



LEADERSPROJECT
TEACHERS COLLEGE • COLUMBIA UNIVERSITY

Cleft Palate Speech and Feeding *Train the Trainer*

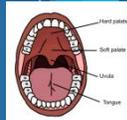




LEADERSPROJECT
TEACHERS COLLEGE • COLUMBIA UNIVERSITY

Module 1.1:

- Anatomy & Physiology
- Why is Speech Therapy Important?
- Embryological Development



Written by:

Catherine (Cate) J. Crowley, J.D., Ph.D., CCC-SLP
Miriam Baigorri Ph.D., CCC-SLP
Chelsea Sommer M.S., CF-SLP

With contributions by:

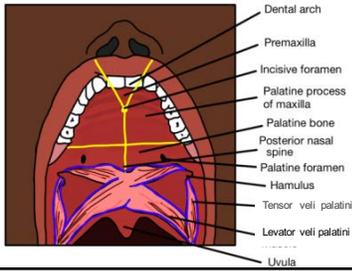
Casey Sheren, Sam Home, Marcos Sastre, Grace Fidos, & Julie Smith

Typical Embryological Development

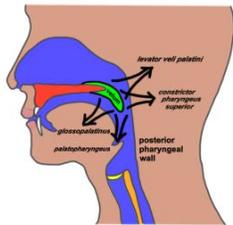
- **Lips and alveolus**
 - Begins around 6-7 weeks of gestation
 - Starts at incisive foramen
- **Hard palate**
 - Begins at 8-9 weeks of gestation
- **Velum and uvula**
 - Complete at 12 weeks of gestation



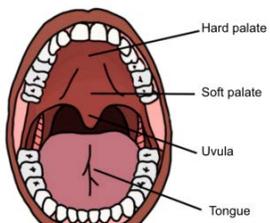
What does typical anatomy of the oral structures look like?



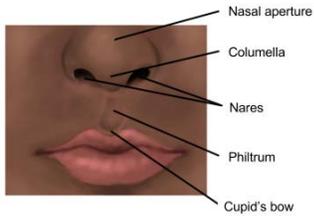
An illustration of the muscles involved in velopharyngeal closure



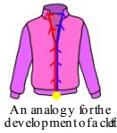
What does typical anatomy of the oral structures look like?



What does typical anatomy of the oral structures look like?



How do the oral structures develop?



The incisive foramen is a point of embryological development. From this location the premaxilla closes on the right side and left side forward to the lip. The palate then closes from the incisive foramen back to the uvula. When one point of development does not close, this results in the cleft.

Typical hard and soft palate



 **Your turn!**



Turn to your partner and, with a flashlight, examine his/her oral structures.

Check the color of the oral tissues, and be sure to identify the:

- Hard palate
- Soft palate
- Uvula



Module 1.2:

- **Anatomy & Physiology of Different Types of Clefts**



Written by:

Catherine (Cate) J. Crowley, J.D., Ph.D., CCC-SLP
Miriam Baigorri Ph.D., CCC-SLP
Chelsea Sommer M.S., CF-SLP

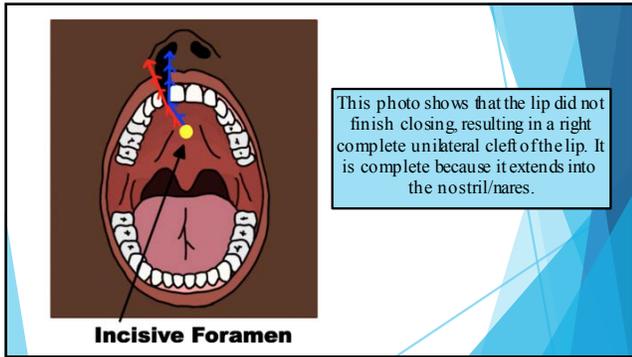
With contributions by:

Casey Sheren, Sam Home, Marcos Sastre, Grace Fidos, & Julie Smith

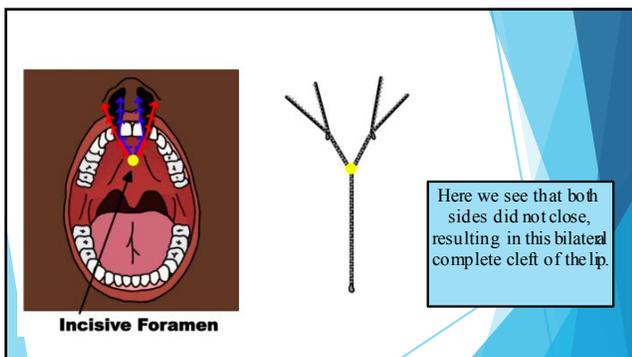
Unilateral Cleft Lip

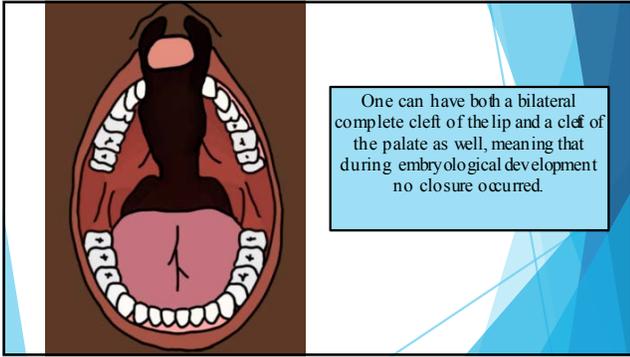


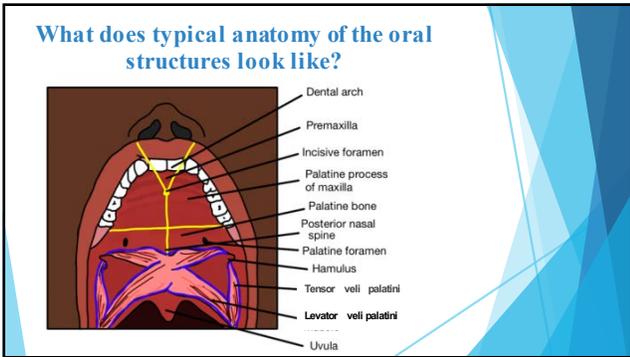
Mugisha, a child with a unilateral cleft lip from Rwanda.

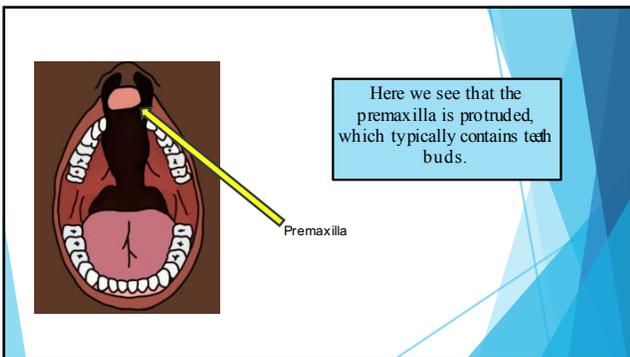




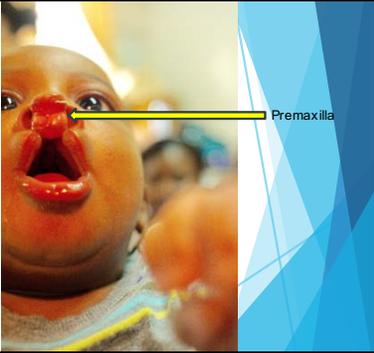








The bulging premaxilla results from incomplete closure of the seams anterior to the incisive foramen. If the seams had closed during development, the premaxilla would be correctly placed.



Premaxilla



An analogy for the development of a cleft

Types of Cleft Lip Deformities

- ❖ Unilateral (one side)
- ❖ Bilateral (two sides)

- ❖ Complete (cleft to the nose)
- ❖ Incomplete (Only a cleft of the lip. The nose is not impacted)

Clinical Questions

Ask yourself: Is one side affected, or both? (Unilateral or bilateral)

Ask yourself: Does the cleft go up to the nose? (Complete or incomplete)

Typical Facial Anatomy



Unilateral Incomplete Cleft Lip



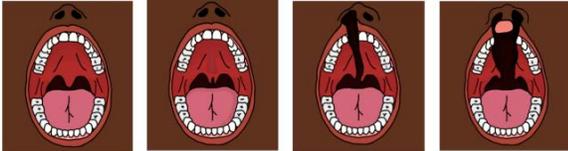
Unilateral Complete Cleft Lip



Bilateral Complete Cleft Lip



Cleft Palate Classification



Normal Palate

Submucous Cleft

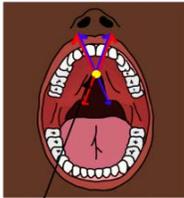
Unilateral Complete

Bilateral Complete

We will discuss this later!

 **Your turn!**

Turn to your partner and discuss:
What happened during embryological development that would result in this kind of a cleft?



Incisive Foramen



 **ANSWER**



Incisive Foramen

This is a cleft of the hard palate. It formed during embryological development due to an interruption to closure of the palate from the incisive foramen back to the uvula.



Anatomical Variations in Cleft Palate

Cleft of Soft Palate



cleft

Cleft of Hard and Soft Palate (& left unilateral cleft lip)



cleft

We can see a cleft of just the soft palate (left) or a cleft of the hard and soft palate (right), depending on the point at which development is interrupted.

Your turn!

Describe the type of cleft you see in the following photos and think about why this might have occurred during development.







Answer: Cleft of the hard and soft palate



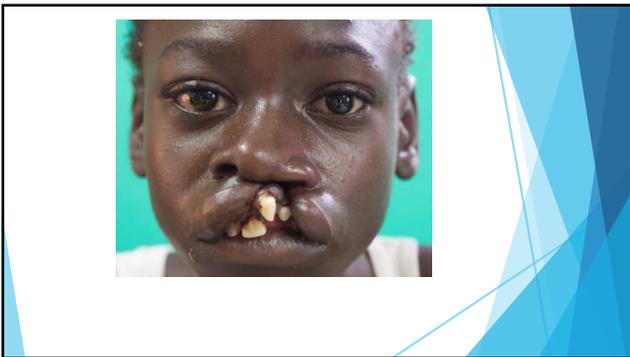
Answer: Bilateral cleft of the lip with bulging premaxilla



Answer: Bilateral cleft of the lip with bulging premaxilla









Answer: Unilateral complete cleft lip with a bulging premaxilla and erupted teeth



LEADERSPROJECT
TEACHERS COLLEGE • COLUMBIA UNIVERSITY

Module 1.3:

- Submucous and Occult Clefts



Written by:

Catherine (Cate) J. Crowley, J.D., Ph.D., CCC-SLP
Miriam Baigorri Ph.D., CCC-SLP
Chelsea Sommer M.S., CF-SLP

With contributions by:

Casey Sheren, Sam Home, Marcos Sastre, Grace Fidos, & Julie Smith

Three characteristics of a submucous cleft

- Bifid uvula
- Zona pellucida
- Notch in posterior border of the hard palate

Submucous Cleft

- **Zona pellucida**
 - Bluish area in the middle of the velum.
 - Bluish coloring
 - Caused by thin mucosa
 - Lack of normal underlying muscle mass
- Velum may appear to be in an inverted “V”, especially during phonation.
 - “V” shape
 - Abnormal insertion of the veli palatini muscles in the posterior section of the hard palate
 - With phonation, velum appears to “tent up” toward hard palate.

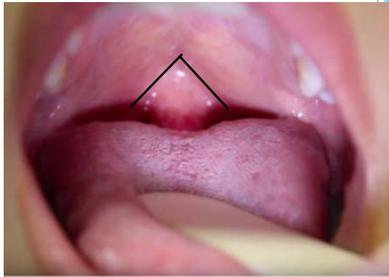
Submucous Cleft - Zona pellucida



Submucous Cleft - “Inverted V”



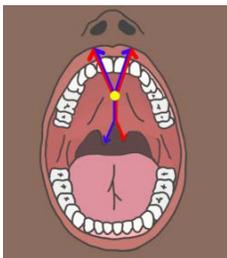
Submucous Cleft - "Inverted V"



Submucous Cleft -- Bifid Uvula

- ❖ May be split down the middle with two pendulous structures
- ❖ May appear as one structure with line down the center
- ❖ May have a simple indentation at the posterior border
- ❖ Uvula may appear small and undeveloped--hypoplastic.

Submucous Cleft -- Bifid Uvula



In this photo, we see that there is a submucous cleft with a bifid uvula, as this did not close in development. Submucous cleft is not always identified because patients are not always symptomatic and, even with physical signs of submucous cleft, can have normal speech!

Submucous Cleft -- Bifid Uvula



Submucous Cleft -- Notch in Posterior Border of Hard Palate

- In normal palate, can often feel slight projection of posterior nasal spine.
- If there is an appreciable notch in the posterior border of the hard palate, this indicates the presence of a submucous cleft palate.
- Use gloved examination. Notch can be small and narrow so use pinky finger to feel.



Occult Cleft

- Sometimes children may seem hypemasal, however, there is no physical abnormality in the palate.
- Occult cleft are diagnosed through nasoendoscopy, which is when a scope with a camera is passed through the nostrils to observe how velopharyngeal structures move during speech.



Module 1.4:

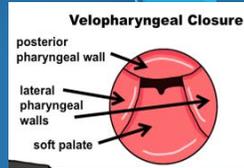
• Velopharyngeal Closure

Written by:

Catherine (Cate) J. Crowley, J.D., Ph.D., CCC-SLP
Miriam Baigorri Ph.D., CCC-SLP
Chelea Sommer M.S., CF-SLP

With contributions by:

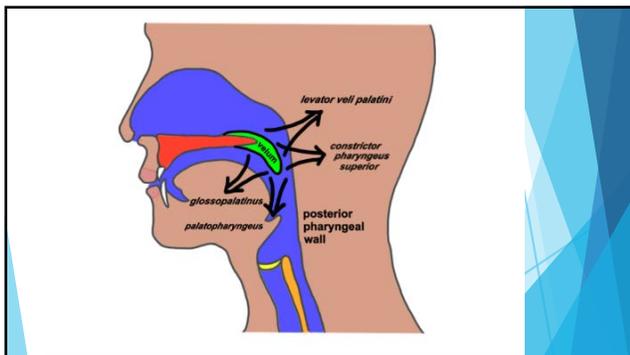
Casey Sheren, Sam Home, Marcos Sastre, Grace Futos, & Julie Smith



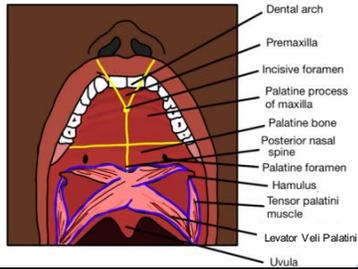
Muscles Involved in Velopharyngeal Closure

- **Levator veli palatini**- main muscle for velar elevation
- **Superior pharyngeal constrictor**- medial displacement of lateral pharyngeal walls
- **Musculus uvulae**- contracts during phonation and create bulge on velum which adds stiffness of velum
- **Palatoglossus muscles**- depresses the velum

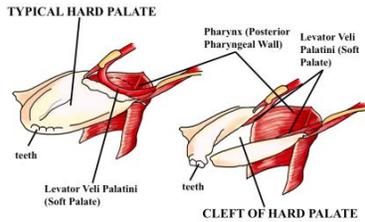
*Tensor veli palatini- opens the Eustachian tube for middle ear drainage; contributes little or nothing with velopharyngeal closure.



Remember what typical anatomy of the oral structures looks like:

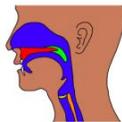


The levator veli palatini muscle cannot connect where there is a cleft palate, meaning that the soft palate cannot raise appropriately to create high pressure oral sounds.



The **Door Metaphor** is an analogy for better understanding cleft palate and why speech errors occur.

Play Video #1 entitled "Door Metaphor for Velopharyngeal Closure"

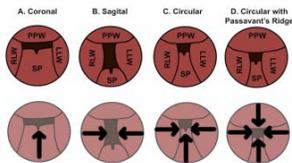




Your turn!

Turn to your partner and practice reciting **The Door Metaphor**. This will be necessary when explaining cleft palate airflow and speech to parents of children with cleft palate.

Velopharyngeal Closure Patterns



There are 4 typical ways velopharyngeal closure can occur. These are different ways in which "the door" can close to create high pressure oral sounds, such as "p", "b", "t", "d", "k", "g", "f", "s", "z", "ch", "sh", etc.

A. Coronal
With coronal closure pattern, superior movement of the soft palate is the main contributor to VPC.

B. Sagittal
With sagittal closure pattern, movement of the lateral pharyngeal walls is the main contributor to VPC.

C. Circular
With circular closure pattern, movement of the lateral pharyngeal walls and SP contribute equally to VPC.

D. Circular with Passavant's Ridge
Passavant's Ridge is a bulge of tissue on the posterior pharyngeal wall that aids in VPC.

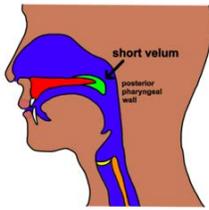
PPW = Posterior pharyngeal wall
RLW = Right lateral pharyngeal wall
LLW = Left lateral pharyngeal wall
SP = Soft palate
VPC = velopharyngeal closure

What is *velopharyngeal dysfunction (VPD)*?

Condition where the door--the velopharyngeal closure-- does not happen. Why?

- Structural** - "*VP insufficiency*"
- Velum too short to reach the posterior pharyngeal wall
 - Hole in the palate--a cleft palate--that is a structural reason why the door cannot close
- Functional** - "*VP incompetency*"
- Physiological: The levator veli palatini does not do its job of lifting the soft palate
 - Neurological: Apraxia, dysarthria, brainstem tumor

Illustration of Velopharyngeal Insufficiency



Examples of velopharyngeal insufficiency include a cleft, submucous cleft, or short velum. This picture shows a short velum, which would be a structural deficit resulting in velopharyngeal insufficiency.

What is “velopharyngeal mislearning”?

- **Articulation disorder** that might *seem* like velopharyngeal dysfunction
 - Normal structure, normal function
- **Air exits through the nose for high pressure sounds**
 - /p/ /b/ /t/ /d/ /k/ /g/
 - Continuous sounds (e.g. /v/ /sh/ or /s/) are hypemasal



Module 1.5:

- **Feeding a Baby with Cleft Palate (Abbreviated)**



Written by:

Catherine (Cate) J. Crowley, J.D., Ph.D., CCC-SLP
Miriam Baigorri Ph.D., CCC-SLP
Chelsea Sommer M.S., CF-SLP

With contributions by:

Casey Sheren, Sam Home, Marcos Sastre, Grace Fintos, & Julie Smith

Strategies for feeding a baby with cleft lip or palate

1. Always feed your baby in an upright position, whether from the breast or cup.
2. Burp your baby every 5 minutes.
3. Keep your baby upright or seated for 20 – 30 minutes after each meal.



Strategies for feeding a baby with cleft lip or palate

For more information on feeding a baby with cleft lip and palate, see Optional Presentation “Feeding a Baby with a Cleft Lip and/or Palate”



Credits

Catherine (Cate) Crowley, J.D., Ph.D., CCC-SLP
Miriam Baigorri, Ph.D., CCC-SLP
Chelsea Sommer, M.S., CF-SLP



Credits

Graduate Research Associates and SLP master's students:

Marcos Sastre III, B.S.

Casey Sheren, B.A.

Sara Horne, B.S.

Graduate Research Assistants and SLP master's students:

Johanna Kreishbuch, B.S.

Julie Smith, B.S.

Pam Kotorac, B.S.



Support and Funding Provided By:

- The Wyncote Foundation
- Smile Train
- Teachers College, Columbia University
- The Crowley Family

Special thanks to the families and children in these videos



Cite this as:

Crowley, C., Baigorri, M., & Sommer, C. (2016).
Cleft Palate Speech and Feeding Video Tutorials.

Available at LEADERSproject.org



Attribution-NonCommercial-NoDerivs
CC BY-NC-ND



**All Cleft Palate Speech Therapy Resources
Available for FREE download
LEADERSProject.org**

Discrimination Clown Picture
Speech Sound Assessment and Stimulability
Acevedo Spoke
Therapy Word Games
Therapy Books for Phrases and Sentences



Attribution-NonCommercial-NoDerivs
CC BY-NC-ND





LEADERSPROJECT
TEACHERS COLLEGE • COLUMBIA UNIVERSITY

LEADERSProject.org

Teachers College, Columbia University, 2016

All content unless otherwise stated is licensed Creative Commons Attribution-NonCommercial-NoDerivs

CCC BY-NC-ND

For more information, please contact Dr. Catherine Crowley at
crowley@exchange.tc.columbia.edu



Attribution-NonCommercial-NoDerivs
CC BY-NC-ND

References

Crowley, C. & Baigorri, M. (2014). *Terapia del Habla para Paladar Hendido: Evaluación y Tratamientos (Cleft palate evaluation and treatment modules for professionals)*. Retrieved from <http://www.leadersproject.org/2014/05/20/terapia-del-paladar-hendido-evaluacion-y-tratamientos-playlist/>

Crowley, C., Baigorri, M., & Kreisbuch, J. (2016, May). *Diagnostic evaluation and interview for cleft palate*. Retrieved from <http://www.leadersproject.org/2016/05/30/diagnostic-evaluation-and-interview-for-cleft-palate/>

Crowley, C., Baigorri, M., & Miranda, J. (2013, June). *Feeding babies with cleft palate with breast/bottle: Parent handout in English*. Retrieved from <http://www.leadersproject.org/2013/07/08/feeding-babies-with-cleft-palate-with-breastbottle-parent-handout-in-english/>

References

Crowley, C., Baigorri, M., Sommer, C., & Acevedo D. (2016, May). *What to do before the cleft palate is repaired to improve speech outcomes after surgery*. Retrieved from <http://www.leadersproject.org/2016/05/30/strategies-before-the-cleft-palate-is-repaired/>

Crowley, C., Baigorri, M., Yeung T. (2013, December). *Feeding babies with cleft palate with breast/cup: Parent handout in English*. Retrieved from <http://www.leadersproject.org/2013/12/30/feeding-babies-with-cleft-palate-with-breastcup-parent-handout-in-english/>

Golding-Kushner, K. (2004). Treatment of sound system disorders associated with cleft palate speech. *SIG 5 Perspectives on Speech Science and Orofacial Disorders*, 14(2), 16-20.

References

Hardin-Jones, M. A., Chapman, K. L., & Scherer, N. J. (2015). *Children with cleft lip and palate: A parent's guide to early speech-language development and treatment*. Bethesda, MD: Woodbine House.

Kummer, A. (n.d.). Speech therapy for cleft palate or velopharyngeal dysfunction (VPD). *Cincinnati Children's Hospital Medical Center*, 1-6.

Peterson-Falzone, S.J., Hardin-Jones, M.A., Kamell, M.P. (2010). *Cleft Palate Speech* (4th Edition). St. Louis, MO: Mosby Elsevier.

Peterson-Falzone, S., Trosi-Cardamone, J., Kamell, M., & Hardin-Jones, M. (2006). *The clinician's guide to treating cleft palate speech*. Philadelphia: Mosby.

References

Sell, D. (2008). Speech therapy delivery and cleft lip and palate in the developing world. *Management of cleft lip and palate in the developing world*. Hoboken, NJ: John Wiley & Sons Ltd. (pp.193-202).

Sommer, C. (2016, May). *English Cleft Palate Speech Therapy Word Lists*. Retrieved from <http://www.leadersproject.org/2016/05/30/english-cleft-palate-speech-therapy-word-lists/>

Sommer, C., Crowley, C., Baigorri, M., & Acevedo D. (2016, May). *Cleft Palate Speech Therapy Hierarchy*. Retrieved from <http://www.leadersproject.org/2016/06/30/cleft-palate-speech-therapy-hierarchy/>

Watson, A., Sell, D., & Grunwell, P. (2001). *Management of cleft lip and palate*. John Wiley & Sons Incorporated.
