CRANIOFACIAL DIFFERENCES: SUBTLE TO SEVERE

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Nashville Public Schools

Mississippi Speech Language Hearing Association
2012 Annual Continuing Education Conference

March 29, 2012
I. Welcome

II. Overview of Goals
   A. Recognize subtle to severe craniofacial anomalies
   B. Understand the types of craniofacial anomalies, the etiologies, and the consequences
   C. Learn to develop appropriate diagnostic protocols and referral contact
   D. Understand the intervention process appropriate for individuals with subtle as well as severe craniofacial differences

III. Severe Craniofacial Anomalies
   A. Define craniofacial differences and incidences
   B. Severe craniofacial anomalies related to syndromes
      1. Treacher Collins
      2. Crouzon
      3. Williams
      4. Velocardiofacial
      5. Pierre Robin
      6. Cleft Lip and Palate
      7. Submucous Cleft Palate
   C. Etiologies of Severe Craniofacial Differences

IV. Consequences of Severe Craniofacial Anomalies
   A. Speech, language, hearing and swallowing disorders
   B. Neurologically based Velopharyngeal Differences
   C. Educational and social differences
   D. Prevention of consequences

V. Management: Evaluation/Diagnosis of Communication Disorders
   A. Team approach and referral sources
   B. Role of Audiologist
   C. Role of Speech-Language Pathologist
   D. Protocol development and procedures

VI. Management: Therapy Goals and Intervention Procedures
   A. Hearing management
   B. Speech and language intervention
      1. Physical management of the cleft and dentition
      2. Early intervention-feeding, speech, language and hearing
      3. Early and aggressive hearing management
      4. Language therapy
      5. Articulation therapy-velopharyngeal management
6. Resonance therapy/hypernasality
7. Vocal hyperfunctioning therapy
8. Swallowing Management

VII. Subtle Craniofacial Differences that Make a Difference for Dentofacial Growth and Speech/Swallowing Disorders
A. Definition of OMD, consequences, and etiologies
B. Visual recognition of differences
C. Frequency of Occurrence
D. Consequences
E. Etiologies
F. Definition
G. ASHA Statement
H. Team Management
I. Research Studies
J. Screening for OMD
K. Evaluation/diagnostic protocol
L. Therapy goals and procedures

VIII. Questions and Answers
Referral Sources for Craniofacial Anomalies

Alabama:

**Birmingham** - University of Alabama at Birmingham Cleft and Craniofacial Center
Website: [http://www.childrensal.org/body.cfm?id=529](http://www.childrensal.org/body.cfm?id=529)
Contact number: 205-939-9369  Team Alt. Phone: 205.939.5388
Team Email: john.grant@ccc.uab.edu John H. Grant, III, MD (Plastic Surgery)
Address: 1600 7th Ave S, Acc 322 Birmingham, AL 35233
Patient referrals: [http://www.childrensal.org/body.cfm?id=286](http://www.childrensal.org/body.cfm?id=286)

- Download the Hearing and/or Speech Evaluation Referral Form
  - This form must be faxed to Patient Registration at 205-939-6096 prior to the patient's appointment
  - Please fax completed form along with any relevant medical records to 205-212-2734

Arkansas

**Little Rock** - Arkansas Children’s Hospital-Cleft Lip and Palate Clinic
Website: [http://www.archildrens.org/Services/Cleft-Clinic.aspx](http://www.archildrens.org/Services/Cleft-Clinic.aspx)
Contact number: 501-364-1658 Team Alt. Phone: 501-364-7546
Team Email: copelandemilyg@uams.edu Emily G. Copeland, BSN, RN (Nursing) or buckmillerlisam@uams.edu Dr. Lisa Buckmiller Director of Cleft Palate Program
Address: 1 Children’s Way, Slot 668 Little Rock, AR 72202-3591
Patient Referrals: Contact Emily Copeland or Dr. Lisa Buckmiller

Georgia:

**Atlanta** - Children’s Healthcare of Atlanta Scottish Rite Craniofacial Center

Team Leader and Speech Therapist: John E. Riski, PhD, CCC-SLP

Website: [http://www.choa.org/craniofacial](http://www.choa.org/craniofacial)
Contact number: 800-848-9049 or 404-785-2239
Team Email: bonnie.pepper@choa.org Bonnie S. Pepper, MSN, CPNP (Nursing)
Address: 5455 Meridian Mark Rd, Suite 200 Atlanta, GA 30342
Referral information for professionals:[http://www.choa.org/Childrens-Hospital-Services/Pediatric-Craniofacial-Center/For-Professionals](http://www.choa.org/Childrens-Hospital-Services/Pediatric-Craniofacial-Center/For-Professionals)

The following resources are available to referring physicians and other craniofacial professionals:

- Referrals can be made via phone, online form or using our downloadable form:
  - Phone: available 24 hours a day by calling 800-848-9049 or 404-785-2239
  - Online: fill out the online form. After it is filled out, sign and fax it to 404-785-3706 along with the current clinical records.
  - Downloadable Form: download and fill out the form, sign and fax it to 404-785-3706, along with the current clinical records.

The nurse coordinator will assess the initial information and address any questions.

We must receive the relevant clinical information before we can schedule an appointment.
Arkansas

Little Rock

Arkansas Children’s craniofacial team
Website: http://www.rch.com/services/craniofacial
Contact number: 501-627-8600
Team Email: craniocare@rch.com
Address: 3000 Goodwin Avenue, Little Rock, AR 72205

Missouri

Columbia

University of Missouri Craniofacial Center
Website: http://medicine.missouri.edu/craniofacial
Contact number: 573-882-6276
Team Email: craniofacialcenter@missouri.edu
Address: 205 Medical Plaza East, Columbia, MO 65212

Oklahoma

Oklahoma City

Oklahoma Children’s Hospital Craniofacial Team
Website: http://www.okch.org/about-us/clinics/craniofacial
Contact number: 405-216-1616 Team Alt. Phone: 405-216-1759
Team Email: craniology@okch.org
Address: 1000 Elm Dr, Oklahoma City, OK 73102

Texas

Dallas

Children’s Health Craniofacial Team
Website: http://www.childrensdallas.org/services/craniofacial
Contact number: 214-456-8029 Team Alt. Phone: 214-456-9566
Team Email: craniofacial@childrensdallas.org
Address: 1900 Childress St, Dallas, TX 75235

Houston

Texas Children’s Craniofacial Team
Website: http://www.texaschildrens.com/services/craniofacial
Contact number: 832-420-5070 Team Alt. Phone: 832-420-5252
Team Email: craniofacial@texaschildrens.com
Address: 6621 Fannin St, Houston, TX 77030

San Antonio

Baylor Scott & White Craniofacial Team
Website: http://www.bswhealth.org/services/craniofacial
Contact number: 210-358-8080
Team Email: craniofacial@bswhealth.org
Address: 7700 La Cantera Pkwy, Ste B-100, San Antonio, TX 78257

El Paso

University of Texas El Paso Craniofacial Team
Website: http://www.utep.edu/services/craniofacial
Contact number: 915-747-5700
Team Email: craniofacial@utep.edu
Address: 500 Terrell Ave, El Paso, TX 79968

Utah

Salt Lake City

University of Utah Craniofacial Team
Website: http://www.uhc.utah.edu/services/craniofacial
Contact number: 801-581-3100
Team Email: craniofacial@uhc.utah.edu
Address: 150 N 300 E, Salt Lake City, UT 84103

Virginia

Richmond

Virginia Commonwealth University Craniofacial Team
Website: http://www.vcuhealth.org/services/craniofacial
Contact number: 804-828-8000
Team Email: craniofacial@vcuhealth.org
Address: Box 980218, Richmond, VA 23298

Washington

Seattle

Seattle Children’s Craniofacial Team
Website: http://www.seattlechildrens.org/services/craniofacial
Contact number: 206-987-2000
Team Email: craniofacial@seattlechildrens.org
Address: 4800 Sand Point Way NE, Seattle, WA 98105

West Virginia

Charleston

 WVU Craniofacial Team
Website: http://www.vcuhealth.org/services/craniofacial
Contact number: 304-595-2000
Team Email: craniofacial@vcuhealth.org
Address: 150 N 300 E, Salt Lake City, UT 84103

Wisconsin

Madison

University of Wisconsin Craniofacial Team
Website: http://www.mayo.edu/services/craniofacial
Contact number: 608-262-4100
Team Email: craniofacial@mayo.edu
Address: 600 Highland Ave, Madison, WI 53792

Wyoming

Cheyenne

University of Wyoming Craniofacial Team
Website: http://www.uwyo.edu/services/craniofacial
Contact number: 307-766-2000
Team Email: craniofacial@uwyo.edu
Address: 150 N 300 E, Salt Lake City, UT 84103

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Augusta-Cleft Team, Craniofacial Center
Contact number: 706-721-1787 Team Alt. Phone: 706-721-2198
Team Email: jyu@mail.mcg.edu Jack C. Yu, MD, DMD, MS Ed (Plastic Surgery)
Address: Medical College of Georgia HB-5040 1446 Harper St Augusta, GA 30912-0415

Savannah-Georgia Southeastern Cleft Lip & Palate Clinic
Contact number: 912-355-4601
Team Email: larrimore@gapcdr.com Beth Larrimore, MEd (Speech-Language Pathology)
Address: 1206 E 66th St Savannah, GA 31404

Louisiana

New Orleans
Ochsner Craniofacial Team
Website: http://www.ochsner.org/services/pediatrics_craniofacial_team/
Contact number: 504-842-4000 x62189
Team Email: cblock@ochsner.org Colleen A. Buchler-Block, MS (Coordinator/Administrator)
Address: 1315 Jefferson Highway New Orleans, LA 70121

Children’s Hospital-Cleft Palate/Craniofacial Team
Website: http://www.chnola.org/PageDisplay.asp?P1=4313
Contact number: 504-896-9857 Team Alt. Phone: 504-895-7200
Team Email: malexand@chnola.org Mary Ellen Alexander, RN, MN (Nursing)
Address: 200 Henry Clay Ave New Orleans, LA 70118

Shreveport-Ark-La-Tex Cleft and Craniofacial Team
Contact number: 318-212-5944
Team Email: gghali@lsuhsc.edu G. E. Ghali, DDS, MD (Oral/Maxillofacial Surgery) Other Contact: Mary Pannbacker, MCD, PhD (Speech Language Pathology)
Address: 2508 Bert Kouns Industrial Loop, Ste 200 Shreveport, LA 71118

Mississippi

Jackson-Blair E. Batson Hospital for Children-Pediatric Craniofacial Center
Website: http://www.umhc.com/craniofacial/
Contact number: 888-815-2005 or make an online appointment request https://www.umhc.com/Forms/Request_an_appointment.aspx
Team Email: GKPhillips@nursing.umsmed.edu Glenda Phillips, RN
(Coordinator/Administrator)
Address: 2500 North State St Jackson, MS 39216

**Tupelo-North Mississippi Cleft Palate Team**
Contact number: 662-844-0847 Team Alt. Phone: 662-842-1891
Team Email: office@drburnstutor.com Janis E. Burns-Tutor, MD (Plastic Surgery) Other contact:
Kay Mathews, MS (Speech-Language Pathology)
Address: 1040-C South Madison St Tupelo, MS 38801

**Tennessee:**

**Nashville-Vanderbilt University Medical Center Craniofacial Surgery Center**
Contact number: Appointments: 615-322-2350 Information: 615-936-0160
Team Email: kevin.kelly@vanderbilt.edu Kevin J. Kelly, DDS, MD (Plastic Surgery)
Address: Vanderbilt University Medical Center Department of Plastic Surgery D-4207 Medical Center North Nashville, TN 37232-2345

**Memphis/Germantown-University of Tennessee/LeBonheur Cleft and Craniofacial Team**
Contact number: 901-347-8290
Team Email: rwallace@uthsc.edu Robert D. Wallace, MD (Plastic Surgery)
Address: 7945 Wolf River Blvd Ste 290 Germantown, TN 38138

**Knoxville-East Tennessee Children’s Hospital Cleft and Craniofacial Clinic**
Website: [http://www.etch.com/services_specialties/services.aspx](http://www.etch.com/services_specialties/services.aspx)
Contact number: 865-541-8510 Alt. Phone: 865-521-6005
Email: jmarciel@etch.com Judy A. Marciel, MSN, CPNP (Nursing)
Address: 2018 Clinch Ave Knoxville, TN 37916

**Chattanooga-Tennessee Craniofacial Center**
Team Website: [http://www.erlanger.org/body.cfm?id=739](http://www.erlanger.org/body.cfm?id=739)
Team Phone: 423-778-9192 Team Alt. Phone: 800-418-3223
Address: 975 E 3rd St Chattanooga, TN 37403

Information retrieved from the following:
Cleft Palate Foundation [http://cleftline.org/](http://cleftline.org/)
Evaluation Protocol—Craniofacial Differences Case History Information

I. Background info:
- Name
- DOB
- Gender
- Age

II. Parent Concerns

III. Developmental History
- Birth weight
- Gestation
  When did your child: Sit Alone/Walk Alone/Toilet Trained/Use First Words/Combine Words/Use Sentences

IV. Medical History
- Immunizations up to date: yes/no
- Any conditions child has now or had in past
- Current medications/Allergies
- Previous surgeries

V. Feeding History: Early feeding difficulties
- Normal/Nasal regurgitation/Failure to thrive

VI. Nasal regurgitation:
- Absent/Present for most meals/Present for less than 50% of meals/Present infrequently

VII. Educational and Speech Therapy History

VIII. Hearing History
- Recent testing revealed normal hearing/Hearing has not been tested recently but there are no concerns expressed/Recent testing revealed hearing/Middle deficits and there is active management underway/Response to sound was not appropriate and a hearing assessment is recommended/History of conductive loss/History of sensorineural loss/Other
IX. Vision History

Recent testing revealed normal vision/Vision has not been tested recently but there are no concerns expressed/Recent testing revealed visual deficits and corrective lenses are in use/Response to visual images was not appropriate and visual assessment is recommended/Vision has not been tested/Other
Craniofacial Speech Language Hearing Assessment Procedures

I. Case Study Assessment
II. Hearing Assessment – Tympanometry and referral for other testing as needed
III. Conversational Speech Sample and Formal Assessment When Needed
   A. Articulation/Intelligibility:
      • Speech sample: Informal assessment listening for number of utterances and intelligibility as a good indicator of what tests to give. Pay particular attention to production of stop-plosives, fricatives and affricates which are most likely to be negatively affected by a cleft.
      • Give any articulation test with transcription of errors that includes stimulability
      • Patients may present with various omissions, distortions and substitutions as well as maladaptive articulation including glottal stops, pharyngeal fricatives, pharyngeal stops, posterior nasal fricatives (“nasal snort”) and anterior nasal fricatives (nasal emission with possible facial grimace)
      • High pressure consonant assessment protocol
      • Assessing the effect of VPI on articulation: Test the aspiration of each pressure sound with nose open, then with nose closed. Increased aspiration (or oral air pressure) with the nose closed suggests VPI is affecting articulation and that managing VPI will improve the quality of articulation. The same is true for fistula.
   B. Voice: Informal assessment for vocal hyperfunctioning paying particular attention to presence of hoarse or breathy vocal quality that could be due to radiated tension in the vocal folds from trying to achieve velopharyngeal closure.
   C. Resonance: You may have the child repeat single words, short phrases and sentences using early developing sounds.
      • To test for hypernasality, construct speech sample from:
         o Oral consonants
         o Voiced sounds
         o High and low vowels
         o Early appearing sounds
         o For example, “Buy baby a bib.”
      • To test for hyponasality, construct speech sample from:
         o Nasal consonants
         o Voiced sounds (nasal sounds are voiced)
         o Early appearing sounds
         o For example, “Mama made lemon jam.”
• To test for nasal air emission, construct speech sample from:
  o Oral consonants
  o Unvoiced sounds (whispered if necessary—this eliminates the confusing artifact of voicing)
  o Early appearing sounds
  o For example, “Papa piped up.”

IV. Language: MLU and other expressive language assessments and receptive assessments where indicated
• Don’t rule out receptive but most common is verbal expressive related to reduced MLU
• Common phonology and articulation deficits impact intelligibility so they usually say shorter sentences to increase intelligibility
• If child is verbal and uses connected speech, MLU count is used to decide what test to do
• For infants and toddlers, use an assessment based on caregiver interview such as the Receptive-Expressive Emergent Language Test, Third Edition (REEL-3)

V. Oral Examination
A. Cranial nerves: Protocol for assessing possible neurological deficits
B. Occlusion/Bite: Look at mandible and maxilla and their relationship to one another and observe the type of maloclusion and any other abnormalities
  • Angles Class 1: The first molars and anterior incisors have appropriate relationship
  • Angles Class 2: The maxillary teeth are too far forward in relation to mandibular teeth—often called “overbite”
  • Angles Class 3: Lower teeth are too far forward in relation to upper teeth—often called “underbite”
C. Hard Palate: Look for presence of any fistulas and the shape (notched alveolar ridge, cleft, wide, collapsed)
D. Facial Muscle Patterns: Looking for symmetry of facial movements and presence of grimace
E. Velum:
  • The symmetry of elevation
  • The placement of velar dimple should be just above uvula, at distal 1/3 and anterior 2/3’s of soft palate
  • The structure of the velum including bifid uvula, submucous cleft and posterior nasal spine
  • Fistula will not affect resonance if below point of velopharyngeal closure
  • Submucous cleft/Bifid uvula present in half the patients
VI. Swallow: Assessing labial and lingual patterns and looking for nasal regurgitation

VII. Velopharyngeal Screening:

- First, listen for oral pressure consonants “p,” “b,” “d,” “s,” etc. in the babbling of infants or repeated words and connected speech of older children. The presence of these sounds usually suggests some degree of velopharyngeal competence whereas the lack of these sounds may suggest a VPI. Then listen for hypernasality, nasal air escape and compensatory articulation/placement errors.

- Observe blowing in young children who are unwilling to speak. The ability to blow a whistle may suggest adequate velopharyngeal functioning. Remember, blowing is not predictive of speech skills, and does not help soft palate function for speech.

- If a SeeScape is available this can be used to reveal any nasal air escape with production of oral pressure consonants

- A nasal listening tube or stethoscope can be made from a simple 18-inch length of tubing, internal diameter of approximately 3/8 inch. One end is held to the patient’s nose and the other to the clinician’s ear. Listen for inappropriate nasal resonance or nasal air escape.
### CONSONANTS FOR VPI TESTING

**List/ Lista de Consonantes**

**POP/Explota**

<table>
<thead>
<tr>
<th>Consonant</th>
<th>Word 1</th>
<th>Word 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Papa/Perro</td>
<td>B</td>
</tr>
<tr>
<td>T</td>
<td>Top/Todo</td>
<td>D</td>
</tr>
<tr>
<td>K</td>
<td>Cat/Carro</td>
<td>G</td>
</tr>
<tr>
<td>CH</td>
<td>Choo choo/Chico</td>
<td>DG</td>
</tr>
</tbody>
</table>

**Most boys like to play football**

**Hiss/Siseo**

<table>
<thead>
<tr>
<th>Consonant</th>
<th>Word 1</th>
<th>Word 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Soap/Sopa</td>
<td>Z</td>
</tr>
<tr>
<td>F</td>
<td>Foot/Foto</td>
<td>V</td>
</tr>
<tr>
<td>SH</td>
<td>Shoe/ N/A</td>
<td>ZH</td>
</tr>
<tr>
<td>TH</td>
<td>Thank you/ N/A</td>
<td>TH</td>
</tr>
</tbody>
</table>

**Nasal:**

<table>
<thead>
<tr>
<th>Consonant</th>
<th>Word 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Mama</td>
</tr>
<tr>
<td>N</td>
<td>No</td>
</tr>
<tr>
<td>NG/ñ</td>
<td>Ring/ niña</td>
</tr>
</tbody>
</table>

**Low Pressure/Presion Baja**

<table>
<thead>
<tr>
<th>Consonant</th>
<th>Word 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Lion/Leon</td>
</tr>
<tr>
<td>W</td>
<td>Water/Huevo</td>
</tr>
<tr>
<td>Y</td>
<td>Yes/ Llama</td>
</tr>
<tr>
<td>R</td>
<td>Red/Rojo</td>
</tr>
<tr>
<td>H</td>
<td>Hello/Juega</td>
</tr>
</tbody>
</table>

*Id Sounds at end of words*

*Identifica los sonidos al final de las palabras.*

*Highlight sounds*

*Destaca los sonidos.*

*Repeat each word 5 times*

*Repite cada palabra 5 veces.*

*Repeat each sentence 5 times*

*Repite cada frase 5 veces.*

*Read entire paragraph*

*Lee el párrafo entero.*
<table>
<thead>
<tr>
<th>Cranial Nerves</th>
<th>Physiology</th>
<th>Look/Listen For</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfactory (I)</td>
<td>Sensory/Smell</td>
<td>C/O: loss of smell</td>
<td>Affected by allergies</td>
</tr>
<tr>
<td>Optic (II)</td>
<td>Vision</td>
<td>Loss of vision</td>
<td>Visual Field Defect</td>
</tr>
<tr>
<td>Oculomotor (III)</td>
<td>Motor nerve fibers to eyelid and ocular muscles.</td>
<td>Eye laterализation and medially (look at nose). Ptosis of eye lid(s), dilated pupils, and diplopia.</td>
<td>CN's III, IV and VI control eye muscles. May wear Eye Patch.</td>
</tr>
<tr>
<td>Trochlear (IV)</td>
<td>Superior oblique muscles of the eye.</td>
<td>Eyes move down and to side, diplopia.</td>
<td></td>
</tr>
<tr>
<td>Trigeminal (V)</td>
<td>Mastication, jaw movement. Tensor P. of Soft palate.</td>
<td>U-deviates to weak side; B-jaw open or cannot clenched teeth.</td>
<td>Loss of muscle tone in the floor of the mouth. One intact side is sufficient</td>
</tr>
<tr>
<td>Abducens (VI)</td>
<td>Lateral rectus muscle of the eye.</td>
<td>Turns head rather than lateralize eyes</td>
<td>Eye pulls towards nasal side, double vision.</td>
</tr>
<tr>
<td>Accessory (XI)</td>
<td>Supplies trapezius and sternocleidomastoid muscles (strap).</td>
<td>Cannot raise shoulder</td>
<td>Shrugs shoulders, turns head side to side, weakness of neck.</td>
</tr>
<tr>
<td>Hypoglossal (XII)</td>
<td>Supplies musculature of the tongue</td>
<td>Distortions of lingual stops vs. sibilants. Tongue tip deviates to weak side when protruded, fasciculations, atrophy.</td>
<td></td>
</tr>
</tbody>
</table>
Therapy Techniques for Patients with VPI

From Managing Speech Disorders: *Improving Your Clinical Competence with Articulation Disorders Related to Cleft Lip/Palate and Craniofacial Disorders* by John E. Riski, Ph.D.
[http://www.choa.org/Childrens-Hospital-Services/Pediatric-Craniofacial-Center/Location Tab to For Professionals]

What are the goals of speech therapy for children with cleft lip/palate or resonance disorders?
The primary goals of speech therapy should be to:

- Establish correct articulatory placements.
- Establish appropriate oral nasal resonance.
- Maximize oral pressure for the pressure consonant sounds (plosives, fricatives and affricates)
- Maximize oral-pharyngeal articulatory function.

What are therapy techniques for treating hypernasality?

- Small degrees of hypernasality can sometimes be managed by increasing articulatory effort.
- Since the soft palate is an articulator, nasality improves with improved articulation.
- Nasal Occlusion can be helpful to prevent nasal pressure loss and direct the airstream orally.
- Whispering can be helpful in preventing vocal fold adduction when glottal stops are present.

Which therapy techniques are ineffective for treating hypernasality? Therapy tasks using sucking and blowing exercises or palatal stimulation are inappropriate and ineffective. In short, they DO NOT WORK.

- Blowing may be diagnostic of velopharyngeal closure in a young child who may be more willing to blow a whistle than say specific words.

How long should speech therapy for hypernasality continue? If hypernasality does not resolve with several weeks of therapy, formal evaluation or physical management such as surgery or prosthetic devices may be warranted.

What kind of feedback is important when treating articulation disorders? It is important to give the patient feedback about the amount of oral air pressure and the direction of airflow for the sibilant sounds, (“s”, “z”, “sh”).
How can I give a patient feedback about speech? There are many inexpensive clinical ways and many computer-driven programs for feedback.

- **See-Scape™**: Do not use nasal air escape as feedback. This only tells the patients when they failed. Use as feedback of oral pressure and flow. This lets the patients know when they succeed. Allow them to succeed often.
- **Tactile (back of hand)**: Helps maximize oral pressure and articulation.
- **Straw**: Reinforces appropriate tongue position when placed at center of teeth for the sibilant sounds, (“s”, “z”, “sh”).

Facilitating Techniques that are helpful in treating articulation disorders:

- **Tongue Blade Restricts Anterior Tongue Elevation**: Used in t/k substitutions, prevents tongue-tip elevation. Posterior tongue usually elevates spontaneously.
- **Reverse Chaining**: Useful for: blends, e.g. “Nake” ... “Ssssnake”
  Syllables: “Na” ...“Li-Na”...“Ro-Li-Na”...“Car-Ro-Li-Na”
- **Whisper**: Eliminates distortion of hypernasality and allows more isolated evaluation of articulation. Eliminates or lessens glottal stop.
- **Occlude Nostrils**: Useful to evaluate effect of velopharyngeal incompetence (VPI) on articulation.
  — Increase oral air pressure by preventing nasal pressure loss.
  — Prevent nasal air flow associated with “nasal fricatives.”
- **Over Enunciate (e.g. puff out cheeks)**: Maximizes oral air pressure and velar elevation. May achieve closure for small VPI.

How can I encourage / teach correct articulatory placement?

- **Release /t/ to /s/, i.e., /tssss/:** Centralizes airflow for /s/.
  Requires that /t/ is already central.
- **Bite Lip And Blow For /f/:** Can correct bilabial production.
- **Extend tongue to lip for stop-plosive.**
  — Move tongue position anterior.
  — Then extend only to teeth.
  — Then extend to behind teeth.
Moves tongue to a post-dental position. Helps correct mid-palatal stops.

- “Stick out your tongue and blow” /th/:
- Retract tongue to /s/ position /th > s/
- Retract tongue further to /sh/ position /s > sh/
- Stop and release /sh/: /sh > ch/

Children with cleft lip/palate and resonance disorders often have unusual speech patterns. Can these speech patterns be corrected? These unusual misarticulations develop in compensation to VPI or dental/arch malformations. Although they are unusual they are simply misarticulations. The following are facilitating techniques and postures for treating these unusual compensatory articulations.

**Glottal Stop Substituted For Plosives Strategy:**

- **Occlude nostrils if there is a VPI:**
  This eliminates the nasal air pressure loss.
- **Whisper:**
  This usually prevents the vocal fold closure in glottal stops.
- **Begin with unvoiced consonants first:**
  This also helps prevent glottal stops.
- **Maximize pressure consonants:**
  This helps focus articulation in the mouth rather than the larynx, e.g., “Puff-Out Cheeks” for /p/ and /b/.
- **Use auditory feedback (straw) or visual feedback:**
  These provide the clinician and patient with feedback about direction of air flow or amount of oral pressure.

**Pharyngeal Fricative Substituted for Fricatives:**

- **Occlude nostrils if there is a VPI:**
  This eliminates the nasal air loss.
- **Extend tongue /th/, work back to /s/:**
  This helps focus articulation in the mouth rather than the pharynx.
- **Release /t/ to make /s/:**
  This uses a correctly produced stop sound to teach the equivalent fricative.
- **Bite lip to make /f/:**
  This helps focus articulation in the mouth rather than the pharynx.
- **Use auditory feedback (straw):**
  This provides the clinician and patient with feedback about oral pressure and oral air flow.
Nasal Fricatives for Fricatives or Affricates:

- **Occlude nostrils if there is a VPI or not easily stimulable:**
  This eliminates the nasal air loss.
- **Release /t/ to make /s/:**
  This uses a correctly produced stop sound to teach the equivalent fricative.
- **Extend tongue to lips for lingua-labial stop:**
  This helps focus articulation in the mouth rather than the nasopharynx.
- **Use auditory feedback (straw):**
  This provides the clinician and patient with feedback about oral pressure and oral air flow.

Lateral Distortions:

- **Release /t/ to make /s/:**
  This uses a stop sound with central airflow to teach central airflow for the sibilant. This requires that airflow for the /t/ is central.
# THE UNIVERSITY OF MISSISSIPPI

## Myofunctional Checklist

<table>
<thead>
<tr>
<th>Patient’s Name:</th>
<th>Date of Birth:</th>
<th>Sex:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent/Guardian Name:</td>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td>City:</td>
<td>State:</td>
</tr>
<tr>
<td>Telephone: (Residence)</td>
<td>Referred by:</td>
<td></td>
</tr>
<tr>
<td>Examiner:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Labial Aspects

<table>
<thead>
<tr>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted upper lip mobility</td>
<td></td>
</tr>
<tr>
<td>Asymmetry of movement for grin/pucker</td>
<td></td>
</tr>
<tr>
<td>Upper/lower vermilion tissue differences</td>
<td></td>
</tr>
<tr>
<td>Bowed upper lip</td>
<td></td>
</tr>
<tr>
<td>Restricted superior labial frenum</td>
<td></td>
</tr>
<tr>
<td>Incompetence/open-mouth posture</td>
<td></td>
</tr>
<tr>
<td>Sublabial furrow</td>
<td></td>
</tr>
<tr>
<td>Mentalis wrinkle</td>
<td></td>
</tr>
<tr>
<td>Excessive lip &amp; muscle activity for swallow</td>
<td></td>
</tr>
<tr>
<td>Lip parting at end of swallow</td>
<td></td>
</tr>
</tbody>
</table>

### Lingual Aspects

<table>
<thead>
<tr>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentalized rest (ULD, ID, LLD)</td>
<td></td>
</tr>
<tr>
<td>Pre-swallow activities</td>
<td></td>
</tr>
<tr>
<td>Dentalized swallow (ULD, ID, LLD)</td>
<td></td>
</tr>
<tr>
<td>Poor up elevation/retroflex</td>
<td></td>
</tr>
<tr>
<td>Incoordination</td>
<td></td>
</tr>
<tr>
<td>Restricted lingual frenum</td>
<td></td>
</tr>
</tbody>
</table>

### Dental and Skeletal Differences

<table>
<thead>
<tr>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diastema</td>
<td></td>
</tr>
<tr>
<td>Posterior dental abnormalities</td>
<td></td>
</tr>
<tr>
<td>Anterior dental abnormalities</td>
<td></td>
</tr>
<tr>
<td>High vaulted palatal arch</td>
<td></td>
</tr>
<tr>
<td>Obvious mandibular/maxillary arch differences</td>
<td></td>
</tr>
<tr>
<td>Nasal system deviation</td>
<td></td>
</tr>
</tbody>
</table>
**Oral Habits**
- Nail biting
- Thumb or digit sucking
- Object biting
- Lip licking
- Lip biting
- Tongue sucking
- Teeth grinding/clenching

**History of Nasal Congestion**
- Current congestion
- History of mouth breathing/UR problems
- Tonsil adenoid conditions
- Frequent upper respiratory problems
- History of allergies, asthma

**Speech Aspects**
- Labiodental production for bilabials
- Dentalization of lingual-alveolar sounds
- Acoustic differences for /s, z/

**Other**
- Plays musical instrument
- Craniofacial differences
- Speech, language, or hearing disorder
- TMJ Dysfunction
- Excessive snoring/sleep apnea
- Chronic middle ear pathologies

**Recommendation:**  
--- Pass screening  
--- Referral for further evaluation: 
  - Myofunctional evaluation
  - Speech-language evaluation
  - Orthodontic assessment
ORAL FACIAL EXAMINATION FORM
FOR ORTHODONTIC AT RISK PATIENTS

G. Kellum & S. Kellum
MSHA 2012

<table>
<thead>
<tr>
<th>NAME</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARENTS</td>
<td>DATE OF BIRTH</td>
</tr>
<tr>
<td>ADDRESS</td>
<td>AGE</td>
</tr>
<tr>
<td>TELEPHONE</td>
<td>GRADE</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>REFERRED BY</td>
</tr>
</tbody>
</table>

**LIP STRUCTURE AND MOBILITY**

<table>
<thead>
<tr>
<th>UPPER LIP</th>
<th>LOWER LIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>length</td>
<td></td>
</tr>
<tr>
<td>thickness</td>
<td></td>
</tr>
<tr>
<td>size</td>
<td></td>
</tr>
<tr>
<td>balance</td>
<td></td>
</tr>
<tr>
<td>mobility</td>
<td></td>
</tr>
<tr>
<td>tone</td>
<td></td>
</tr>
<tr>
<td>symmetry at rest</td>
<td>mentalis wrinkle ____ sublabial furrow ____</td>
</tr>
</tbody>
</table>

**LIP POSTURE**

<table>
<thead>
<tr>
<th>UPPER LIP</th>
<th>LOWER LIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>at rest</td>
<td></td>
</tr>
<tr>
<td>during speech</td>
<td>(word) (sentence)</td>
</tr>
<tr>
<td>during swallowing</td>
<td></td>
</tr>
<tr>
<td>bilabial contact at rest</td>
<td></td>
</tr>
<tr>
<td>shape of lip line</td>
<td></td>
</tr>
</tbody>
</table>

**FOR SWALLOWING**

<table>
<thead>
<tr>
<th>observed</th>
<th>AT REST</th>
</tr>
</thead>
<tbody>
<tr>
<td>reported</td>
<td></td>
</tr>
<tr>
<td>practice swallow</td>
<td></td>
</tr>
</tbody>
</table>

**TONGUE POSITION**

<table>
<thead>
<tr>
<th>observed</th>
<th>AT REST</th>
</tr>
</thead>
<tbody>
<tr>
<td>reported</td>
<td></td>
</tr>
</tbody>
</table>

**PLACEMENT DURING SPEECH (ARTICULATION)**

<table>
<thead>
<tr>
<th>t</th>
<th>d</th>
<th>n</th>
<th>l</th>
<th>sh</th>
<th>t</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tongue movement patterns: /p t k /p /k /p U /t k

**SOUND**

<table>
<thead>
<tr>
<th>Sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**PALATAL WIDTH**

| lingual: labial: inferior _____ superior _____ |

**MUSICAL INSTRUMENT**

<table>
<thead>
<tr>
<th>(which instrument)</th>
<th>(how long) (practice time)</th>
</tr>
</thead>
</table>

**RESPIRATORY HISTORY (Parent/Patient Report)**

<table>
<thead>
<tr>
<th>Allergies</th>
<th>Asthma</th>
<th>Sinus</th>
<th>Frequent Colds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Comments</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ESTIMATE OF NASAL AIRWAY
Adequate: Yes ______ No ______
Potential blockage: adenoids ______ deviated septum ______ allergies ______

MOUTH BREATHING (Parent/Patient Report)
observed: during day ____________________________ sleeping ____________________________
history ____________________________
gingivae ____________________________ chapped lip ____________________________

TONSILS AND ADENOIDs
tonsils intact ____________________________ adenoids intact ____________________________
tonsils removed ____________________________ adenoids removed ____________________________

ORAL HABITS (Frequency, History, Posture)
thumb/finger sucking ____________________________ pacifier ____________________________ Other ____________________________
lip biting/sucking ____________________________ clenching ____________________________
nail biting ____________________________ pencil chewing ____________________________
comments ____________________________

CRANIAL FACIAL STRUCTURAL DIFFERENCES

SPEECH, LANGUAGE, HEARING (Note Cosmetic Differences)

MOTIVATION ASPECTS ____________________________

ORTHODONTIC/DENTAL ____________________________

SUMMARY OF CONCERNS ____________________________

RECOMMENDATIONS
ok ____________________________
review ____________________________
re-eval ____________________________ (date) ____________________________
TCE ____________________________
TX1 ____________________________
TX2 ____________________________
TX3 ____________________________

INTERVENTION TARGET/GOALS
(check appropriate items)
__ mouth breathing
__ mouth posture
__ lip approximation
__ lip length and mobility
__ lip symmetry
__ lingual-alveolar postures
__ (At rest ___ speech ___ swallow ___)
__ reduce oral habits
__ parents monitor night mouth-breathing

REFERRAL EVALUATION NEEDED
Airway ENT ____________________________
oral surgeon (frenum) ____________________________
plastic surgeon (lip) ____________________________
Sp/L ____________________________
other ____________________________

REFERRAL RECOMMENDATIONS
Craniofacial Differences: Subtle to Severe

Gloria Kellum, PhD, CCC-SLP and Staci Kellum, M.S. CF-SLP

MSHA 2012

References

American Speech and Hearing Association and American Association of Dental Schools, Joint Committee on Dentistry and Speech Pathology-Audiology (1975), ASHA, 17 (5), 331-337.


Craniofacial Anomalies Internet References

American Cleft Palate-Craniofacial Association: http://www.acpa-cpf.org/


ASHA Special Interest Group 5, Speech Science and Orofacial Disorders: Study Issue-Craniofacial anomalies and related structural disorders: http://www.asha.org/SIG/05/

Children’s Healthcare of Atlanta Craniofacial Center: http://www.choa.org/craniofacial

Cleft Palate Foundation: http://cleftline.org/

International Association of Orofacial Myology: http://www.iaom.com/

National Association for Down Syndrome: http://nads.org/

Pierre Robin Network: http://www.pierrerobin.org/

Reflections on Treacher Collins Syndrome: http://www.treachercollins.org/tcs/Welcome.html

The Williams Syndrome Association: http://old.williams-syndrome.org/