Section 9: Speech-Related Outcomes

Background

The aim of this section is to describe the initial steps that were taken to develop a protocol that could be used to collect speech data as well as the creation of the CAPS-A-Americleft Modification (AM) Analysis. The general aspects of the Speech Management of patients with clefts, is described, followed by the details of the CAPS-A-AM Analysis below. It involves the collection of high quality audio-video recordings of five- and six-year-old children with cleft palate with or without cleft lip. As of February, 2011, the participant population was expanded to include ten- and eleven-year-old children.

Sampling Considerations

All children who had initial palate repair and any secondary velopharyngeal surgery within a given center should be identified and recalled for the speech assessment and recordings. The participants from each center must comprise consecutive cases so as not to distort or bias the data. That is, the entire cohort for the ages and time frame covered should be invited with the following exclusions: children with submucous cleft palate, diagnosed syndromic cleft palate with or without cleft lip, known cognitive impairment, documented generalized developmental delay or permanent bilateral hearing loss greater than mild (30-35 db or above). All children should be able to complete the sentence protocol. The number of children evaluated out of the total eligible cohort should be documented. Those who are not available for speech recordings when recalled should be listed with reasons identified for non-attendance (e.g., no show, moved away, illness, etc.).

Data Collection

The methodology is based on the Scandcleft methodology (Eurocran/Scandcleft Protocol 2004; Lohmander et al., 2009), and work done in the UK (John et al., 2006; Sell et al., 2009). Recordings should be made in a quiet room with the subject facing natural light if possible and the face and upper neck only framed in the picture. Ideally, there should be one consistent unbusy background. The stimuli will be presented by the speech-language pathologist (SLP) who should be seated directly facing the child. The camera should be at the child's eye level, so that the child is looking straight at the camera. An aerial view should be avoided. The target sentences should be produced following the SLP's model even if the child is able to read. In this way, the rate at which sentence the elicitation takes place is controlled in order to facilitate subsequent transcription and analysis. There should be a stimulus presentation gap of two to three seconds between each sentence presentation. Recording equipment should be checked prior to each data collection session and following each session (using headphones) to make sure that a high quality sample has been recorded. The SLP will document the recording number on the Background form developed for this project.

Equipment. It is not possible to recommend specific equipment given the continual changes in the market place but it is important to ensure equivalent specifications to the descriptions below. Recordings are to be made on high quality digital video cameras using a high quality external lavalier microphone. Ideally, the clinician should also have headphones to check that sound has been recorded.

Camera. A center's current equipment may be suitable. Digital video cameras should be used for ease of editing. The camera should have two separate ports, one for a high-quality external microphone and the other for headphones for monitoring of recordings.

Microphone. A lapel microphone is preferred and provides adequate mic-to-mouth distance. If a stand-alone microphone is used, it should be placed approximately 12 inches from the child's mouth (and slightly to the side to avoid obstructing the face). The stand-alone microphone can be placed on a floor stand, tripod or tabletop. Remember to evaluate compatibility of all the components.

The Nature of the Speech Sample. As recommended by Henningsson et al (2008), the speech sample should include conversational speech, sentence repetition and single word production. The sample is controlled in the sense that sentences and single word stimuli include only the target consonant being assessed and an adequate sampling of high and low vowels. The American English Speech Sample (sentences only) developed by Trost-Cardamone (2007, revised 2011) will be used. In addition to the sentence repetition task, the speech sample should include conversational speech, automatic or rote speech (counting, days of the week) and nursery rhymes or other familiar memorized material, in keeping with routine clinical practice for five- and six-year-olds. *The Goldman-Fristoe Test of Articulation 2* (G-FTA 2) (Goldman & Fristoe, 2000), the single word articulation test portion, will also be administered.

The order of data collection is as follows:

For 5 and 6 year olds	*For 10 and 11 year olds*
*Conversational speech	*Conversational speech
Counting from 1-20 and 60-70	Counting from 1-20 and 60-70
Saying days of the week	Saying days of the week
A nursery rhyme (or two)	Pledge of Allegiance
*Sentence repetition	*Sentence repetition
G-FTA 2	Picture description (WAB)

*Minimal sample requirements

The *conversational speech sample* should include a minimum of 2-3 minutes of the child's speech and should be no longer than 4 minutes. It should be elicited by questions where the answer is not easily predetermined. Yes or No questions should be avoided. For example, the following elicitation questions may be helpful and will help to standardize the stimulus questions:

- Tell me about your brothers and sisters.
- Tell me about your favorite movie.
- Tell me about your favorite TV program.
- Tell me about your favorite place to go.
- Tell me about what you like to do on your birthday.
- Tell me what you like to do on vacation.

For the *nursery rhyme elicitation* (five- & six-year-olds) try to include one or two of the following:

- Baa Baa Black Sheep
- Humpty Dumpty
- Itsy Bitsy Spider
- Jack and Jill
- Hickory Dickory Dock

For the *picture description*, (ten- and eleven-year-olds) here are some suggested prompts:

- Tell me what's happening in this picture…can you tell me more?
- What time of year do you think it is? …and why?

- Tell me who you see in the picture
- Tell me what's happening out in the water

Background Information. For each child in the study, the SLP should complete the Background form, in conjunction with the parent(s) and others involved with the child's care. This form documents the identification, surgical history, history of past and current speech therapy intervention, and other influencing factors.

Progress to Date

Several SLPs from different centers across North America who collected data as part of this project participated in a half-day training and ratings calibration session (ACPA Phoenix, AZ – April, 2009) using a variety of patient recordings and practicing the Universal Parameters System (UPS) protocol. Subsequently, a decision was made to use CAPS-A analysis framework rather than to attempt to both validate the UPS and use it for data analysis simultaneously.

A pilot study (which included 20 samples from three centers in North America) consisted of independent ratings of nasality (hypernasality, hyponasality), nasal airflow (nasal emission, nasal turbulence), cleft-type speech characteristics, and developmental immaturities by a clinician from the UK trained in using the CAPS-A analysis framework. In addition, DS and JTC also provided ratings of hypernasality on these same samples for purposes of inter-rater reliability.

In February, 2011, SLPs participating in the project met at the University of Minnesota Dental School for CAPS-A training, discussion and consensus ratings of video-recorded speech samples and scoring practice. Baseline speech ratings on 10 samples, rated prior to the meeting, will becompared to immediate post-training ratings, and a final set of perceptual speech ratings conducted one month later (March, 2011) to compute inter- and intra-rater reliability. Training in methodology was provided by Debbie Sell (UK), Triona Sweeney (Ireland), and Anne Harding-Bell, (UK), who are experienced in CAPS-A training and have led efforts in the UK in assessment of speech outcomes in individuals with clefts.

Institutional Review Board (IRB) Documents

IRB approval is required for data collection as part of the Americleft Project. IRBs should be as broad as possible and should allow for analysis by listeners in other centers or listeners other than the SLPs collecting the data. Please make the statement that all the data will be anonymized. There is an exemplar IRB available on request. The University of Utah is the coordinating center for data analysis.

The Americleft Project Workbook is periodically updated and can be accessed as follows: http://www.acpa-cpf.org/research/americleft-study-guide.pdf.

References

Eurocran – ScandcleftProtocol: http://www.eurocran.org/content.asp?contentID=1507

Goldman R., & Fristoe, M. (2000). *The Goldman-Fristoe Test of Articulation 2*. San Antonio, TX: Pearson.

Henningsson G., Kuehn D.P., Sell D., Sweeney T., Trost-Cardamone, JE & Whitehill, TL. (2008). Universal parameters for reporting speech outcomes in individuals with cleft palate. *The Cleft Palate-Craniofacial Journal,* 45, 1-15.

John A. Sell D. Harding-Bell A. Sweeney T. Williams A. (2006). CAPS-A – A validated and reliable measure for auditing cleft speech. *The Cleft Palate-Craniofacial Journal,* 43, 272-288.

Lohmander A, Willadson E, Persson C, Henningsson G, Bowden B, Hutters B. (2009). Methodology for speech assessment in the Scandcleft project – An international randomized clinical trial on palatal surgery: experiences from a pilot study. *The Cleft Palate–Craniofacial Journal*, 46, 347-362.

Sell D. John A. Harding-Bell A. Sweeney T. Hegarty F. Freeman J. Cleft Audit Protocol for Speech (CAPS-A): A Comprehensive Training Package for Speech Analysis. (2009). *International Journal of Language and Communication Studies.* iFirst Article, 1-20. Downloaded from http://www.informalhealthcare.com. D10.1080/13682820802196815.

Americleft

Americleft Speech Clinical Rating Form

- At the request of attendees at listener training sessions, this form was developed as a clinical tool using defined parameters from the Americleft speech project.
- It is different from the CAPS-A-AM form and the procedures that are used to judge recordings for research purposes (or for QI/QA, etc.).
- It is offered as a protocol form to supplement current clinic procedures.
- Clinical rating form is intended for use in the live clinic setting.

For information on the research protocol, please see:

- Chapman, K., Baylis, A.L, Trost-Cardamone, J., Cordero, K.N., Dixon, A., Dobbelsteyn, C., Thurmes, A.K., Wilson, K.D., Harding-Bell, A., Sweeney, T., Stoddard, G., & Sell, D. (2016). The Americleft Speech Project: Training and reliability outcomes. *Cleft Palate Craniofacial Journal*, *53*(1), 93-108 .

For additional information on clinical implementation of this protocol, please reach out to the Americleft speech group. Kelly Cordero (Kelly.cordero@dignityhealth.org) can direct you to one of the members who can best assist with your particular question.

Chapman, K., Dobbelsteyn, C., Trost-Cardamone, J., Wilson, K., Baylis, A., Cordero, K., Dixon, A., Thurmes, A. (3/12/17). *A One-Day Listener Training Workshop: Presented by the Americleft Speech Group*. Full day workshop at the American Cleft-Palate Craniofacial Association Annual Conference. Colorado Springs, Colorado.

Americleft

PATIENT NAME:_____DATE:_____AGE:_____MRN:_____

AMERICLEFT SPEECH- CLINICAL RATING FORM

BACKGROUND/HISTORY

ASSESSMENT PROTOCOL

- ☐ Conversational Sample
- ☐ Count from 1-20, 60-70
- ☐ Sentences: American English Sentence Sample
- ☐ Goldman Fristoe Test of Articulation Third Edition (GFTA-3) or other single word articulation test
- ☐ Oral Examination
- ☐ CAPS-A-AM Ratings

Additional Measures, as indicated:

- ☐ Instrumental Testing
- ☐ Imaging
- ☐ Parent and patient reported outcome measures

Chapman, K., Dobbelsteyn, C., Trost-Cardamone, J., Wilson, K., Baylis, A., Cordero, K., Dixon, A., Thurmes, A. (3/12/17). *A One-Day Listener Training Workshop: Presented by the Americleft Speech Group*. Full day workshop at the American Cleft-Palate Craniofacial Association Annual Conference. Colorado Springs, Colorado.

Americleft

American English Sentence Sample – Recording Form *(Trost-Cardamone, 2012)*

Insert a √ for targets correctly produced; transcribe errors in appropriate columns for Initial and Final positions

Target Sentence (target sounds in bold)	Sound	Initial	Final	Total #Errors
1. **M**om 'n Amy are ho**m**e	/m/			
2. Puppy will **p**ull a ro**p**e	/p/			
3. Buy **b**aby a bi**b**	/b/			
4. A fly **f**ell off a lea**f**	/f/			
5. I lo**v**e every **v**iew	/v/	*	*	
6. **Th**irty- two tee**th**	/θ/			
7. **Th**e other feather	/ð/			
8. Anna **kn**ew no o**ne**	/n/			
9. Your **t**urtle ate a ha**t**	/t/			
10**. D**o it today for Da**d**	/d/			
11. **L**aura will ye**ll**	/l/			
12. Sissy **s**aw Sally ra**c**e	/s/			
13. **Z**oey ha**s** roses	/z/			
14. **Sh**e washed a di**sh**	/ʃ/			
15. Wa**tch** a **ch**oo-choo	/tʃ/	*	*	
16. Geor**g**e saw **G**igi	/dʒ/	*	*	
17. We are hangi**ng** on	/ŋ/			
18. A **c**ookie or a ca**k**e	/k/			
19. **G**ive Aggie a hu**g**	/g/			
20. Hurry ahead **H**arry	/h/			
21. I **sp**y a **st**arry **sk**y	/sp/			
	/st/			
	/sk/			
22. **R**ay will arrive early	***/r/***			
23. We **w**ere away	/w/			
			TOTAL NUMBER OF CONSONANT ERRORS:	
24. We ran a long mile (*for rating hyponasality*)	-			

Chapman, K., Dobbelsteyn, C., Trost-Cardamone, J., Wilson, K., Baylis, A., Cordero, K., Dixon, A., Thurmes, A. (3/12/17). *A One-Day Listener Training Workshop: Presented by the Americleft Speech Group*. Full day workshop at the American Cleft-Palate Craniofacial Association Annual Conference. Colorado Springs, Colorado.

Americleft

ARTICULATION ANALYSIS (list affected phonemes)

Non-Oral Errors:

- ☐ Glottal stop / Coarticulation: _____
- ☐ Pharyngeal Stop: _____
- ☐ Pharyngeal Fricative: _____
- ☐ Nasal Fricative: _____
- ☐ Nasal Substitution: _____

Obligatory Distortions:

- ☐ Weak Pressure Consonants
- ☐ Nasalization

Oral Substitutions and Distortions:

- ☐ Dentalization: _____
- ☐ Lateralization: _____
- ☐ Palatalization: _____
- ☐ Mid-Dorsum Palatal Stop: _____

Phonological Pattern Types:

- ☐ Stopping: _____
- ☐ Backing: _____
- ☐ Final Consonant Deletion: _____
- ☐ Cluster Reduction: _____
- ☐ Fronting: _____
- ☐ Gliding: _____
- ☐ Other: _____

PERCEPTUAL SPEECH RATINGS (based on CAPS-A-AM, Chapman et al., 2016)

Hypernasality	Hyponasality	Other Resonance Distortions
0 Absent	**0** Absent	☐ Cul-de-sac
1 Borderline/minimal: some perceptible increase in nasal resonance	**1** Mild: partial denasalization of nasal consonants	☐ Mixed
2 Mild: hypernasality is evident on high vowels	**2** Marked**:** denasalization of nasal consonants and adjacent vowel	☐ Unable to Rate
3 Moderate: hypernasality is evident on vowels	**8** Unable to rate	☐ None
4 Severe: increased nasal resonance on vowels and voiced consonants		
8 Unable to rate		

Chapman, K., Dobbelsteyn, C., Trost-Cardamone, J., Wilson, K., Baylis, A., Cordero, K., Dixon, A., Thurmes, A. (3/12/17). *A One-Day Listener Training Workshop: Presented by the Americleft Speech Group*. Full day workshop at the American Cleft-Palate Craniofacial Association Annual Conference. Colorado Springs, Colorado.

Americleft

Audible Nasal Emission/Turbulence	Inaudible Nasal Emission	Voice
0 Absent **1** Occasionally/seldom note **2** Frequently noted **8** Unable to Rate ⌋ Phoneme Specific ⌋ Suspect related to fistula	⌋ Consistent ⌋ Inconsistent ⌋ Did not test ⌋ Absent (normal)	**0** Normal **1** Unusual or abnormal voice quality **8** Unable to Rate
Speech Acceptability	**Language Skills**	**Fluency**
0 Speech is acceptable **1** Speech is mildly unacceptable **2** Speech is moderately unacceptable **3** Speech is very unacceptable **8** Unable to rate	⌋ No Concern ⌋ Concern (describe)	⌋ No Concern ⌋ Concern (describe)

Oral Exam Observations:

IMPRESSIONS/SUMMARY:

Recommendations/Plan

PUBLICATIONS

1. Baylis, A., Chapman, K., Whitehill, T., and Americleft Speech Group. Validity and reliability of visual analog scaling for assessment of speech outcomes in children with repaired cleft palate. Cleft Palate-Craniofacial Journal. 52:660–670, 2015.

2. Chapman KL, Baylis AL, Trost-Cardamone J, Cordero K., Dixon AJ, Dobbelsteyn C, Thurmes A, Wilson K, Harding-Bell A, Sweeney T, Stoddard G, Sell D. (2016). The Americleft Speech Project: A training and reliability study. Cleft Palate-Craniofacial J. 53:93–108, 2016.

PRESENTATIONS

2012 ACPA San Jose, CA

THE AMERICLEFT SPEECH PROJECT: TRAINING, TRIALS, AND RELIABILITY OUTCOMES
Cordero, Baylis, Chapman, Dixon, Dobbelsteyn, Harding-Bell, Sell, Sweeney, Thurmes, Trost-Cardamone, Wilson

THE AMERICLEFT SPEECH PROJECT: OVERCOMING DISTANCE WITH TECHNOLOGY
Wilson, Thurmes, Baylis, Nett-Cordero, Dixon, Dobbelsteyn, Chapman, Sell, Trost-Cardamone

COLLECTING AND REPORTING SPEECH OUTCOME DATA: A PRACTICAL APPROACH
Baylis, Dixon, Thurmes, Dobbelsteyn, Nett-Cordero, Wilson, Chapman, Sell, Trost-Cardamone

2013 – 12th International Congress on Cleft Lip/Palate and Related Craniofacial Anomalies, Orlando, FL.

THE AMERICLEFT SPEECH PROJECT: AN INTERCENTER COMPARISON OF SPEECH OUTCOME
Chapman, Baylis, Dixon, Dobbelsteyn, Wilson, Trost-Cardamone, Nett-Cordero, Sell, Thurmes

THE AMERICLEFT SPEECH PROJECT: VALIDITY AND RELIABILITY OF VISUAL ANALOG SCALING FOR ASSESSMENT OF SPEECH OUTCOMES IN CHILDREN WITH REPAIRED CLEFT PALATE
Baylis, Chapman, Whitehall, Dixon, Dobbelsteyn, Nett-Cordero, Wilson, Thurmes, Trost-Cardamone

THE AMERICLEFT SPEECH PROJECT: UTILIZING WEB-BASED TECHNOLOGY FOR DATA COLLECTION AND MANAGEMENT IN MULTI-CENTER SPEECH OUTCOME STUDIES
Wilson, Chapman, Nett-Cordero, Dixon, Dobbelsteyn, Sell, Thurmes, Trost-Cardamone, Baylis

2015 ACPA Palm Springs, CA

THE AMERICLEFT PROJECT: GUIDELINES FOR PARTICIPATION IN COLLABORATIVE INTERCENTER OUTCOMES STUDIES
Long, Trost-Cardamone, Chapman, Sell, Baylis, Dixon, Nett-Cordero, Dobbelsteyn, Thurmes, Wilson, Kapp-Simon

2018 ACPA Pittsburgh, PA

CHALLENGES AND BENEFITS OF INTERNAL CLINICAL AUDITS AND TRANSPARENT EXTERNAL PEER-BENCHMARKING.
Long, Sitzman, Chapman, Kapp-Simon, Doucet, Russell, Mercado, Cordero, Crerand, Baylis

AN INTERCENTER COMPARISON OF SPEECH OUTCOMES: THE AMERICLEFT PROJECT.
Chapman, Baylis, Dixon, Dobbelsteyn, Wilson, Cordero, Trost-Cardamone, Stoddard

2019 ACPA Tucson, AZ

CLEFT PALATE SPEECH DISORDERS: IDENTIFICATION AND PERCEPTUAL RATINGS PRACTICE – PART 1.
Dixon, Wilson, Baylis, Cordero, Dobbelsteyn, Chapman, Barigayomwe

CLEFT PALATE SPEECH DISORDERS: IDENTIFICATION AND PERCEPTUAL RATINGS PRACTICE – PART 2.
Dixon, Wilson, Baylis, Chapman, Cordero, Dobbelsteyn, Barigayomwe