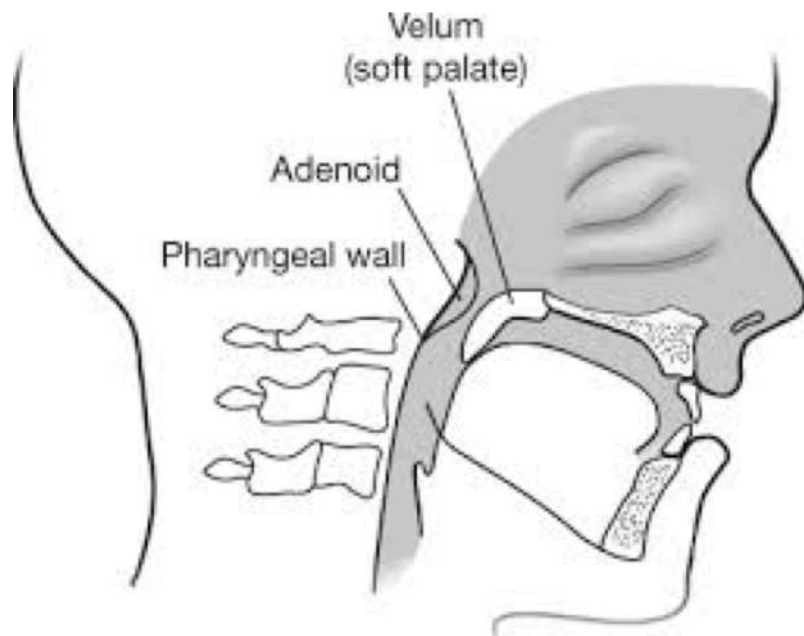
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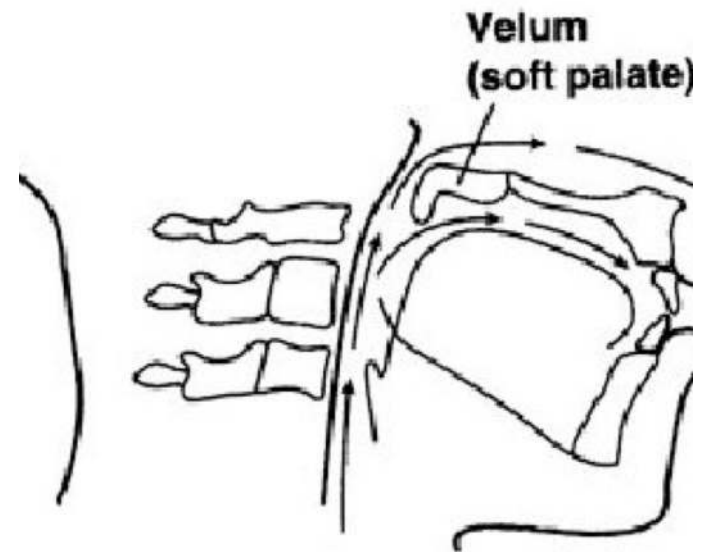
Continued Monitoring

As the child grows, secondary plastic surgery procedures may be required due to Velopharyngeal Insufficiency

For example: As the adenoid pad begins to disappear around age 5, Velopharyngeal Insufficiency may appear



The adenoid pad may help the velum achieve appropriate closure.



As the adenoid pad regresses, the distance between the velum and the pharyngeal wall increases and velopharyngeal insufficiency may appear.

Common Articulation Errors and Distortions

Error/Distortion	Articulatory Characteristics	Phonemes Affected
Glottal Stop	Quick and forceful adduction of vocal folds	Stops and Affricates
Pharyngeal Stop	Tongue base contacts posterior pharyngeal wall	Velar stops, alveolar stops
Pharyngeal Fricative	Tongue base approximates pharyngeal wall	Alveolar fricatives
Mid-Dorsum Palatal Stop	Middle of tongue contacts hard palate	Alveolar stops
Anterior Nasal Fricative	Oral stop with airflow directed through open velopharyngeal port	Alveolar Fricatives
Posterior Nasal Fricative	Oral stop with airflow directed through a partially closed velopharyngeal port	Sibilants and Fricatives

Evaluation

- Case History including surgical history
 - Oral Mech
 - Look at palatal elevation
 - Expressive/Receptive Language
 - Depending on age informal play-based assessment
 - Formal assessment if able
 - Look for age appropriate receptive and expressive milestones
 - Pragmatics
 - Fluency
 - Articulation: are errors obligatory or compensatory?
 - Formal assessment: GFTA
 - Developmental Speech Errors?
 - Age-Inappropriate Errors?
 - Cleft- Specific errors?
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Evaluation Continued

- Voice
 - Can formally assess using a nasometer
 - Perceptually assess resonance in conversational speech or play
 - Hypernasal/hyponasal
 - Listen for nasal air emission or nasal turbulence



Fig. 10. (A) Use of a stethoscope to listen for hypernasality or nasal emission. (B) Use of a bending straw to listen for hypernasality or nasal emission.

Speech Sample to Assess Velopharyngeal Function

- Syllables
 - Pa pa pa
 - Pi pi pi
 - Ta ta ta
 - Ti ti ti
 - Ka ka ka
 - Key key key
 - Sa sa sa
 - See see see
- Sentences
 - Pet the puppy
 - Pop the bubble
 - Take the turtle
 - Go get the cookie
 - Suzy sees the sun in the sky
 - Kit kat kit kat kit kat
 - Hamper, hamper, hamper
 - Mommy made muffins

*** check out the Appendix to see more word lists*

Stimulability Testing

- Try nasal occlusion to promote oral air flow
 - Occluding the nostrils will prevent active nasal air emission or passive emissions from pharyngeal fricatives
 - Allow feedback for unwanted air or acoustic energy in the noise
 - Use a tissue to provide visual feedback for oral pressure sounds /p,b,t/
 - Do not do oral motor exercises!!!!
 - Note the following things:
 - Do they have appropriate placement?
 - Were any changes noted in nasal air emissions? hypernasality?
-

Treatment Strategies

- **Contact and collaborate** with craniofacial team
 - Use **phonetic placement techniques**, usually starting with bilabials and then moving to alveolars.
 - Use **sustained /h/** to break the glottal pattern and to teach easy oral airflow with open glottis.
 - Insert /h/ after oral stop consonants to discourage use of glottal stops prior to vowel onset [e.g., p(h)op for "pop"].
 - Teach **auditory discrimination** between the correct target and the compensatory error to facilitate self-monitoring.
 - **Tactile Cues**
 - Feeling one's neck musculature to help identify incorrect placement for glottal stops and for pharyngeal stops and fricatives;
 - Feeling a released puff of air on one's hand during the production of plosives
 - Using one's finger to feel bilabial closure and oral air pressure on plosives
 - Using nose plugging/pinching (nasal occlusion) to provide the sensation of oral pressure and to discourage nasal airflow errors
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Take Home Points

- As children grow, structures change so it is important to **routinely evaluate** children with a history of cleft lip and palate to keep an eye on velopharyngeal function
- **Oral Motor Exercises are ineffective!**
- Speech Therapy CANNOT change hypernasality or nasal emission due to abnormal structure
- Speech Therapy *is* effective and appropriate when:
 - Compensatory articulation productions that are secondary in nature
 - Hypernasality or nasal emission following surgical correction. The child may need to learn to use the corrected velopharyngeal valve through auditory feedback
- **You already have all the skills you need!**



Resources

ASHA: <https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589942918§ion=Resources>

Cincinnati Children's Hospital:

<https://www.cincinnatichildrens.org/service/s/speech/patients/handouts>

[A Guide For Cleft Palate Speech Sampling](#)

[Classification of Velopharyngeal Dysfunction](#)

[Guide to Treatment Decision-Making for Cleft-Type Speech](#)

Appendix A Words Without Nasal Consonants

badges
batch
boat
cab
cage
cake
cash
cast
cat
catch
cheap
chicks
chips

cupcake
dishes
ditch
face
fifty-five
foot
jeeps
jokes
juice
just
keeps
kitty
packages

pipe
safety
seafood
sheep
sheet
shoes
sixty-six
socks
stop
suit
Susie
tack
teeth

Production of these words should maintain elevation of the velum and will help determine whether the velum can remain elevated throughout a non-nasal word. These words do not contain nasal sounds such as m or n. They also avoid l and r sounds, which can be difficult under normal circumstances for children to pronounce.

(Kuehn & Henne, 2003)

Appendix B Words With All Nasal Consonants

amen
an
any
in
mama
mane
many
mean
memo

men
menu
mine
mini
minnow
moan
mom
money
moon

name
nanny
nine
no
none
noon
noun
omen

The velum should remain in an almost fully lowered position (i.e., approaching rest position) with air escaping from the nose during the production of these words. These words will help determine if the patient has adequate airflow through the nose for speech. Inadequate airflow can be caused by velopharyngeal port obstruction due to enlarged adenoids or nasal blockage due to a deviated nasal septum, enlarged nasal turbinates, or other physical problems.

(Kuehn & Henne, 2003)

Appendix C Sentences Used in Evaluating Dynamic Velopharyngeal Functioning

- Non-Nasal Sentences:
 - She wore blue shoes.
 - Cookies are good to eat.
- Combination of Nasal and Non-Nasal Sounds:
 - Santa came so soon.
 - Nancy is a nurse.

(Kuehn & Henne, 2003)

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