

# LocuTour Multimedia

## *Speech Visualization*

by

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LocuTour Speech Visualization -- Guided Session

**Voicing: Dx 1: Evaluation of Glottal Stops and Breathiness**

Take in a breath, yawn, then exhale with an audible sigh, or "ah" sound to establish optimal pitch.  
Now say:  
**If only I ate eggplant instead.**

Model:

0s 1s 2s 3s

4150 Hz  
2350 Hz  
1330 Hz  
760 Hz  
430 Hz  
250 Hz  
140 Hz  
80 Hz  
40 Hz

85 dB  
80 dB  
0 dB

Load Recording... Load Model... Play

Practice:

0s 1s 2s

4270 Hz  
2570 Hz  
1540 Hz  
930 Hz  
560 Hz  
340 Hz  
200 Hz  
120 Hz  
70 Hz  
40 Hz

85 dB  
80 dB  
0 dB

% Glottal: 9.5  
% Breathy: 8.824  
Sample Time: 3.2s

Glottal Breathy Remove Restore Record Play Save Recording...

A: Assessment Notes... Back Next Finish

View your clients' speech waveforms in real-time and analyze voice qualities.  
Keep detailed records with LocuTour's Client Manager.

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# Speech Visualization

*Speech Visualization* by LocuTour Multimedia® is an easy to use spectral speech tool that allows real-time viewing of speech; visual comparison between speech models; analysis of the voice sample using common terminology; and simplified record keeping. The program can assist the speech professional in evaluating speech production but it does not diagnose, treat, or substitute for medical consultation or evaluation.

The program provides prompted speech models for you to use in evaluating and monitoring your client's speech. The program also provides tools to guide you through recording your own speech models. The customization feature allows you to tailor the program for specific clients, provide regional dialects, and let clients use their own voice as the model.

## Overview

The program targets seven communication areas (modules): *Breath Support and Loudness; Pitch and Intonation; Voicing; Timing, Rate, and Rhythm; Phonological Accuracy; Syllable Stress and Sequencing; and Vocal Quality and Resonance*. The individuals who may benefit from this program are varied in age, speech and language skill, and medical diagnoses. For some individuals it may be more meaningful to practice improving volume and breath support, for others phonological or articulation accuracy may be the key to improved communication. For example, an individual with a repaired cleft palate may have the following priorities for treatment:

- Vocal Quality and Resonance
- Phonological Accuracy
- Breath Support and Loudness
- Voicing
- Pitch and Intonation
- Timing, Rate, and Rhythm
- Syllable Stress and Sequencing

At the risk of making sweeping generalizations, we have pre-selected treatment priorities for a variety of diagnoses based on common known features of a medical disorder. We recognize that each individual brings vocal strengths and weaknesses to the treatment session, so you and your client may add or subtract any of the tasks to help you reach your communication goals.

We will assume some fundamental knowledge base for both the clinician and the client using these programs. The appendix lists some excellent resources for beginning and experienced clinicians. The *Description of Terms* appendix covers some of the terminology used in this manual.

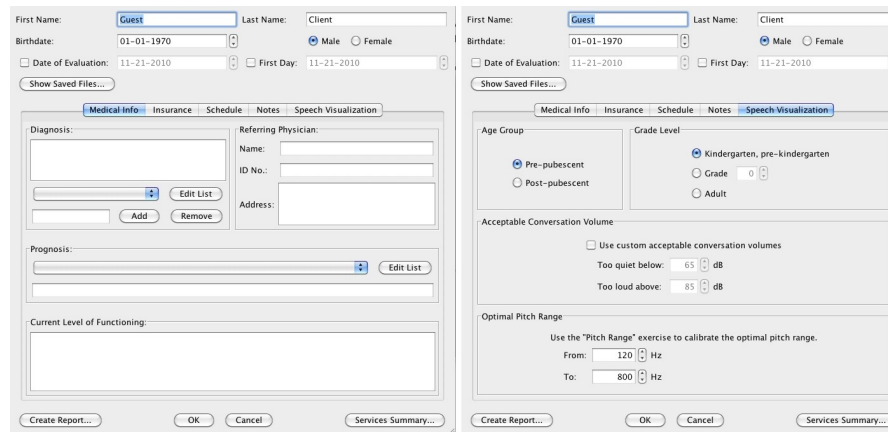
Individuals with voice and articulation disorders can benefit from visual and auditory feedback of their speech production as well as graphic and numeric information about their approximations and attempts to change vocal output. A speech-language pathologist familiar with voice disorders may know that the graphic representation of pitch can also give information concerning syllable stress and may choose to use just one graph. Others wanting explicit information may want to move between graphs to show different ways of thinking about the fundamental frequency. Some individuals obtain a better understanding of the abstract concepts of pitch, loudness, and quality by seeing numbers, some respond better to waveforms, and others to meters. For this reason we have included multiple ways to view and think about the seven target areas.

LocuTour's *Client Manager* is used to access the *Speech Visualization* program. Use the *Launch Game* button at the bottom right of the screen. The dropdown will display all of the LocuTour games that are installed on your computer.

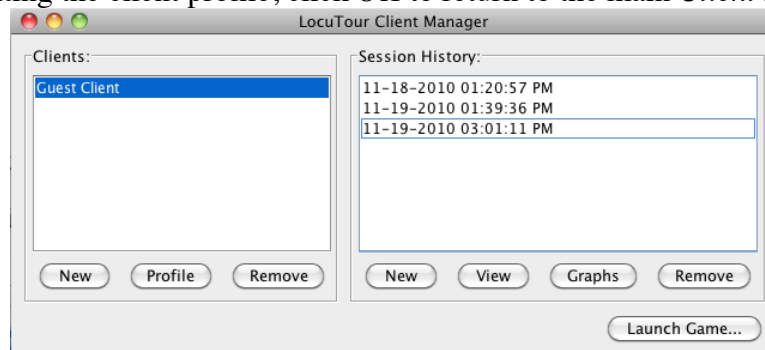


## Quick Start

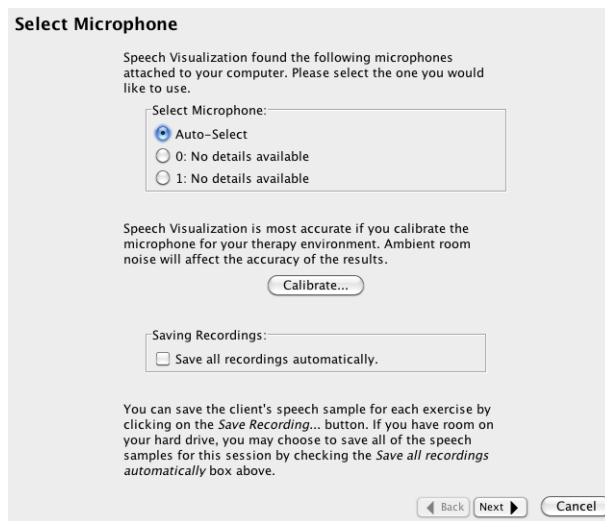
- Identify the client and update medical and personal information in the profile section of *Client Manager*. Make sure to completely fill out all the fields in the *Speech Visualization* tab of the client profile. This section contains information about age, education, and puberty. ***Speech Visualization cannot produce accurate normative data if this section is not completed.***



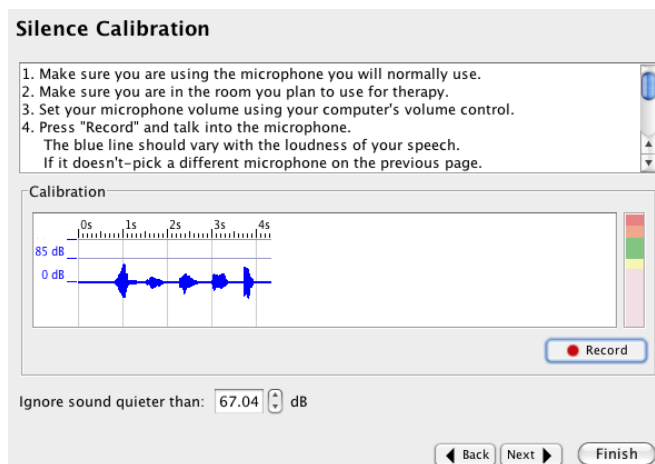
- If you are editing the client profile, click *OK* to return to the main *Client Manager* window.



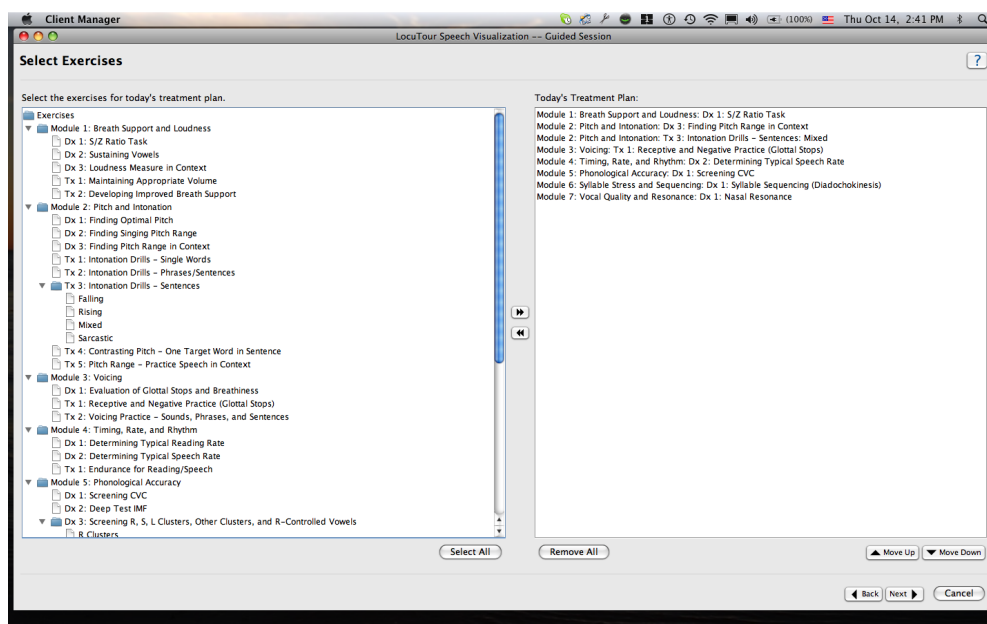
- Launch the program by selecting “*Speech Visualization*” from *Client Manager*’s “*Launch Game*” menu.
- The first screen will help you set up your microphone. The program will attempt to find the microphone that is attached to your computer, but it will sometimes pick the internal microphone instead of an attached microphone. To be sure that the correct microphone is



selected, click on the *Calibrate* button and record your voice. If you see the level meter move and a wiggly blue line, then you have a microphone selected. The larger the blue line, the better the volume. This example is a little too quiet.



- When you are sure you have the correct microphone and volume settings, click the *Record* button and make no noise for 10 seconds. The computer will ignore sound below the ambient room noise. The ambient room noise level should be between 15 and 40dB. If it is louder than that, the computer may not be able to distinguish vocalizations from room noise.
- When the computer has finished recording, click the *Next* button.
- Click the *Finish* button and you will return to the *Select Microphone* screen.
- If you want to save all the recordings for the session, click the *Save all recordings automatically* checkbox. A typical session might use between 30 and 60 MB of space.
- Click *Next* and the *Select Exercises* screen will appear.



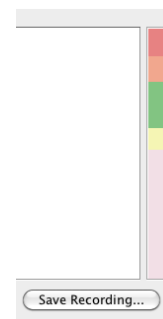
- To **include** an exercise in the treatment plan, double-click it. It will appear in the list on the right side. If you double-click a folder, Speech Visualization will add all the exercises in that folder to your treatment plan.
- To **remove** an exercise from the treatment plan, select it from the list on the right side, and double-click it.
- To **change** the order of the exercises, select an exercise and then click the *Move Up* or *Move Down* buttons. Use *Select Exercises* screens to select which areas to target for today's session. Double-click on an exercise to add it to the panel on the right—*Today's Treatment Plan*.
- When you are finished choosing exercises, click *Next*.
- If you have chosen any exercises that have multiple words or phrases, *Speech Visualization* will prompt you to select words or phrases to present to the client.
- Click the checkboxes next to the items you wish to present.
- When you have selected all of the sounds for this session, the session will begin.
- The exercises are presented in the order that they were selected.
- Practice imitating new speech patterns (Pitch, loudness, etc.).
- Compare and contrast speech using the speech visualization tools.
- Evaluate the speech using the on-screen rating scales.
- Make notations using the *Assessment Notes* button.
- Save samples, if desired, using the *Save Recording* button.
- The *Back* button allows you to return to previous screens.
  - Using the back button will delete the scoring for all pages that you go back thru.**
  - You will not lose your A:Notes if you go back.
- After the last exercise is completed, the *Session Summary* page appears.
- Click *Finish* to return to *Client Manager* and complete the SOAP notes.
- Print reports for your files or for submission to insurance companies.

## Interpreting the Speech Sample

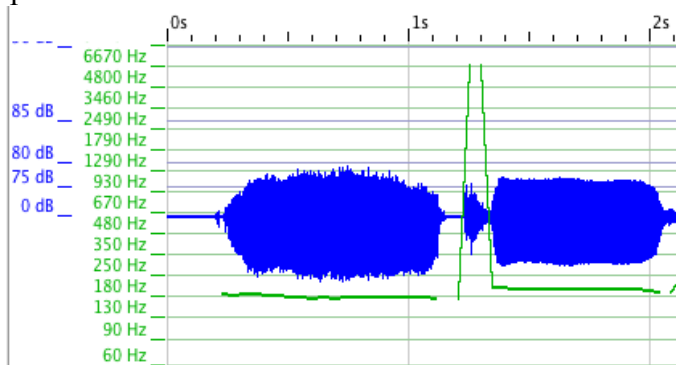
The sounds are displayed in the recording box as they are being spoken. The **sound level meter is the vertical bar on the right**. You want to speak loud enough to have the bar go up to the green area. If you speak too loudly, the bar will go all the way to the red area, if you are too quiet, it will rise only to the pink area.

## Colors for the Sound Level Meter

86 dB	red	Too loud, noticeably inappropriate.
81-85	orange	Loud, but acceptable for a large room or crowd.
71-80	green	Normal, acceptable for a small room or typical conversation.
65-70	yellow	Quiet, whispered speech.
≤ 65	pink	Too quiet for conversational speech.



As you are speaking you will see lines appear in the sound recording area. The blue line indicates the volume of the speech. For some clients, the production will not show up as "loud" or as "big" as the model. This is not necessarily a problem; your recording may be "loud enough" based on what you determine to be the volume goal. If you want the appearance of a big blue band for loudness, then move the microphone closer. Try to establish a consistent microphone to mouth distance so that volume for different sessions can be compared. If you are not working on volume as a target, then it is acceptable to ignore the blue band. Norms for volume are found in the *Guide - Loudness and pressure levels* chart found at the end of Module 1. Speech produced right into the microphone will be measured as being louder than speech produced 3 feet away from the microphone. We set the loudness level assuming you are speaking directly into the microphone. If the loudness level doesn't seem right, readjust the microphone to mouth distance and check you microphone input volume in your computer's control panels section.



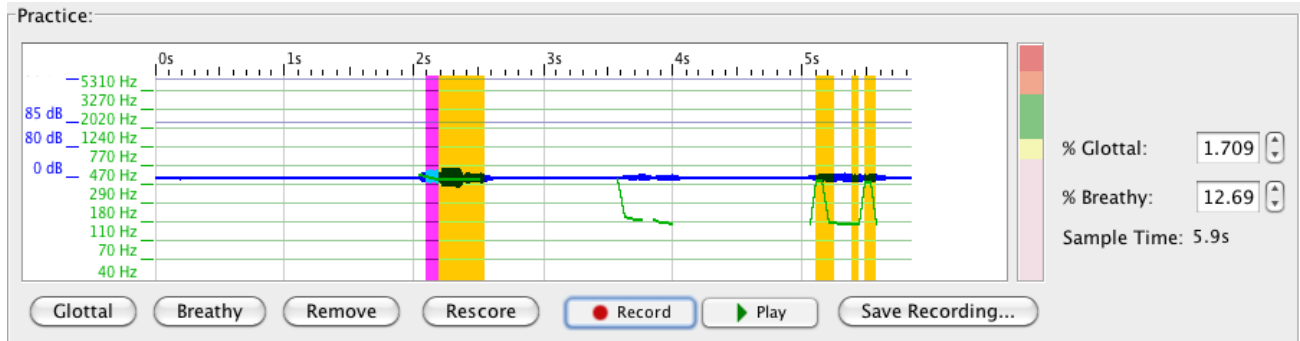
## Colors for Pitch and Volume

In some games there is a green line. The green line represents the pitch. The lower the line on the sound box, the lower the pitch. You can estimate the pitch by looking at the numbers on the left of the sound box labeled with Hz for Hertz. If there are breaks in the green pitch line, that indicates that the computer did not pick up any sound and you were either silent, or not speaking loudly enough to have the sound register. You may either speak louder, or return to the calibration page and reset the calibration to a smaller number, perhaps 20dB or lower for very quiet speakers.

## Colors for Glottal Stops and Breathiness

Module 3 evaluates breathiness and glottal stops. The computer can assist you in the assessment of glottal and breathy speech but does not substitute for clinical assessment of the sample. The yellow highlight indicates that the computer picked up a significant amount of air or breathiness. The pink highlight shows where there was a sudden drop in the fundamental frequency  $f_0$ , which indicates a

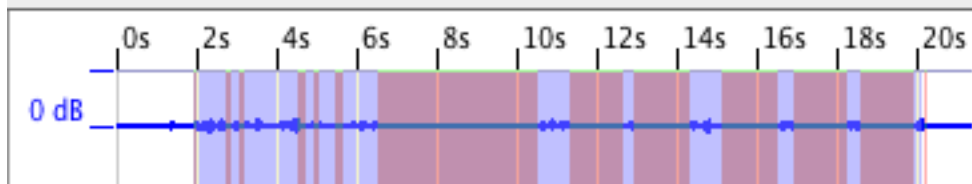
glottal stop. You can adjust the computer's interpretation of the speech sound to more accurately reflect your assessment of the speech. Click and drag on an area of speech to highlight it. Then use the buttons on the bottom left to mark the sample as Glottal or Breathy. Click on *Rescore* and the percentages reported on the right will update.



What do the colors mean? Blue means "highlighting". The blue highlight turns to lime green then yellow when you click on the *Breathy* button. To identify an area as Glottal, select the area. The blue highlight appears, when you click on the *Glottal* button, the selected area turns brown. When it is deselected it turns red. Highlighting over top of an existing glottal production turns the area brown. If you highlight a section of speech and mark it as both Glottal and Breathy, the area will be dark purple, then finally pink when you click anywhere else on the bar. The colors seem complicated at first, but that is just the way the colors appear when overlapped. To sum it up: **Yellow = Breathy; Glottal = Red; Pink = Glottal and Breathy**; Lime green and brown mean you aren't done with the highlighting and need to click on the bar to show the final colors.

### Colors for Timing, Rate, and Rhythm

The computer will automatically highlight what it thinks is speech. It will ignore silence at the beginning and at the end of the sample. If there is silence inside the speech sample, it will identify those areas of silence as "pauses". This exercise measures how long it takes to read a sample and will separate out the pauses from the speech. The speech is highlighted blue and the pauses are highlighted pink. This allows the individual the ability to **see** pauses. All speech must have pauses. If there is excessive pausing and start and stop speech production, you will see an alternating blue and pink pattern. If there is excessive pausing, there will be excessive pink areas. If there is not enough pausing for thought groups, then there will be an absence of pink.



The area from 0-2 seconds was evaluated by the computer as silence before the speaking began, and thus not included in the sample. The area between 2-6 was normal reading speed with typical pausing. The area between 7-9 was a long pause. The section between 10s and 20s shows a typical word by word reading rate. If you do not want to include a portion of the speech sample, exclude it from the highlighted area. This will change the Time, Rate, Pause Time, Articulatory Rate, and Pause Ratio.



# Treatment Sequence

Below are sixteen suggested treatment plans for various diagnoses. The treatment sequence may be re-ordered or areas omitted for specific clients.

## *Voice Disorders*

- Vocal Quality and Resonance
- Pitch and Intonation
- Voicing
- Breath Support and Loudness
- Timing, Rate, and Rhythm
- Syllable Stress and Sequencing
- Phonological Accuracy

## *Cleft Palate*

- Vocal Quality and Resonance
- Phonological Accuracy
- Breath Support and Loudness
- Voicing
- Pitch and Intonation
- Timing, Rate, and Rhythm
- Syllable Stress and Sequencing

## *Dysfluencies*

- Voicing
- Timing, Rate, and Rhythm
- Breath Support and Loudness
- Phonological Accuracy
- Syllable Stress and Sequencing
- Pitch and Intonation
- Vocal Quality and Resonance

## *Deafness*

- Phonological Accuracy (th, th, y, ng, ch, j, sh, zh, h, s, z, t, d ,k, g)
- Voicing
- Vocal Quality and Resonance
- Syllable Stress and Sequencing
- Pitch and Intonation
- Breath Support and Loudness
- Timing, Rate, and Rhythm

## *Hard of Hearing*

- Vocal Quality and Resonance
- Phonological Accuracy
- Voicing
- Syllable Stress and Sequencing
- Pitch and Intonation
- Breath Support and Loudness
- Timing, Rate, and Rhythm

### ***Cochlear Implants***

- Voicing
- Phonological Accuracy
- Vocal Quality and Resonance
- Syllable Stress and Sequencing
- Pitch and Intonation
- Breath Support and Loudness
- Timing, Rate, and Rhythm

### ***Dialect Differences***

- Phonological Accuracy
- Voicing
- Syllable Stress and Sequencing
- Pitch and Intonation
- Timing, Rate, and Rhythm
- Vocal Quality and Resonance
- Breath Support and Loudness

### ***Articulation Disorders***

- Phonological Accuracy
- Voicing
- Syllable Stress and Sequencing
- Vocal Quality and Resonance
- Timing, Rate, and Rhythm
- Pitch and Intonation
- Breath Support and Loudness

### ***Parkinson Disease***

- Breath Support and Loudness
- Timing, Rate, and Rhythm
- Phonological Accuracy
- Vocal Quality and Resonance
- Voicing
- Pitch and Intonation
- Syllable Stress and Sequencing

### ***Traumatic Brain Injury***

- Breath Support and Loudness
- Timing, Rate, and Rhythm
- Vocal Quality and Resonance
- Phonological Accuracy
- Syllable Stress and Sequencing
- Pitch and Intonation
- Voicing

### ***Dysarthria***

- Timing, Rate, and Rhythm
- Phonological Accuracy
- Breath Support and Loudness

- Vocal Quality and Resonance
- Syllable Stress and Sequencing
- Pitch and Intonation
- Voicing

***Apraxia***

- Phonological Accuracy
- Timing, Rate, and Rhythm
- Voicing
- Syllable Stress and Sequencing
- Vocal Quality and Resonance
- Pitch and Intonation
- Breath Support and Loudness

***Asperger Syndrome***

- Pitch and Intonation
- Syllable Stress and Sequencing
- Timing, Rate, and Rhythm
- Phonological Accuracy
- Breath Support and Loudness
- Vocal Quality and Resonance
- Voicing

***Prosodic Speech Disorders***

- Pitch and Intonation
- Timing, Rate, and Rhythm
- Breath Support and Loudness
- Syllable Stress and Sequencing
- Vocal Quality and Resonance
- Phonological Accuracy
- Voicing

***Down Syndrome***

- Phonological Accuracy
- Syllable Stress and Sequencing
- Pitch and Intonation
- Breath Support and Loudness
- Timing, Rate, and Rhythm
- Vocal Quality and Resonance
- Voicing

***Age-Related Voice changes***

- Breath Support and Loudness
- Pitch and Intonation
- Vocal Quality and Resonance
- Voicing
- Syllable Stress and Sequencing
- Phonological Accuracy
- Timing, Rate, and Rhythm

# Module 1: Breath Support and Loudness

## Assessment Exercise 1: S/Z Ratio Task

### *Producing /s/*

Take a deep breath. As you let it out, say the sound /s/ for as long as you can. Children should be able to sustain the sound for ~10 seconds, adults for 20-25 seconds. Record three trials and choose the longest of the three.

### *Producing /z/*

Take a deep breath. As you let it out, say the sound /z/ for as long as you can. Children should be able to sustain the sound for ~10 seconds, adults for 20-25 seconds. Record three trials and choose the longest of the three.

### Therapist Notenasa

The client should record an /s/ (or a /z/) sound into each of the three *Trial* boxes. *Speech Visualization* will then highlight the client's production in blue and display the length (in seconds) of the production next to the *Record* button. The longest continuous sample in the three trials will be automatically selected by the program as the best recording.

If *Speech Visualization* highlighted sound you don't want to include, or didn't highlight sound you do want to include, you will need to select the desired portion of the client's production yourself. Highlight the preferred selection by clicking and dragging the cursor over the speech sample to be analyzed.

Once you are satisfied that the client's production is accurately highlighted in each of the three trials, pick the trial you want *Speech Visualization* to analyze and save. (Usually, the longest trial is the optimal trial if quality is maintained during the production.) Pick a trial by selecting the radio button to the left of the sound graph.

Click *Next* to continue.

### SOAP Note Rules

If below average: This reduced length may indicate further evaluation for pathology or reduced breath support. Treatment is recommended to lengthen vowel production.

Normal	20-30 seconds	5
Good	15-19 seconds	4
Fair	10-14 seconds	3
Poor	1-9 seconds	2
Absent	0 seconds	1

O: /s/ : /z/ ratio:

Scenario 1: If the /s/ and /z/ sounds are long enough and in an appropriate ratio:

O: The client's performance for /s/ was \_\_\_ seconds and for /z/ was \_\_\_ seconds. The s/z ratio was \_\_\_\_\_. This indicates normal respiratory ability and the absence of vocal fold pathology.

Scenario 2: If either the /s/ or the /z/ was too short:

O: The client's performance at \_\_\_ seconds for /s/ and \_\_\_ seconds for /z/ is less than the average performance of children/adults, and indicates a possible respiratory insufficiency. The S/Z ratio was \_\_\_. Further evaluation of vital capacity is recommended.

Scenario 3: If the S:Z ratio is between 1.2 and 1.4:

O: The client's performance for /s/ was \_\_\_ seconds and for /z/ was \_\_\_ seconds. The S/Z ratio of \_\_\_ is greater than 1.2:1 which indicates possible vocal fold pathology. Unequal /s/ and /z/ productions typically indicate a laryngeal problem. Follow-up evaluation for laryngeal pathology is recommended.

Scenario 4: If the S:Z ratio is greater than 1.4:

O: The client's performance for /s/ was \_\_\_ seconds and for /z/ was \_\_\_ seconds. The S/Z ratio of \_\_\_ was greater than 1.4:1. 95% of individuals with a ratio higher than 1.4:1 had vocal fold pathology. [Prater and Swift, 1984] Follow-up evaluation is recommended.

A: Characteristics observed were:

- Normal
- Too Loud
- Too Quiet
- Too Much Fluctuation
- Inappropriate
- Absent

## Assessment Exercise 2: Sustaining Vowels

Take a deep breath. As you let it out, say the vowel "ee" for as long as you can. Record three trials and choose the longest of the three.

ee	aw/au	ue
i	oe	or
e	UU	ar
ae	oo	er/ir/ur
a	oi/oy	ear
u	ow/ou	ire
o	ie	air

### Therapist Note

The client should record the target vowel sound into each of the three *Trial* boxes. *Speech Visualization* will then highlight the client's production in blue and display the length (in seconds) of the production next to the *Record* button. The longest continuous sample in the three trials will be automatically selected by the program as the best recording.

If *Speech Visualization* highlighted sound you don't want to include, or didn't highlight sound you do want to include, you will need to select the desired portion of the client's production yourself. Highlight the preferred selection by clicking and dragging the cursor over the speech sample to be analyzed.

Once you are satisfied that the client's production is accurately highlighted in each of the three trials, pick the trial you want *Speech Visualization* to analyze and save. (Usually, the longest trial is the optimal trial if quality is maintained in the production.) Pick a trial by selecting the radio button to the left of the sound graph.

When you are satisfied with the highlighting and the selection of the sample, click *Next* to continue.

### SOAP Note Rules

Length for each vowel sound:

O: The client produced \_\_\_ for \_\_\_ seconds (Maximum Phonation Time, MPT), this was/was not in the normal range (\_\_\_ seconds or longer) and is consistent/inconsistent with other child/adult speakers. The decibel range was from \_\_\_ dB to \_\_\_ dB. \_\_\_% of the sample was in the too quiet range, \_\_\_% of the sample was in the too loud range, and \_\_\_% of the sample was at an appropriate speaking volume.

A: Characteristics observed were:

- Normal
- Too Loud
- Too Quiet
- Too Much Fluctuation
- Inappropriate
- Absent

### Assessment Exercise 3: Loudness Measure in Context

Speak into the microphone at a normal, comfortable, loudness level. Complete three trials and select a sample for the computer to analyze.

#### Therapist Note

The client will speak into the microphone at a normal, comfortable loudness level. The volume for speech will be measured and an estimate of how loudly they are speaking will be made. (Do not worry about pauses, the computer will ignore silence.) *Speech Visualization* will display the length (in seconds) of the Quiet, Normal, and Loud production next to the *Record* button.

If the client is able to speak and, at the same time, observe the volume bar (on the left side of the screen) you can point out that, "Pink is too quiet. Yellow is good for a quiet room. Green is good for most conversations. Orange is okay for outside voices. Red is way too loud."

*Speech Visualization* will report the length of the sample, the range in decibels, and the "average" decibel level. This average is calculated by using a time sample every .10 ms. (default) but you can change it in the *Tools* menu..

When you are satisfied with the recording and have selected a sample, click *Next* to continue.

## SOAP Note Rules

86 dB	red	Too loud, noticeably inappropriate.
81-85	orange	Loud, but acceptable for a large room or crowd.
71-80	green	Normal, acceptable for a small room or typical conversation.
65-70	yellow	Quiet, whispered speech.
≤ 65	pink	Too quiet for conversational speech.

As measured by the *Speech Visualization* program. Results may vary with different microphones.

O: The decibel range was from \_\_\_ dB to \_\_\_ dB. \_\_\_% of the sample was in the too quiet range, \_\_\_% of the sample was in the too loud range, and \_\_\_% of the sample was at an appropriate speaking volume.

### Clinician Selected Check Boxes

A: Characteristics observed were:

#### **Loudness**

- Overall, whole utterance is too soft
- Overall, whole utterance is too loud
- Too much fluctuation
- Inappropriate
- Single words in sentences are too loud or too quiet and interfere with the whole message being communicated
- Sentences start out with appropriate loudness, but by the end of the sentence the volume drops off and the final portion is unintelligible
- Sentences start out with appropriate loudness, but by the end the person is “pushing” out the sentence on reserve air and didn’t plan ahead for the length of the sentence. Voice sounds strained or drops to vocal fry
- Unable to emphasize words in a sentence by increasing the loudness
- Changing physical position improves volume
- Responds positively to external cueing
- Does not respond to external cueing
- Absent, no vocalization observed

#### **Respiration**

- Forced expiration/inspiration
- Grunt at end of expiration
- Audible inspiration
- Initiated respiration at an atypical point in the respiration cycle
- All pauses contain inspiration
- Exaggerated respiratory movements
- Produces few words per breath
- Improves respiration with position change
- Unaware of speech breathing pattern

#### **Stridor – audible breathing as a result of**

- Asthma
- Nasal blockage
- Laryngeal neoplasms
- Laryngeal webs
- Vocal fold abductor weakness or paralysis

## Guide - Loudness Perception - Sound pressure levels (SPL)

Decibel is a log scale. A 3dB increase is a doubling of the actual sound energy, 10dB represents a ten-fold increase. However, to complicate matters, the human ear is not linear and *perceives a 10 dB increase as a very approximate doubling of volume*. (Husband 1999, McAfee 1998)

Note that the measurement of Sound Level by *Speech Visualization* when speaking into a microphone 1 inch from your mouth will be significantly higher than the Sound Level perceived by a person sitting next to the speaking individual since Sound Level attenuates significantly with distance from the source.

<i>Sound level (dB)</i>	<i>Approximate observed equivalent.</i>
-10 dB	Hypersensitive hearing
0 dB	Sound proof room, threshold of normal hearing
10 dB	Rustle of leaves in a breeze, normal breathing, sounds—f, s, th
20 dB	Whisper, watch ticking, sounds—z, v, p, h, g, k
30 dB	Quiet conversation, average home noises, sounds—ch, sh
40 dB	Conversation at home, birds chirping, night noises, sounds—j, m, d, b, n, ng, l, r, vowels
50 dB	Typical outside conversation, moderate restaurant noises, typical quiet conversation, speech is easy to hear in a 55-65 dB “low noise” environment
60 dB	Noise in a large shop, normal conversational speech, department store
70 dB	City street, slightly animated conversation, bus, noisy restaurant, busy traffic, baby crying, voice must be raised to hear in a 65-75 dB “medium noise” environment
80 dB	Noisy office with typing, talking over noise in a classroom, loud music, Niagara Falls, dog barking nearby, speech is difficult to hear in a 75-85 dB “high noise” environment
90 dB	Underground railway train passing, pneumatic drill, talking over the noise at a party
95 dB	Speech is almost impossible to hear in a 85-95 dB “very high noise” environment
100 dB	Typical rock concert, person shouting 3 feet away
110 dB	Prop aircraft taking off, jet engine, jet skis, thunder, risk of hearing damage in less than 1 hour of exposure
120 dB	Jet aircraft taking off, risk of hearing damage in less than 15 minutes,
125 dB	Threshold of pain, firecracker, air raid siren

### Therapy Exercise 1: Maintaining Appropriate Volume

Speak into the microphone at a normal, comfortable loudness level. Complete three trials and select a sample for the computer to analyze.

#### Therapist Note

Same as Breath Support and Loudness: Assessment Exercise 3.



## SOAP Note Rules

O: The client's breath support and loudness was judged to be:

Normal	The client's breath support or loudness was judged to be normal. This indicates that breath support/loudness is consistently accurate, and rarely in error. (___% normal; ___% too quiet; ___% too loud)	5
Good	The client's breath support or loudness was judged to be good. This indicates that breath support/loudness was mostly accurate, but there were errors in the sample. (___% normal; ___% too quiet; ___% too loud)	4
Fair	The client's breath support or loudness was judged to be fair. This indicates that breath support/loudness was frequently accurate, but noticeably in error. (___% normal; ___% too quiet; ___% too loud)	3
Poor	The client's breath support or loudness was judged to be poor. This indicates that breath support/loudness was infrequently accurate, but occasional accuracy was possible. (___% normal; ___% too quiet; ___% too loud)	2
Absent	The client's breath support or loudness was judged to be none. This indicates that breath support/loudness was inaccurate, normal breath support/loudness was never heard. (___% normal; ___% too quiet; ___% too loud)	1

## Clinician Selected Check Boxes

A: Same as Evaluation Exercise 1.

## Therapy Exercise 2: Developing Improved Breath Support

Improved breath support can be achieved through improved posture and diaphragmatic breathing. Sit up in the chair, shoulders down, head and chin in a relaxed position, then speak into the microphone at a normal, comfortable loudness level. Complete three trials and select a sample for the computer to analyze.

## Therapist Note

Same as Breath Support and Loudness: Assessment Exercise 3.

## SOAP Note Rules

O: Same as Breath Support and Loudness: Therapy Exercise 1.

## Clinician Selected Check Boxes

A: Same as Breath Support and Loudness: Evaluation Exercise 1.

## Module 2: Pitch and Intonation

### Assessment Exercise 1: Finding Optimal Pitch

Take in a breath, yawn, then exhale with an audible sigh or, “ah” sound.

#### Therapist Note

*Speech Visualization* will determine the client's optimal pitch. The client should yawn with an audible "ah" sound into the microphone. After they finish recording, *Speech Visualization* will make an initial guess about the optimal pitch. If you are satisfied with this guess, you can click *Next* to continue.

The initial guess, however, is not likely to be very accurate. This is because *Speech Visualization* will use the entire sound for calculating the optimal pitch, including both the breathy and voiced parts of the client's yawn.

To more accurately determine the optimal pitch, you should highlight the voiced part (or the "ah" part) of the client's production, while leaving the breathy parts unselected. *Speech Visualization* will then use your selection to make a more accurate guess about the optimal pitch.

If you are unsatisfied with this sample, you may have the client say "uh-huh", as if to answer "yes" to a question. Both syllables should be produced at the same pitch. Follow the highlighting and selection process outlined above to determine the optimal pitch.

#### SOAP Note Rules

O: The client's optimal pitch (ah) was at \_\_\_\_ Hz or \_\_\_\_ on the musical scale. The typical fundamental frequency (f0) for a male/female age \_\_\_\_ ranges from \_\_\_\_ Hz to \_\_\_\_ Hz, or from \_\_\_\_ to \_\_\_\_ . The client was approximately \_\_\_\_ Hz (or \_\_\_\_ notes) above/below/within this range.

#### Clinician Selected Check Boxes

A: Characteristics also observed were:

- Too high (Falsetto)
- Too low (Fry)
- Too much fluctuation
- Misplaced pitch for single-syllable words
- Misplaced pitch for multi-syllable words
- Misplaced pitch for phrases or sentences
- Monopitch
- Reduced ability to rapidly change pitch
- Pitch Breaks are frequent
- Pitch Breaks are rare
- Inconsistent Volume
- Has difficulty conveying emotions through pitch

### Assessment Exercise 2: Finding Singing Pitch Range

#### *Setting the upper limit*

Take in a breath, then yawn with an audible “ah” sound. Raise your pitch one note for each number as you count up the scale to eight, “ah, two, three, four, five, six, seven, eight.” (Typical range is 12 notes, you may add more.)

## Therapist Note

The Pitch Range exercise allows you to determine your client's pitch range. It has two components—the upper and lower limits.

In the upper limit portion of the exercise, clients will exhale with an audible sigh to get them to start at their optimal pitch. They will then count up the note scale, from one to eight. (The client may add higher notes if they choose.)

*Speech Visualization* will attempt to find the highest note and use it to determine the upper limit of the client's pitch range. Alternately, you may select the portion of the sound containing the spoken number "eight", or the highest tone. *Speech Visualization* will use your selection to calculate the upper limit of the client's pitch range. You may choose to include or exclude falsetto. The upper limit is displayed next to the *Record* button. If you are satisfied with *Speech Visualization's* determination, you can click *Next* at this point to continue to the lower limit portion of the exercise.

If you are not satisfied, you can select a portion of sound for *Speech Visualization* to use to calculate the upper limit. You should select the last note and try to limit your selection to the part where the green pitch lines are straight and level. (If the pitch lines are never straight and level, select the whole note.) Falsetto can be included or excluded at this point. *Speech Visualization* will update the upper limit to reflect your selection. When you are satisfied, click *Next* to continue to the lower limit portion of the exercise.

You must complete Dx2: Finding Singing Pitch Range before you can do Dx3: Finding Pitch Range in Context.

### ***Setting the lower limit***

Take in a breath, then yawn with an audible “ah” sound. Lower your pitch one note for each number as you count down the scale, “ah, four, three, two, one.” (Typical range is 12 notes, you may add more.)

## Therapist Note

The Pitch Range exercise allows you to determine your client's pitch range. It has two components—the upper and lower limits.

In the lower limit portion of the exercise, clients will exhale with an audible sigh to get them to start at their optimal pitch. They will then count down the note scale, from four to one. (The client may add lower notes if they choose.)

*Speech Visualization* will attempt to find the lowest note and use it to determine the lower limit of the client's pitch range. Alternately, you may select the portion of the sound containing the spoken number "one", or the lowest tone. *Speech Visualization* will use your selection to calculate the lower limit of the client's pitch range. You may choose to include or exclude vocal fry. The lower limit is displayed next to the *Record* button. If you are satisfied with *Speech Visualization's* determination, you can click *Next* at this point to continue.

If you are not satisfied, you can select a portion of sound for *Speech Visualization* to use to calculate the lower limit. You should select the last note (or the "one"), and try to limit your selection to the part where the green pitch lines are straight and level. (If the pitch lines are never straight and level, select the whole note.) Glottal fry can be included or excluded at this point. *Speech Visualization* will update the lower limit to reflect your selection. When you are satisfied, click *Next* to continue.

**You must complete Dx2: Finding Pitch Range before you can do Dx3: Pitch Range in Context.**

### SOAP Note Rules

O: The client's singing pitch range is from \_\_\_ to \_\_\_ Hz or \_\_\_ to \_\_\_ on the musical scale. The typical speaking pitch range for a male/female aged \_\_\_ is \_\_\_ to \_\_\_ Hz or \_\_\_ to \_\_\_ . The client's pitch range is typical/atypical. The client's pitch range is broader than/narrower than/--average.

### Clinician Selected Check Boxes

A: Same as Pitch and Intonation: Assessment Exercise 1.

## Assessment Exercise 3: Finding Pitch Range in Context

Speak or read for at least 10 seconds to determine the pitch range in running speech.

### Therapist Note

The client should speak into the microphone in a normal, conversational tone for at least 10 seconds. *Speech Visualization* will analyze the client's speech to determine the pitch range they use in conversation. When the client has finished speaking, click *Next*.

*Speech Visualization* will show a Phonetogram, which graphs the client's pitch vs. their loudness. The Phonetogram is not a waveform, which shows volume over time, it is a picture of the amplitude and pitch over the entire sample. The Phonetogram has no time component.

If you want to save the Phonetogram to review later, click the *Save Graph* button at the bottom of the window.

The Phonetogram is a snapshot of both the pitch and the volume for a speech sample. The blue columns represent the volume. The longer the blue column, the more time was spent at that volume level. These were measured in decibels (dB) and plotted on the Y axis. In most speech samples you will see that most of the speech sample was spoken in a specific range, although there may be short instances where the speech was too quiet and too loud (below 65dB and above 86dB). Speech at the bottom of the chart are very quiet sounds, speech at the top of the chart are very loud sounds.

The X axis shows the pitch range in Hertz (it is not labeled). Lines on the left of the chart are lower pitched sounds and lines on the right are higher pitched sounds.

**You must complete Dx2: Finding Pitch Range before you can do Dx3: Pitch Range in Context.**

### SOAP Note Rules

O: The client's pitch range in running speech is from \_\_\_ to \_\_\_ Hz, or \_\_\_ to \_\_\_ on the musical scale. The typical pitch range for a male/female of age \_\_\_ is \_\_\_ to \_\_\_ Hz or \_\_\_ to \_\_\_ on the musical scale. The client has a broader than/ narrower than/--average pitch range.

The client has a pitch range of \_\_\_ notes. The client had \_\_\_ notes within the normal range, \_\_\_ notes were above the normal range, and \_\_\_ were below the normal range.

### Clinician Selected Check Boxes

A: Same as Pitch and Intonation: Assessment Exercise 1.

### Guide - Voice Frequency Range by Age and Sex

Age	Male	Female
1-2	340-470 Hz	340-470 Hz
3	255-360	255-360
4	240-340	240-340
5	225-320	230-325
6	220-315	225-315
7	220-310	220-310
8	210-295	215-300
9	200-285	205-290
10	195-280	205-290
11	195-275	200-285
12	195-275	200-280
13a Pre-pubescent	195-275	200-280
13b Post-pubescent	140-215	195-275
14	140-215	190-270
15	135-205	185-260
16	125-180	180-255
17	115-165	175-250
18	105-160	175-245
adult	80-160	150-300
50-59		176-241
60-69		143-235
70+	80-195	170-249

*Wilson 1987 Ages 1-18*

*Stoicheff 1981 Females 50+*

### Guide - Voice Frequency Ranges (Hz)

#### Musical (Hz)

Bass	87.31 - 349.23	F2 - F4
Baritone	98.00 - 392.00	G2 - G4
Tenor	130.00 - 493.88	C3 - B4
Contralto	130.81 - 698.46	C3 - F5
Soprano	246.94 - 1,174.70	B3 - D6

These are the ranges demanded in classical opera, hence the decimal point accuracy.

*(Husband 1999)*

## Therapy Exercise 1: Intonation Drills – Single Words

Say the word with three different pitch ranges: Monotone, Rising, and Falling.

<b>Monotone Incorrect production using only 2-4 tones.</b>	<b>Rising Correct production to convey meaning.</b>	<b>Falling Correct production to convey meaning.</b>
Oh	Oh	Oh
Ah	Ah	Ah
No	No	No
Yes	Yes	Yes
Please	Please	Please
Maybe	Maybe	Maybe
Here	Here	Here
Now	Now	Now
Don't	Don't	Don't
Well	Well	Well

### Therapist Note

Intonation drills allow the client to practice saying a specific word or phrase using correct intonation. For example, "Yes?", "Yes!", and "Yes."

The client should first listen to each model. Then, they should record their imitation of each model in the practice box.

When the client has finished recording, play back the client's productions and compare them to the models. Score the client's production using the *C* or *I* buttons (Correct/Incorrect) below the graph. If nothing is selected it will be scored as correct when the *Next* button is clicked.

When you have finished scoring the client's productions, click *Next* to continue.

### SOAP Note Rules

O: The client's imitation of \_\_\_\_\_ intonation for the combined sample, was \_\_\_\_\_ % correct and \_\_\_\_\_ % incorrect.

### Clinician Selected Check Boxes

A: Same as Pitch and Intonation: Assessment Exercise 1.

## Therapy Exercise 2: Intonation Drills – Phrases/Sentences.

Say the following phrases or sentences with three different intonations: Monotone, Rising, and Falling.

<b>Monotone Incorrect production</b>	<b>Rising Correct production to convey meaning.</b>	<b>Falling Correct production to convey meaning.</b>
She did.	She did?	She did.
That's it.	That's it?	That's it.
how much	How much?	how much
Say it again.	Say it again?	Say it again.
Please, don't.	Please, don't?	Please, don't.
maybe tomorrow	maybe tomorrow	maybe tomorrow
Here we go.	Here we go!	Here we go.
not now	Not now?	not now
Don't you know it.	Don't you know it?	Don't you know it.
what about that	What about that?	what about that

**Therapist Note**

Same as Pitch and Intonation: Therapy Exercise 1.

**SOAP Note Rules**

O: Same as Pitch and Intonation: Therapy Exercise 1.

**Clinician Selected Check Boxes**

A: Same as Pitch and Intonation: Assessment Exercise 1.

**Therapy Exercise 3: Intonation Drills – Sentences**

Say the following sentences with four different intonations: Falling, Rising, Mixed, and Sarcastic

<b>Falling intonation</b>	<b>Rising intonation</b>	<b>Mixed intonation</b>	<b>Sarcastic intonation</b>
I just don't understand.	Will you be at the party?	I'm not so sure about that!	I'm sorry, did I offend you?
I'll get the paper.	May I have one?	Are you sure it's a good idea?	What wonderful news!
That's alright.	Is it today?	You must be kidding me!	That looks interesting!
Just go without me.	Are you done?	I can't believe it!	It'll be great!

**Therapist Note**

Same as Pitch and Intonation: Therapy Exercise 1.

**SOAP Note Rules**

O: Same as Pitch and Intonation: Therapy Exercise 1.

**Clinician Selected Check Boxes**

A: Same as Pitch and Intonation: Assessment Exercise 1.

**Therapy Exercise 4: Contrasting Pitch – One Target Word in Sentence**

**Screen 1:**

Say the following using a normal tone of voice:

**Screen 2:**

Say the following, placing stress on the word in italics:

The first sentence uses the target word in an unstressed context. The second sentence stresses the target word and the stress adds to the meaning of the sentence.

### Therapist Note

#### **Example of Contrastive Stress Drill**

It is possible to change the meaning of a sentence by changing the stress (emphasis) on a word.

It is my *new* dress.

It is *my* new dress.

In this exercise, the client will learn to distinguish between normal intonation and stressed intonation to convey meaning. The client is first presented with a sentence in a normal tone of voice. Click *Record* and imitate the model sentence. When they have finished recording, compare their

production to the model. Score the client's production using the *C* or *I* buttons (Correct/Incorrect) below the graph. Then click *Next* to perform the stressed portion of the exercise.

In the stressed portion, they should click *Record* and imitate the model sentence, remembering to place stress on the appropriate word. When they have finished recording, compare their production to the model. Score the client's production using the *C* or *I* buttons (Correct/Incorrect) below the graph. Then click *Next* to continue.

If you do not click on the *C* or *I* button to score, the passage will be scored as correct when the *Next* button is clicked.

Some problems to watch for are excessive, equal, or misplaced stress. An additional therapy activity would be to shift emphasis to other words in the sentence. This will demonstrate how the meanings and implications of the sentence can shift in conversational speech. Help your client identify the unstated message. Advanced practice may include using intonation to reflect the following tones of voice: fearful, joyful, humorous, assertive, sarcastic, sincere, sad, happy, angry, sensitive, content, impatient, humble, and arrogant.

### SOAP Note Rules

O: The client's imitation of the target utterance was appropriate \_\_\_% of the time for normal speech, and appropriate \_\_\_% of the time when using intonational stress to convey meaning.

### Clinician Selected Check Boxes

A: Same as Pitch and Intonation: Therapy Exercise 1.



### ***Articles***

1. a

We saw a play at the theater.  
A single student won the contest.

2. an

She saw an elephant at the zoo.  
You think I can eat just *an* apple a day!

3. the

The cat was on the couch.  
It wasn't just any prince, it was *the* Prince of Monaco.

### ***Prepositions***

4. at

I'll meet you at the restaurant.  
You will need to be there *at* five.

5. for

Which present did you get for her?  
Did you vote *for* or against him?

6. from

It came from New Jersey.  
I can't guess, who is it *from*?

7. into

She finally got into the Thursday night class.  
It is easy enough to get *into* a maze.

8. of

We took care of all the details.  
You did say, "*Of* the people and for the people."

9. to

Would they go to the store?  
I walked *to* the store and got a ride home.

### ***Conjunctions***

10. and

Bob and John are baseball players.  
Bill, Joan, *and* Syndi are on the team.

11. as

She spilled the milk as she got up.  
It is soft *as* silk.

12. but

They cleaned up, but they didn't want to.  
She finished all *but* the hard parts.

13. or  
It doesn't matter, wear the red or the green dress.  
You can have candy *or* cake, not both.

14. than  
This stick is longer than that one.  
It was sharper *than* a knife?

### ***Auxiliary Verbs***

15. am  
I am going to eat the whole thing.  
I *am* running a marathon on Saturday.

16. are  
You are needed in the cafeteria.  
You *are* going to eat your broccoli!

17. can  
I can see a bird in the tree.  
Elephants *can* lift logs.

18. could  
You could cut the rose stems on a diagonal.  
You *could* walk to school.

19. do  
I do like to see pictures of the ruins.  
I *do* wash the dishes!

20. does  
It does look like rain.  
It *does* seem odd that they are still not home.

21. had  
I had made a sandwich but forgot to bring it.  
I *had* gone to the dentist instead of lunch.

22. has  
He has purchased a new computer.  
He *has* obtained all of the information he needs.

23. have  
They have scheduled a picnic for Saturday.  
You *have* to go to the parade.

24. must  
I must remember to get mustard for the lunches.  
I *must* be forgetting something.

25. should  
She should walk home from school.  
She *should* finish her homework.

26. was  
I was working on the car.  
I *was* eating when you interrupted.

27. were  
We were ordering the pizza.  
We *were* going to put mushrooms on it.

28. will  
I will be there by 3:00.  
I *will* arrive on time.

29. would  
You would eat it all?  
I *would* like fries with that.

### ***Linking Verbs***

30. am  
I am not feeling well this morning.  
I *am* a student.

31. was  
I was sleepy this morning.  
The stew *was* delicious.

32. were  
They were sure that it would be delivered.  
They *were* late every time last month.

### ***Pronouns***

33. he  
I couldn't believe he gave it to her.  
*He* was the one in the black hat.

34. her  
Her coat was over there on the chair.  
It was *her* problem to begin with.

35. him  
What did you think of him?  
Why did they give the part to *him*?

36. his  
It was great to see that his job was done.  
*His* job was to remember to turn off the lights.

37. some  
I'd like some please.  
*Some* think my sense of humor is sharp.

38. that  
I don't suppose that is on sale, is it?  
*That* was a spectacular temper tantrum.

39. them  
We gave them the extra dessert.  
She walked past us and gave the award to *them*!

40. us  
The waiter brought us the water.  
We had been practicing, so it was easy for *us*.

41. you  
I guess you will know soon.  
*You* of all people should know!

42. yours  
The blue one in the corner is yours.  
After this payment, the truck will be *yours*.

### **Therapy Exercise 5: Pitch Range – Practice Speech in Context**

Speak or read for at least 10 seconds to determine your pitch range in running speech. Make modifications to your pitch range based upon the visual feedback from the phonetogram.

#### **Therapist Note**

Same as Pitch and Intonation: Assessment Exercise 3.

#### **SOAP Note Rules**

O: Same as Pitch and Intonation: Assessment Exercise 3.

#### **Clinician Selected Check Boxes**

A: Same as Pitch and Intonation: Assessment Exercise 1.

## Module 3: Voicing

### Assessment Exercise 1: Evaluation of Glottal Stops and Breathiness

Take in a breath, yawn, then exhale with an audible sigh or, “ah” sound to establish optimal pitch. Now say the following.

ae, ee, ie, oe, ue
oh, ah, ou, oo, oi, aye
all ye, all ye out, come in free
It's okay.
I owe you an apology.
An elephant is enormous.
I often eat apples.
I enjoy exciting excursions.
If only I ate eggplant instead.

#### Therapist Note

This voicing exercise is designed to evaluate the client's speech for inappropriate glottal stops and breathiness.

The client will be presented with a phrase in the *Model* box. After they have listened to the model, they should click *Record* in the *Practice* box, and say the phrase themselves.

When the client has finished recording, *Speech Visualization* will analyze the sound they produced and search for glottal attacks and breathiness. Glottal attacks will be highlighted in red and breathiness will be highlighted in yellow. Sound that is both glottal and breathy will be highlighted in pink.

Check and review *Speech Visualization's* guesses. If you see an area marked that shouldn't be, select it by highlighting it, then click *Remove*. If you want to mark an area as a glottal attack or as breathiness, select the area and click the Glottal or Breathy buttons next to *Mark As*.

After the appropriate ranges of sound are highlighted, *Speech Visualization* will display the overall glottal and breathy percentages to the right of the graph. Review these, then click *Next* when you are ready to continue.

#### SOAP Note Rules

O: In the \_\_\_ seconds of the combined speech samples, the client made \_\_\_ glottal attacks. \_\_\_% of the sample contained glottal attacks (\_\_\_ sec) and \_\_\_% of the sample was breathy (\_\_\_ sec).

#### Clinician Selected Check Boxes

A: The characteristics observed were:

- Excessive Glottal Attack
- Excessive Breathiness for age, sex, culture
- Inconsistent production of normal speech

## Therapy Exercise 1: Receptive and Negative Practice (Glottal Stops)

### Part I – Receptive

Listen to all three speech models. Notice the staccato, hard onset of the glottal vowel model (incorrect). Notice how the smooth “h” sound facilitates an easy onset for the vowel (H+ vowel). Notice the sound of the initial vowel in the easy onset speech model (correct—Vowel first).

<b>Vowel first (incorrect with glottal attack) Listen</b>	<b>H + vowel (to facilitate a smooth vowel) Listen</b>	<b>Vowel first (correct relaxed air stream, no glottal attack) Listen</b>
ail	hail	ail
eat	heat	eat
I'd	hide	I'd
own	hone	own
use	hues	use
am	ham	am
elm	helm	elm
itch	hitch	itch
ow	how	ow
I	high	I

### Part II – Expressive

Say each word imitating the easy-onset model.

#### Therapist Note

The Receptive and Negative Practice exercise presents a word in three different ways: incorrectly (with a glottal vowel), with an initial 'h' sound (to model easy onset of the vowel), and correctly. On the first screen, play the models for the client and allow them to listen to the three different productions. When they are finished listening, click *Next* to proceed to the practice portion of the exercise.

On the next page, the client should press *Record* and practice saying the word correctly. As in previous voicing exercises, when the client has finished recording, *Speech Visualization* will analyze the client's production for glottal attacks and breathiness. Glottal attacks will be highlighted in red, and breathiness will be highlighted in yellow. Sound that is both glottal and breathy will be highlighted in pink.

Some clinicians may elect to teach "negative practice." This process of practicing "wrong" intentionally is indicated when the client needs to compare and contrast the different "feel" of the productions. Negative practice is not indicated when it will cause further damage to the vocal folds. The ultimate goal is to gain control over the vocal mechanism and produce speech that does not cause physiological damage, and is functional.

Check and review *Speech Visualization's* guesses. If you see an area marked that shouldn't be, select it by highlighting it, then click *Remove*. If you want to mark an area as a glottal attack or as breathiness, select the area and click the *Glottal* or *Breathy* button.

After the appropriate ranges of sound are highlighted, *Speech Visualization* will display the overall glottal and breathy percentages to the right of the graph. Review these, then click *Next* when you are ready to continue.

#### SOAP Note Rules

O: Same as Voicing: Assessment Exercise 1.

## Clinician Selected Check Boxes

A: Same as Voicing: Assessment Exercise 1.

## Therapy Exercise 2: Voicing Practice - Sounds, Phrases, and Sentences

### *Part I – Receptive*

Listen to all three speech models. Notice the sound of the initial vowel on the normal speech model. Notice the staccato, hard onset of the glottal vowel model. Then listen carefully for the breathy escape of air.

<b>Normal (Correct) Listen</b>	<b>Glottal (Incorrect) Listen</b>	<b>Breathy (Incorrect) Listen</b>
ae, ee, ie, oe, ue	ae, ee, ie, oe, ue	ae, ee, ie, oe, ue
oh, ah, ou, oo, oi, aye	oh, ah, ou, oo, oi, aye	oh, ah, ou, oo, oi, aye
all ye, all ye out, come in free	all ye, all ye out, come in free	all ye, all ye out, come in free
It's okay.	It's okay.	It's okay.
I owe you an apology.	I owe you an apology.	I owe you an apology.
An elephant is enormous.	An elephant is enormous.	An elephant is enormous.
I often eat apples.	I often eat apples.	I often eat apples.
I enjoy exciting excursions.	I enjoy exciting excursions.	I enjoy exciting excursions.
If only I ate eggplant instead.	If only I ate eggplant instead.	If only I ate eggplant instead.

### *Part II – Expressive*

Say each word imitating the model.

#### Therapist Note

Same as Voicing: Therapy Exercise 1.

#### *SOAP Note Rules*

O: Same as Voicing: Assessment Exercise 1.

## Clinician Selected Check Boxes

A: Same as Voicing: Assessment Exercise 1.

## **Module 4: Timing, Rate, and Rhythm**

### **Assessment Exercise 1: Determining Typical Reading Rate**

Choose a reading passage. Read the paragraph aloud using your typical reading rate.

#### **The Rainbow Passage**

(Fairbanks)

When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow. Throughout the centuries people have explained the rainbow in various ways. Some have accepted it as a miracle without physical explanation. To the Hebrews it was a token that there would be no more universal floods. The Greeks used to imagine that it was a sign from the gods to foretell war or heavy rain. The Norsemen considered the rainbow as a bridge over which the gods passed from earth to their home in the sky. Others have tried to explain the phenomenon physically. Aristotle thought that the rainbow was caused by reflection of the sun's rays by the rain. Since then physicists have found that it is not reflection, but refraction by the raindrops which causes the rainbows. Many complicated ideas about the rainbow have been formed. The difference in the rainbow depends considerably upon the size of the drops, and the width of the colored band increases as the size of the drops increases. The actual primary rainbow observed is said to be the effect of super-imposition of a number of bows. If the red of the second bow falls upon the green of the first, the result is to give a bow with an abnormally wide yellow band, since red and green light when mixed form yellow. This is a very common type of bow, one showing mainly red and yellow, with little or no green or blue.

Total Words in Passage: 330

#### **The Grandfather Passage**

(Fairbanks)

You wished to know all about my grandfather. Well, he is nearly ninety-three years old; he dresses himself in an old black frock coat, usually minus several buttons; yet he still thinks as swiftly as ever. A long, flowing beard clings to his chin, giving those who observe him a pronounced feeling of the utmost respect. When he speaks, his voice is just a bit cracked and quivers a trifle. Twice each day he plays skillfully and with zest upon our small organ. Except in the winter when the snow or ice prevents, he slowly takes a short walk in the open air each day. We have often urged him to walk more and smoke less, but he always answers, "Banana oil!" Grandfather likes to be modern in his language.

Total Words in Passage: 131

#### **Aesop's Fables - The North Wind and the Sun**

(University of Aberdeen)

The North Wind and the Sun were disputing which was the stronger, when a traveler came along wrapped in a warm cloak. They agreed that the one who first succeeded in making the traveler take his cloak off should be considered stronger than the other. Then the North Wind blew as hard as he could, but the more he blew the more closely did the traveler fold his cloak around him, and at last



the North Wind gave up the attempt. Then the Sun shone out warmly, and immediately the traveler took off his cloak. And so the North Wind was obliged to confess that the Sun was the stronger of the two.

Total Words in Passage: 113

### **Aesop's Fables - The Man, the Boy and the Donkey**

(Joseph Jacobs)

A Man and his son were once going with their Donkey to market. As they were walking along by its side a countryman passed them and said: "You fools, what is a Donkey for but to ride upon?" So the Man put the Boy on the Donkey and they went on their way. But soon they passed a group of men, one of whom said: "See that lazy youngster, he lets his father walk while he rides." So the Man ordered his Boy to get off, and got on himself. But they hadn't gone far when they passed two women, one of whom said to the other: "Shame on that lazy lout to let his poor little son trudge along."

Well, the Man didn't know what to do, but at last he took his Boy up before him on the Donkey. By this time they had come to the town, and the passers-by began to jeer and point at them. The Man stopped and asked what they were scoffing at. The men said: "Aren't you ashamed of yourself for overloading that poor donkey of yours with your hulking son?"

The Man and Boy got off and tried to think what to do. They thought and they thought, till at last they cut down a pole, tied the Donkey's feet to it, and raised the pole and the Donkey to their shoulders. They went along amid the laughter of all who met them till they came to Market Bridge, when the Donkey, getting one of his feet loose, kicked out and caused the Boy to drop his end of the pole. In the struggle the Donkey fell over the bridge, and his fore-feet being tied together he was drowned.

"That will teach you," said an old man who had followed them: "Please all, and you will please none."

Total Words in Passage: 309

### **Bed in Summer (R.L. Stevenson)**

In winter I get up at night  
And dress by yellow candle-light.  
In summer quite the other way,  
I have to go to bed by day.

I have to go to bed and see  
The birds still hopping on the tree,  
Or hear the grown-up people's feet  
Still going past me in the street.

And does it not seem hard to you,  
When all the sky is clear and blue,  
And I should like so much to play,  
To have to go to bed by day?

Total Words in Passage: 88

## **The Road Not Taken** (Robert Frost)

Two roads diverged in a yellow wood,  
And sorry I could not travel both  
And be one traveler, long I stood  
And looked down one as far as I could  
To where it bent in the undergrowth;

Then took the other, as just as fair,  
And having perhaps the better claim,  
Because it was grassy and wanted wear;  
Though as for that the passing there  
Had worn them really about the same,

And both that morning equally lay  
In leaves no step had trodden black.  
Oh, I kept the first for another day!  
Yet knowing how way leads on to way,  
I doubted if I should ever come back.

I shall be telling this with a sigh  
Somewhere ages and ages hence:  
Two roads diverged in a wood, and I--  
I took the one less traveled by,  
And that has made all the difference.

Total Words in Passage: 144

## **My Kitty**

I have a cat.  
Her name is Kitty.  
She is nice.  
She likes to sit on my lap.  
I feed her cat food.  
When she is happy, she purrs.  
I like to hear her purr.  
She is my friend.

Total Words in Passage: 39

## **Therapist Note**

*Speech Visualization* will measure the client's reading rate by recording a passage and measuring the amount of time it took them to read it.

First, check to make sure the client can read the text in the *Passage* box. If necessary, click the *Larger font* checkbox to make the text larger. When you are sure the client can read the text, click *Record*, and have them begin reading.

When they are finished reading, click *Stop*. *Speech Visualization* will determine the length of time it took for the client to read the passage, and calculate their speed in Words Per Minute (WPM).

*Speech Visualization* will ignore silence at the beginning and end of the recording, so you do not need to edit the sound yourself.

If the client wasn't able to finish reading the passage, you can edit the text in the *Passage* box to remove the portion of the text they didn't read. The word count and rate will automatically change accordingly.

If you choose "Custom Passage" when you select passages, you can type a passage for your client to say or read into the text block. (You can also cut and paste from a word processor.) The word count will automatically be updated. Have the client read or speak the passage.

If you want to determine Words Correct Per Minute, you will need to manually tabulate the number of errors. Enter this number into the *Errors* box. The computer will subtract the number of errors from the WPM and report a WCPM in the report.

When you are satisfied with the reading rate, click *Next* to continue.

O: The client's reading rate was \_\_\_\_\_ Words Per Minute (WPM) in a sample of \_\_\_\_ minutes and \_\_\_\_ words. of the sample speech were pauses.

The client read \_\_\_\_\_ words correctly out of \_\_\_\_\_ total words, with a rate of \_\_\_\_\_ Words Correct Per Minute (WCPM). \_\_\_\_\_ % of the words were produced correctly.

The typical reading rate for an adult [or: a student in grade \_\_\_\_] is \_\_\_\_ to \_\_\_\_ WPM. The client's reading rate of \_\_\_\_\_ is typical/atypical. The client has a slower/faster/average reading rate. An adult typically reads between 140 and 180 WPM, however when the material is serious or technical, the reading rate is typically 140 WPM. Faster reading rates of 160-180 WPM are typical of descriptive factual and humorous/light reading.

The client read \_\_\_\_ words correctly out of \_\_\_\_ total words, with a rate of \_\_\_\_\_ Words Correct Per Minute (WCPM). \_\_\_\_% of the words were produced correctly. Norms are available for grades 1-8. At grade \_\_\_\_ a weak reader (below the 10th percentile) would read approximately \_\_\_\_ WPM in the Fall and \_\_\_\_ WPM in the Spring. An average reader (25th to 75th percentile) would read approximately \_\_\_\_ WPM in the Fall and \_\_\_\_ WPM in the Spring. A good reader (above the 90th percentile) would read approximately \_\_\_\_ WPM in the Fall and \_\_\_\_ WPM in the Spring.

### Clinician Selected Check Boxes

A: Characteristics also observed were:

#### Rate

- Rate is too fast – Too few pauses for thought breaks, conveys nervousness
- Rate is too slow – Too many pauses, conveys uncertainty
- Rate is inconsistent
- Rate does not match content – gives inaccurate message

#### Rhythm

- Rhythm is inappropriate
- Rhythm is jerky
- Rhythm is patterned and unusual
- Rhythm is awkward with poor phrasing
- Rhythm is disrupted by excessive delay before responding

### **Phrasing**

- Sound/syllable/word repetitions
- Single-word revisions
- Dysfluent–cluttering-like speech (not stuttering)
- Word-by-word reading

### **Accuracy**

- Noticeable reading or speech errors due to rapid rate
- Noticeable slowing of reading or speech due to problems with decoding
- Noticeable omission of punctuation and appropriate phrasing
- Accurate reading due to slowed reading rate

### **Tone**

- Appropriately slow and sad for context
- Inappropriately slow and sad for context
- Appropriately bright, fast, and cheery for context
- Inappropriately bright, fast, and cheery for context
- Inappropriately boring for context

### **Miscues and Reading Errors**

- Comprehensive reading evaluation is indicated
- Multiple self-corrections
- Used finger to keep place
- Frequently lost place
- Disregarded punctuation
- Frequent omissions, additions, reversals of sounds and/or syllables
- Frequent omissions, additions, reversals of whole words and/or phrases
- Poor enunciation/mumbling

### **Stuttering-like Dysfluencies**

- Part word repetition
- Whole word repetition
- Secondary facial or body movements
- Appears to anticipate dysfluency
- Avoids speaking

## **Assessment Exercise 2: Determining Typical Speech Rate**

Speak in a conversational tone for one minute. Enter in the number of words spoken in that minute to determine your speaking rate.

### **Therapist Note**

The client should record a speech sample for approximately one minute. *Speech Visualization* will determine the exact length of time the client spoke and calculate their rate in Words Per Minute (WPM). *Speech Visualization* will ignore silence at the beginning and end of the recording, so you do not need to edit the sound yourself.

After the spoken sample is complete, the clinician may transcribe the speech into the *Passage* box. You may play the recording and type simultaneously while transcribing. The number of words in the passage will be updated automatically in the *Word Count* field. If you do not transcribe the speech sample, you will need to determine the total number of spoken words and enter that number into the *Word Count* field. If you want to save or print the text for later use, you must copy and paste it into a word processing document.

To determine Words Correct Per Minute, you will need to manually tabulate the number of errors. Enter this number into the *Errors* box. The computer will subtract the number of errors from the WPM and report a WCPM in the report.

When you are satisfied with the speech rate, click *Next* to continue.

**SOAP Note Rules**

O: The client’s speech rate in conversational speech was \_\_\_\_\_ Words Per Minute (WPM) in a sample of \_\_\_ minutes and \_\_\_ words. The typical speech rate for the age range \_\_\_ to \_\_\_ is from \_\_\_ to \_\_\_ WPM. The client’s speech rate is typical/atypical. The client has a slower/faster/average WPM speech rate. \_\_\_% of the sample speech were pauses.

\_\_\_\_\_ errors were reported in a sample of \_\_\_ words spoken with \_\_\_\_\_ Words Correct Per Minute (WCPM). \_\_\_% of the words were produced correctly.

The client’s articulatory rate (i.e., minus pauses) in conversational speech was \_\_\_\_\_ WPM. A significant difference between speech rate and articulatory rate may indicate other communication disorders (e.g., fluency disorder, word retrieval disorder, reading disorder, etc.).

**Clinician Selected Check Boxes**

A: Same as Voicing: Assessment Exercise 1.

**Therapy Exercise 1: Endurance for Reading/Speech**

*This task can be either a reading or speech “endurance” task*

If you are doing this task as a reading endurance task, then read the paragraph aloud using your typical reading rate. If this is a speech endurance task, talk at a normal rate.

**Therapist Note**

Choose a reading passage from one of the selections in Assessment Exercise 1 or from text that you provide. If you provide the text, or if this is a speech endurance task, you will need to enter the number of words in the sample in order for Speech Visualization to calculate the rate.

**SOAP Note Rules**

O: Same as Voicing: Assessment Exercise 1.

**Clinician Selected Check Boxes**

A: Same as Voicing: Assessment Exercise 1.

**Guide - Reading Rate (adults)**

<b>Words per Minute WPM</b>	<b>Type of Text</b>
120–140	Usually considered excessively slow for speech but might be used to provide emphasis to complex, profound or sad material
140–180	Typical for reading rate
140	Serious, technical
160	Descriptive factual
180	Humorous, light

### Guide - Reading Rate (children) (from Hasbrouck & Tindal 2005)

Grade/ Words Correct per Minute WCPM	Weak Readers (10%) WCPM		Average Readers (50%)		Good Readers (90%)	
	Fall	Spring	Fall	Spring	Fall	Spring
1	---	15	--	53	--	111
2	11	31	51	89	106	142
3	21	48	71	107	128	162
4	45	72	94	123	145	180
5	61	83	110	139	166	194
6	68	93	127	150	177	204
7	79	98	128	150	180	202
8	77	97	133	151	185	199

### Guide - Conversational Rate (adults)

Words per Minute WPM	Type of Speech
140–180	Typical but some speakers will still be considered acceptable at faster rates
150–185	Fast typical
160–170	Considered “superior” if the speech is clear and intelligible. The content must also be such that it can be understood at that rate
180–410	Exceptionally fast, but may be appropriate if the material is energetic or even forceful or angry
600	Auctioneer or professional speed talker

# 2006 Hasbrouck & Tindal Oral Reading Fluency Data

Jan Hasbrouck and Gerald Tindal have completed an extensive study of oral reading fluency. The results of their study were published in a technical report entitled, "Oral Reading Fluency: 90 Years of Measurement," which is available on the University of Oregon's website, [brt.uoregon.edu/tech\\_reports.htm](http://brt.uoregon.edu/tech_reports.htm), and in *The Reading Teacher* in 2006 (Hasbrouck, J. & Tindal, G. A. (2006). Oral reading fluency norms: A valuable assessment tool for reading teachers. *The Reading Teacher*. 59(7), 636-644.).

The table below shows the mean oral reading fluency of students in grades 1 through 8 as determined by Hasbrouck and Tindal's data.

You can use the information in this table to draw conclusions and make decisions about the oral reading fluency of your students. **Students scoring 10 or more words below the 50th percentile using the average score of two unpracticed readings from grade-level materials need a fluency-building program.** In addition, teachers can use the table to set the long-term fluency goals for their struggling readers.

**Average weekly improvement** is the average words per week growth you can expect from a student. It was calculated by subtracting the fall score from the spring score and dividing the difference by 32, the typical number of weeks between the fall and spring assessments. For grade 1, since there is no fall assessment, the average weekly improvement was calculated by subtracting the winter score from the spring score and dividing the difference by 16, the typical number of weeks between the winter and spring assessments.

Grade	Percentile	Fall WCPM*	Winter WCPM*	Spring WCPM*	Avg. Weekly Improvement**
1	90		81	111	1.9
	75		47	82	2.2
	50		23	53	1.9
	25		12	28	1.0
	10		6	15	0.6
2	90	106	125	142	1.1
	75	79	100	117	1.2
	50	51	72	89	1.2
	25	25	42	61	1.1
	10	11	18	31	0.6

\*WCPM = Words Correct Per Minute

Grade	Percentile	Fall WCPM*	Winter WCPM*	Spring WCPM*	Avg. Weekly Improvement**
3	90	128	146	162	1.1
	75	99	120	137	1.2
	50	71	92	107	1.1
	25	44	62	78	1.1
	10	21	36	48	0.8
4	90	145	166	180	1.1
	75	119	139	152	1.0
	50	94	112	123	0.9
	25	68	87	98	0.9
	10	45	61	72	0.8
5	90	166	182	194	0.9
	75	139	156	168	0.9
	50	110	127	139	0.9
	25	85	99	109	0.8
	10	61	74	83	0.7
6	90	177	195	204	0.8
	75	153	167	177	0.8
	50	127	140	150	0.7
	25	98	111	122	0.8
	10	68	82	93	0.8
7	90	180	192	202	0.7
	75	156	165	177	0.7
	50	128	136	150	0.7
	25	102	109	123	0.7
	10	79	88	98	0.6
8	90	185	199	199	0.4
	75	161	173	177	0.5
	50	133	146	151	0.6
	25	106	115	124	0.6
	10	77	84	97	0.6

\*\*Average words per week growth

[www.readnaturally.com](http://www.readnaturally.com)

**Guide - Conversational Rate (children)**  
 (from Pindzola et. al. and Smith et. al. - Ages 3-5)  
 (from Sturm and Seery - Ages 7-11)

Age	Speaking Rate <sup>1</sup> Syllables/Min	Speaking Rate <sup>2</sup> Words/Min	Articulatory Rate <sup>3</sup> Syllables/Min	Articulatory Rate <sup>2</sup> Words/Min
3	116–163	97–136	155–196	129–163
4	117–183	98–152	159–226	133–188
5	109–183	91–152	139–226	116–188
7	108.7–194.9	91.1–152.3	192.0–295.2	160–246
9	122.8–190.0	103.2–154.9	265.2–402.6	221–335
11	131.8–192.8	112.3–160.7	279.6–364.2	233–303

1. Speaking rate is defined as the number of speech units produced (syllables/min) and includes the pauses in the sample. Slow speaking rate (below 120 syllables/min) in high risk children (1 parent with RD) may predict future reading disability. Pausing times over .1 second in running speech was also reported in children who later presented with a Reading Disorder (RD). (Smith 2006)
2. Speaking rate in Words/Min was reported by Sturm and Seery for ages 7, 9, 11. The ratio of 1.2 Syllables per word in Sturm was used to calculate the rate for ages 3, 4, and 5.
3. Articulatory rate reflects the pace of speech excluding the pauses. Converted from Syllables/Sec to Syllables/Min for ages 7, 9, and 11.
4. Converted to Words/Min using 1.2 Syllables per word.

**Guide - Conversational Rates Used in Speech Visualization O Notes**  
 (Extrapolated from the data in the tables above.)

Age	Speaking Rate <sup>2</sup> Words/Min	Articulatory Rate <sup>2</sup> Words/Min
3–5.11	90–150	120–190
6.0–8.11	90–150	160–246
9.0–Puberty	100–160	220–330
Adults	220–410	NA



## Module 5: Phonological Accuracy

### Assessment Exercise 1: Screening CVC

Say the following CVC word. Score the production before moving to the next screen.

Sound	CVC	I	V	F
p	peep	p	ee	p
b	bob	b	o	b
t	toot	t	oo	t
d	did	d	i	d
k	cake	k	ae	k
g	gag	g	a	g
f	fife	f	ie	f
v	viv	v	i	v
th	thuth	th	u	th
<u>th</u>	<u>thouth</u>	<u>th</u>	ou	<u>th</u>
s	sauce	s	au	s
z	zUuz	z	UU	z
sh	sheesh	sh	ee	sh
zh	zhowzh	zh	ow	zh
ch	chuech	ch	ue	ch
j	joij	j	oi	j
m	mam	m	a	m
n	known	n	oe	n
ng	-ong	--*	o	ng
l	lel	l	e	l
r	roar	r	or	r
w	wow	w	ow	--*
h	huh	h	u	h
wh	whi-	wh	i	--*

- does not occur in English in this position

#### Therapist Note

This articulation screening exercise is designed to evaluate the client's speech for accurate production of 24 consonant and 16 different vowel sounds.

The client will be presented with a word to produce. Click on the *Record* button in the *Practice* box and have the client say the word. Record over the sample until you are satisfied with the production. *Speech Visualization* will save the production so that you can re-play it later to demonstrate progress.

When the client has finished recording, the clinician will need to score the production. There are several scoring options. You may score the entire production (word) as *Incorrect* or you may score the individual speech sounds in the CVC pattern. These will be reported as correct or incorrect by position and sound on the results page. You may use the *Assessment Notes* to indicate sound substitutions.

Click *Next* when you are ready to continue. The speech sample can be saved in a file by date and title: Phonological Accuracy: Screening CVC.

### SOAP Note Rules

O: The client produced \_\_\_\_ words. Their production of the word was incorrect \_\_\_\_% of the time. They incorrectly produced the initial consonant \_\_\_\_% of the time, the medial vowel was incorrect \_\_\_\_% of the time, and the final consonant was incorrect \_\_\_\_% of the time.

### Clinician Selected Check Boxes

A: Characteristics also observed were:

- Speech was unintelligible
- Speech characterized by weak articulatory contacts
- Speech was very difficult to understand
- Speech in conversation is significantly poorer than in isolation
- Speech was consistently accurate
- Speech was intelligible with careful listening
- Speech was mostly accurate but errors were observed
- Speech was frequently accurate but noticeably in error
- Speech was infrequently accurate, but occasional accuracy was possible
- Speech contained multiple sound omissions, deletions and/or substitutions
- Speech characterized by vowelization
- Gestures supplemented speech
- Tongue protrusion
- Mouth open at rest
- Speech improved with external prompting

### Types of Errors:

- Initial Consonant errors
- Medial Consonant errors
- Final Consonant errors
- Vowel production errors
- Evaluation of consonant clusters is indicated as observed in conversational speech

### Phonological Process Errors:

- Vowel production errors
- Syllable reduction
- Cluster reduction
- Prevocalic singleton obstruent omissions
- Postvocalic singleton obstruent omissions
- Stridency deletion
- Velar deviations
- Liquid/l/deviations
- Liquid/r,ʁ/deviations
- Nasal deviations
- Glide deviations

## Assessment Exercise 2: Deep Test IMF

These words contain a target sound in the initial, medial or final position. Say these words paying close attention to the target sound. Score each production before moving to the next screen.

Consonant	Initial	Medial	Final
p	paw	hippo	up
b	bow	oboe	cab
t	tea	eating	hut
d	day	hiding	head
k	cow	baker	back
g	game	wagon	egg
f	fin	coffee	if
v	van	lava	wave
th	thin	within	bath
<u>th</u>	<u>this</u>	mo <u>th</u> er	ba <u>th</u> e
s	see	icing	house
z	zip	buzzer	boys
sh	shoe	ocean	bush
zh	--*	Asian	beige
ch	chip	peaches	inch
j	jaw	banjo	edge
m	mop	hammer	home
n	no	bunny	hen
ng	--*	oink	sing
l	lime	salad	hall
r	ray	arrive	fur
w	we	shower	--*
h	hi	Ohio	--*
wh	why	nowhere	--*

\* does not occur in English in this position

### Therapist Note

This articulation deep test is designed to evaluate the client's speech for accurate production of 24 consonant sounds in the initial, medial and final positions. (Some sounds are not produced in some positions in English—these have been omitted.)

The client will be presented with one word in each of the three *Text* boxes. They may read the model or listen to the speech model (imitative). Click on the *Record* button in each *Practice* box and have the client say the word. Record over the sample until you are satisfied with the production. *Speech Visualization* will save the production so that you can re-play it later to demonstrate progress.

When the client has finished recording, the clinician will need to score each production as (C) *Correct* or (I) *Incorrect*. The words are listed with the target sound in the Initial, Medial, or Final positions. These will be reported as correct or incorrect by position and sound on the results page. Vowels should not be scored in this exercise. You may use the *Assessment Notes* to indicate sound substitutions.

If you have recorded the client's production, then you must score the production before moving on to the next word. If you want to skip a word do not record anything and the program will let you proceed to the next word without scoring.

Click *Next* when you are ready to continue. The speech sample can be saved in a file by date and title: Phonological Accuracy: Deep Test IMF.

### SOAP Note Rules

O: The client produced \_\_\_\_ words. Their production of the word with the initial consonant was incorrect \_\_\_\_% of the time, with the medial consonant \_\_\_\_% of the time, and the final consonant was incorrect \_\_\_\_% of the time.

### Clinician Selected Check Boxes

A: Characteristics also observed were:

- Speech was unintelligible
- Speech characterized by weak articulatory contacts
- Speech was very difficult to understand
- Speech in conversation is significantly poorer than in isolation
- Speech was consistently accurate
- Speech was intelligible with careful listening
- Speech was mostly accurate but errors were observed
- Speech was frequently accurate but noticeably in error
- Speech was infrequently accurate, but occasional accuracy was possible
- Speech contained multiple sound omissions, deletions and/or substitutions
- Speech characterized by vowelization
- Gestures supplemented speech
- Tongue protrusion
- Mouth open at rest
- Speech improved with external prompting

### Types of Errors:

- Initial consonant errors
- Medial consonant errors
- Final consonant errors
- Vowel production errors
- Evaluation of consonant clusters is indicated

### Assessment Exercise 3: Screening R, S, L Clusters, Other Clusters, and R-Controlled Vowels

These words contain a target sound in the initial, medial or final position. Say these words paying close attention to the target sound. Score the production before moving to the next screen.

<b>R Clusters</b>			
<b>Sound</b>	<b>Initial</b>	<b>Medial</b>	<b>Final</b>
pr	pretty	April	upper
br	brown	toothbrush	lumber
tr	train	electric	butter
dr	draw	children	spider
kr	cry	ice cream	pucker
gr	grapes	playground	bigger
fr	friend	afraid	offer
thr	three	bathroom	
spr	spring	hairspray	
str	street	instruments	poster
scr	scrub		
shr	shrub		
vr			over
thr			mother
chr			nature
jr			major
mr			hammer
nr			owner
ngr			hanger
zr			dozer

<b>S Clusters</b>			
<b>Sound</b>	<b>Initial</b>	<b>Medial</b>	<b>Final</b>
sp	spot	crispy	grasp
st	stem	costume	fist
sk	ski	basket	ask
sl	slow	asleep	castle
sm	small	outsmart	
sn	snow		
sw	swim		
skw	squish		
str	stripe		
spr	spring		
scr	scrub		
shr	shrub		
Challenge s-s	stamps	sunglasses	states

<b>L Clusters</b>			
<b>Sound</b>	<b>Initial</b>	<b>Medial</b>	<b>Final</b>
pl	play	reply	apple
bl	blimp	tablet	bubble
kl	clock	duckling	freckle
gl	glue	piglet	eagle
fl	flow	afloat	ruffle
sl			dorsal
lt			salt
ld			old
lf			elf
lth			wealth
lz			bills
tl			beetle
dl			poodle
vl			oval
zl			puzzle

ml			normal
nl			kernel

<b>Other Clusters</b>			
<b>Sound</b>	<b>Initial</b>	<b>Medial</b>	<b>Final</b>
ft			lift
fts			gifts
nt			paint
nts			pants
nd			end
ndz			hands
vd			saved
vz			hives
bz			cabs
dz			pods
gz			bugs
zn			frozen
ns			ounce
ks			box

<b>R-Controlled Vowels</b>			
<b>Sound</b>	<b>Initial</b>	<b>Medial</b>	<b>Final</b>
ar	are	party	car
or	orange	fork	door
er	Earth	bird	shower
ae+r	airplane	stairs	bear
ee+r	ear	cereal	deer
ou+r	our	showers	sour
ie+r	ire	tired	bonfire
Challenge r-r	ruler	library	corner

### Therapist Note

The R, S, L screening is designed to evaluate the client's speech for accurate production of R, S, and L clusters and R-Controlled vowels in the initial, medial and final positions. (Some sounds are not produced in some positions in English—these have been omitted.)

The client will be presented with one word in each of the three *Text* boxes. They may read the model or listen to the speech model (imitative). Click on the *Record* button in each *Practice* box and have the client say the word. Record over the sample until you are satisfied with the production. *Speech Visualization* will save the production so that you can re-play it later to demonstrate progress. When the client has finished recording, the clinician will need to score each production. There are several scoring options. You may score the entire production as *correct* or *incorrect* or you may score the individual target speech sound in one of the three locations: Initial, Medial, Final. These will be reported as correct or incorrect by position and sound on the results page. Vowels are not scored in this exercise. You may use the *Assessment Notes* to indicate sound substitutions.

If you have recorded the client's production, then you must score the production before moving on to the next word. If you want to skip a word do not record anything and the program will let you proceed to the next word without scoring.

Click *Next* when you are ready to continue. The speech sample can be saved in a file by date and title: Phonological Accuracy: Clusters IMF.

### SOAP Note Rules

O: Same as Phonological Accuracy: Assessment Exercise 2.

### Clinician Selected Check Boxes

(Same as assessment Exercise 2.)

A: Characteristics also observed were:

- Speech was unintelligible
- Speech characterized by weak articulatory contacts
- Speech was very difficult to understand
- Speech in conversation is significantly poorer than in isolation
- Speech was consistently accurate
- Speech was intelligible with careful listening
- Speech was mostly accurate but errors were observed
- Speech was frequently accurate but noticeably in error
- Speech was infrequently accurate, but occasional accuracy was possible
- Speech contained multiple sound omissions, deletions and/or substitutions
- Speech characterized by vowelization
- Gestures supplemented speech
- Tongue protrusion
- Mouth open at rest
- Speech improved with external prompting

### Types of Errors:

- Initial consonant errors
- Medial consonant errors
- Final consonant errors
- Vowel production errors
- Evaluation of consonant clusters is indicated



## Treatment Exercise 1: Articulation

Use information from the Assessment Exercises to select the appropriate treatment exercises from LocuTour's Articulation programs. *Artic Games and More* includes all consonants, vowels and clusters. The following games have specialized targets.

*Articulation I: Consonant Phonemes*

*Articulation II: Consonant Clusters*

*Articulation III: Vowels + R and R Clusters*

*Artic Games - Just R*

*Artic Games - Just S*

*Artic Games - Just L*

### Guide - Speech sounds most often misarticulated (target)\*

#### Hearing Children – English speaking

Target	Substituted sound (most to least often)
th	f, t, s, m, d, v
v	b, d, f, <u>th</u>
s	th, t, f
z	d, th, s, <u>th</u> , t, f, v
sh	t, s, th, f, z
<u>th</u>	d, v, t, f, z,
k	t, d, g
g	d, k, n
f	t, p, s, m, th
d	n, k, t
n	m, d
t	d, k
m	b, n
ng	n, k
p	b, k
b	p

\*Information extrapolated from data obtained by Singh and Frank 1972

## Module 6: Syllable Stress and Sequencing

### Assessment Exercise 1: Syllable Sequencing (Diadochokinesis)

#### *Part I – /pʰtʰkʰ/ series-1 syllable repetition*

Make 20 accurate repetitions of the following syllables as fast as you can.

Say: “pu, pu, pu, pu, pu, ...”

Say: “tu, tu, tu, tu, tu, ...”

Say: “ku, ku, ku, ku, ku, ...”

#### *Part II – /pʰtʰkʰ/ series-2 syllable repetition*

Make 15 accurate sequences as fast as you can. For example, “putu” is one sequence.

Say: “putu, putu, putu...”

Say: “tuku, tuku, tuku ...”

#### *Part III – /pʰtʰkʰ/ series-3 syllable repetition*

Make 10 accurate sequences as fast as you can. For example, “putuku” is one sequence.

Say: “putuku, putuku, putuku, putuku ...”

#### *Alternate Part I – /bʰdʰgʰ/ series-1 syllable repetition*

Make 20 accurate repetitions of the following syllables as fast as you can.

Say: “bu, bu, bu, bu, bu ...”

Say: “du, du, du, du, du ...”

Say: “gu, gu, gu, gu, gu ...”

#### *Alternate Part II – /bʰdʰgʰ/ series-2 syllable repetition*

Make 15 accurate sequences as fast as you can. For example, “budu” is one sequence.

Say: “budu, budu, budu...”

Say: “dugu, dugu dugu ...”

#### *Alternate Part III – /bʰdʰgʰ/ series-3 syllable repetition*

Make 10 accurate sequences as fast as you can. For example, “budugu” is one sequence.

Say: “budugu, budugu, budugu, budugu ...”

### Therapist Note

Rapid syllable repetition can be used as a sensitive measurement of orofacial motor impairment. In this exercise the client will attempt to produce a maximum repetition rate (MRR) for selected syllables. Make observations concerning the sequencing, speed, and number of repetitions in addition to the variation between successive syllables. A longer syllable duration is often found in dysarthria, and syllable sequencing problems are found in apraxia. Both qualitative and quantitative observations should be noted.

Use the *Assessment Notes* to document dysarthric features of slowness etc., and apraxic features such as unsequenced or perseverative syllable production.

### Alternate

Some individuals may not be able to produce /pʰtʰkʰ/ but can produce /bʰdʰgʰ/. Norms are not available for /bʰdʰgʰ/ but the table for /pʰtʰkʰ/ may be useful for comparison.

## SOAP Note Rules

O: The client produced the syllable sequence, \_\_\_\_ in \_\_\_\_ seconds. There were \_\_\_\_ correct productions (\_\_\_\_%) and \_\_\_\_ incorrect productions (\_\_\_\_%). For a child of age \_\_\_\_ this was \_\_\_\_ S.D. above/below the mean of \_\_\_\_ which places them in the average/low average/impaired range. The average adult takes \_\_\_\_ seconds for this sequence. The measurement of maximum speech rate is correlated to the integrity of the physical system, motor control, and the ability to articulate rapidly.

Individuals who cannot sustain /p<sup>h</sup>t<sup>h</sup>k<sup>h</sup>/ and switch to /b<sup>h</sup>d<sup>h</sup>g<sup>h</sup>/ likely have an apraxic or dysarthric disorder. Norms are not available for /b<sup>h</sup>d<sup>h</sup>g<sup>h</sup>/ therefore the reference norms for /p<sup>h</sup>t<sup>h</sup>k<sup>h</sup>/ are provided as a guideline.

MMR – Syllables per second						
Age	/p <sup>h</sup> /	/t <sup>h</sup> /	/k <sup>h</sup> /	/p <sup>h</sup> t <sup>h</sup> /	/t <sup>h</sup> k <sup>h</sup> /	/p <sup>h</sup> t <sup>h</sup> k <sup>h</sup> /
<b>6</b>	4.2	4.1	3.6	2.0	1.9	1.0
<b>7</b>	4.7	4.1	3.8	2.0	1.9	1.0
<b>8</b>	4.8	4.6	4.2	2.4	2.1	1.2
<b>9</b>	5.0	4.9	4.4	2.5	2.3	1.3
<b>10</b>	5.4	5.3	4.6	2.7	2.3	1.4
<b>11</b>	5.6	5.6	5.0	3.1	2.6	1.5
<b>12</b>	5.9	5.7	5.1	3.2	2.7	1.6
<b>14</b>	6.1	6.1	5.4	3.6	2.9	1.8
<b>Adult</b>	6.0-7.0	6.0-7.0	5.5-6.5	4.6	-	2.5

Normative data on MMR converted from Fletcher 1972b by Kent, Kent, and Rosenbek 1987.

Seconds per Trial (20 Reps single syllable, 15 reps bisyllables, 10 reps /p^t^k^/)						
Age		/p^/	/t^/	/k^/	/p^t^/	/t^k^/
6	Mean	4.8	4.9	5.5	7.3	7.8
	SD	0.8	1.0	0.9	2.0	1.8
7	Mean	4.8	4.9	5.3	7.6	8.0
	SD	1.0	0.9	1.0	2.6	1.8
8	Mean	4.2	4.4	4.8	6.2	7.2
	SD	0.7	0.7	0.7	1.8	1.4
9	Mean	4.0	4.1	4.6	5.9	6.6
	SD	0.7	0.7	0.7	1.6	1.7
10	Mean	3.7	3.8	4.3	5.5	6.4
	SD	0.4	0.4	0.5	1.5	1.2
11	Mean	3.6	3.6	4.0	4.8	5.8
	SD	0.6	0.7	0.6	1.1	1.3
12	Mean	3.4	3.5	3.9	4.7	5.5
	SD	0.6	0.5	0.6	1.2	1.1
13	Mean	3.3	3.3	3.7	4.2	5.1
	SD	0.6	0.5	0.6	0.8	1.3
Adult	Min	2.8	2.8	3.1	3.3	N/A
	Max	3.3	3.3	3.7		

Fletcher 1972b, Adult converted from Kent, Kent, and Rosenbek 1987. Data included on the O-Note is from this table.

Clinician Selected Check Boxes

A:

- Switched from p^, t^, or k^ to voiced b^, d^, or g^ indicating difficulty with control of oral productions.
- Production started strong, but preciseness deteriorated and production became slurred.
- Unable to sustain for 20, 15, or 10 repetitions as required.
- Rate was slow and sequencing was inaccurate.
- Rate was slow but sequencing was accurate.
- Rate was fast and sequencing was inaccurate.
- Rate was inconsistent.
- Accuracy was inconsistent.

## Therapy Exercise 1: Alternating Syllable Practice

This is a practice exercise in order to learn how to accurately sequence syllables. Clap your hands and at the same time, say one syllable per second. Listen to the model and imitate the production for about 20 seconds.

1 syllable per second	2 syllables per second	3 syllables per second
“pu, tu, pu, tu, pu, tu, ...”	“pu, tu, pu, tu, pu, tu, ...”	“pu, tu, pu, tu, pu, tu, ...”
“pu, ku, pu, ku, ...”	“pu, ku, pu, ku, ...”	“pu, ku, pu, ku, ...”
“tu, ku, tu, ku, ...”	“tu, ku, tu, ku, ...”	“tu, ku, tu, ku, ...”
“pu, tu, ku, ...”	“pu, tu, ku, ...”	“pu, tu, ku, ...”

### Therapist Note

Rapid syllable repetition can be used as a sensitive measurement of orofacial motor impairment. In this exercise the client will attempt to produce a maximum repetition rate (MRR) for selected syllables. Make observations concerning the sequencing, speed and number of repetitions in addition to the variation between successive syllables. A longer syllable duration is often found in dysarthria and syllable sequencing problems are found in apraxia. Both qualitative and quantitative observations should be noted.

### SOAP Note Rules

O: The client used a pacing sequence set to 1, 2, and 3 beats per second to practice the repetition of alternating syllable sequences.

The client produced \_\_\_\_ repetitions of the syllable sequence, \_\_\_\_ in \_\_\_\_ seconds. At 1 syllable per second there were \_\_\_\_ correct productions (\_\_\_\_%) and \_\_\_\_ incorrect productions (\_\_\_\_%). At 2 syllables per second there were \_\_\_\_ correct productions (\_\_\_\_%) and \_\_\_\_ incorrect productions (\_\_\_\_%). At 3 syllables per second there were \_\_\_\_ correct productions (\_\_\_\_%) and \_\_\_\_ incorrect productions (\_\_\_\_%).

### Clinician Selected Check Boxes

A: Same as Syllable Stress and Sequencing: Assessment Exercise 1.

## Therapy Exercise 2: Challenging Words - Syllable Stress; Sound Sequencing; Syllable Sequencing

Notice the order of the sounds and the syllable stress. You may say the word more than once and score each production as correct or incorrect.

Word	Syll	Word	Syll	Word	Syll	Word	Syll
aluminum	4	espresso	3	length	1	prescription	3
ambulance	3	February	4	library	3	probably	3
ask	1	height	1	nuclear	3	Realtor	2
athlete	2	hundred	2	perspire	2	recognize	3
chimney	2	introduction	4	picture	2	regular	3
cinnamon	3	irrelevant	4	pitcher	2	suppose	2
escape	2	larynx	2	preferable	4	theater	3

### Therapist Note

This articulation exercise allows the client to make productions then use visual and auditory feedback to monitor correct or incorrect production of target sounds; syllable stress; and sound and syllable sequencing.

### SOAP Note Rules

O: The client produced \_\_\_\_ words. There were \_\_\_\_ correct productions (\_\_\_\_) and \_\_\_\_ incorrect productions (\_\_\_\_).

### Clinician Selected Check Boxes

A:

- Rate was slow and sequencing was inaccurate.
- Rate was slow but sequencing was accurate.
- Rate was fast and sequencing was inaccurate.
- Rate was inconsistent
- Accuracy was inconsistent

### Therapy Exercise 3: Common Challenging Words for L2 Speakers

Say these words. Notice the crisp consonants and each vowel sound. You may say the word more than once and score each production as correct or incorrect.

black	blue	bring	chair	chew
chip	chop	cold	come	crash
cream	drink	dry	failure	first
flat	floor	free	from	glass
glow	great	grow	hair	hall
hand	happy	harm	hasty	he
heater	helper	her	him	his
hit	home	house	how	hungry
job	juice	jump	jury	law
lease	leash	left	let	lid
lie	nearly	nine	noon	normal
pleasant	please	pride	problem	protect
rare	read	real	reason	red
rice	ride	ring	road	roof
room	rotten	said	schedule	scrap
script	sharp	ship	shirt	shop
sleep	sleeve	smell	smoke	snack
snow	some	space	speak	splash
splinter	spring	sprocket	stamp	start
street	string	ten	than	thank
that	their	them	think	thirty
this	those	thought	thread	thumb
tongue	tread	tree	truth	use
value	very	wash	wave	went
west	why	window	wine	winner
wish	word	year	yell	yes
yet	yogurt	you	yours	youth
zero	zip code	zone		

#### Therapist Note

This articulation screening exercise is designed to evaluate the client's speech for accurate production of words that are difficult for L2 (non-native English) speakers.

#### SOAP Note Rules

O: The client said the word, “\_\_\_”. The production for that word was \_\_\_% accurate for \_\_\_ trials. (C/Total)

#### Clinician Selected Check Boxes

A: Same as Syllable Stress and Sequencing: Therapy Exercise 2.

## Therapy Exercise 4: Speech in Context

Say this rhythmic passages focusing on articulation of the rapidly alternating sounds.

### Pat-a-cake, Pat-a-cake

Pat-a-cake, pat-a-cake, baker's man,  
Bake me a cake as fast as you can.  
Pat it, and prick it, and mark it with a, "B"  
And put it in the oven for Baby and me!

Total Words in Passage: 38

### Pussycat, Pussycat

"Pussycat, pussycat, where have you been?"  
"I've been to London to visit the Queen."  
"Pussycat, pussycat, what did you there?"  
"I frightened a little mouse under her chair."

Total Words in Passage: 28

### Hey Diddle, Diddle

Hey diddle, diddle,  
The cat and the fiddle,  
The cow jumped over the moon.  
The little dog laughed  
To see such sport,  
And the dish ran away  
With the spoon.

Total Words in Passage: 30

## Therapist Note

Rapid syllable repetition can be used as a sensitive measurement of oralfacial motor impairment. In this exercise the client will attempt to produce rapidly alternating speech sounds in context. Make observations concerning the sequencing, speed and number of repetitions in addition to the variation between successive syllables. A longer syllable duration is often found in dysarthria and syllable sequencing problems are found in apraxia. Both qualitative and quantitative observations should be noted. Use the *Assessment Notes* to document your observations.

## SOAP Note Rules

O: The client read a passage that required the rapid alternating of speech sounds in context. The production for that passage was \_\_\_% accurate. (C/Total)



## Clinician Selected Check Boxes

A:

### Rate

- Rate is too fast AND affects overall stress or sequencing
- Rate is too slow AND affects overall stress or sequencing
- Rate is inconsistent AND affects overall stress or sequencing

### Rhythm

- Rhythm is inappropriate
- Rhythm is jerky
- Rhythm is patterned and unusual
- Rhythm is awkward with poor phrasing
- Rhythm is disrupted by excessive delay before responding

### Phrasing

- Sound/syllable/word repetitions
- Single-word revisions
- Dysfluent–cluttering-like speech (not stuttering)
- Word-by-word reading

### Accuracy

- Noticeable syllable stress errors due to rapid rate
- Noticeable syllable sequencing errors due to rapid rate
- Noticeable slowing of reading or speech due to problems with decoding
- Noticeable omission of punctuation and appropriate phrasing
- Accurate reading due to slowed reading rate

### Stuttering-like Dysfluencies

(Be aware that syllable stress and sequencing practice might require a different approach for individuals with fluency disorders.)

- Part word repetition
- Whole word repetition
- Secondary facial or body movements
- Appears to anticipate dysfluency
- Avoids speaking

## Guide - Description of Articulation/Phoneme Contrasts

These are practical categories that may be used to communicate a place and manner of articulation to the student and are not to be considered a distinctive feature analysis. There are many fine textbooks that cover this topic.

### Speech consonant sounds that require *mostly*:

Lip movement or strength	p, b, m, w
Tongue tip movement or strength	t, d, n, l, th, <u>th</u> , s, z, ch, j
Mid tongue movement or strength	s, z, sh, zh, ch, j, r
Back tongue movement or strength	k, g, ng
Popping or pushing air movement	p, b, ch, j, h
Smooth, consistent air movement	f, v, th, <u>th</u> , s, z, sh, zh, w, h, wh, l, r, m, n, ng
Back tongue and lip movement	kw (qu), ks (x)
Resonance in the mouth (oral cavity)	p, b, t, d, k, g, f, v, th, <u>th</u> , s, z, sh, zh, ch, j, l, r, w, h, wh, kw, ks
Resonance in the nose (nasal cavity)	m, n, ng

### Speech vowel sounds:

High vowel sounds, tongue fronting and lips smiling	ee, i, e
Mid vowel sounds, tongue flattening and lips opening, jaw moving down	ae, a, u
Low vowel sounds, tongue flat and mouth open, jaw lowered	o, au, aw
Back vowel sounds, tongue bunching up in the back with lip rounding	oe, uu, oo
Sliding vowel sounds, multiple movements for one sound	ie, ue, oi, oy, ou, ow, y
Vowel sounds with /r/	aer, eer, ier, oer, uer, yer, ir, or, ar

## Module 7: Vocal Quality and Resonance

### Assessment Exercise 1: Nasal Resonance

#### *Nasal Emissions Test - words*

Say the following words in two ways. The "pinched" speech production is accomplished by lightly pinching the nose to determine if there is nasal resonance. Click on the *1st Syl* checkbox if nasal emission was heard on the first syllable and select the *2nd Syl* checkbox to indicate nasal emission on the second syllable.

There should **not** be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

Unpinched	Pinched
people	people
paper	paper
puppy	puppy
pepper	pepper
piper	piper
baby	baby
Bobby	Bobby
bubble	bubble
B.B.	B.B.
bye-bye	bye-bye

#### Therapist Note

These exercises will allow you to evaluate the vocal qualities and resonance of the speaker. There are both subjective and objective values to consider when determining what is normal or deviant in vocal quality. The physical structure, culture, and projections of emotion, attitude and mood can all subtly and overtly change the vocal quality.

This is a tool to use to allow you and your client to make those judgments. The tasks suggested are typical activities found in Voice textbooks. The results page will give a percentage of scored productions for the first and second syllables. The computer does not score these, the clinician makes the judgment of Correct or Incorrect.

There should **not** be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

#### SOAP Note Rules

O: The client produced \_\_\_\_ pinched/unpinched word pairs. Their unpinched production of the first syllable had nasal emission \_\_\_\_% of the time and their production of the second syllable had nasal emission \_\_\_\_% of the time. Their pinched production of the first syllable had nasal emission \_\_\_\_% of the time and their production of the second syllable had nasal emission \_\_\_\_% of the time. There should not be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

## Assessment Table for Vocal Quality and Resonance Exercises

Normal	Consistently accurate, rarely in error < 10%	5
Good	Mostly accurate, but some assimilation nasality heard in < 15%	4
Fair	Frequently accurate, but noticeable nasality 16 - 25%	3
Poor	Infrequently accurate, nasality affects communication 26 - 80%	2
Absent	Inaccurate, accurate vocal quality or resonance was not observed > 80% nasal emission	1

### Clinician Selected Check Boxes

A: Characteristics also observed were:

- Breathy
- Rough
- Strained
- Break/shift/tremulous
- Register Break
- Diplophonia
- Articulatory errors
- Glottal Attack
- Phrasing errors
- Poor breath support
- Poor posture
- Incorrect phrasing
- High rate of speech errors
- Production of non-speech sounds
- Audible inhalation or “snorts”
- Acceptable yet noticeable level of nasality for culture or regional dialect

### *Alternate Nasal Emissions Test – single sound “P”*

Say “P” (sounds like the letter name “p”) 10 times. The “pinched” speech production is accomplished by lightly pinching the nose to determine if there is nasal resonance. Click on the *I* (incorrect) counter, for each nasal emission then click on the *C* (correct) counter, to indicate no nasal emission.

There should **not** be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

### Therapist Note

This exercise is for clients who are young (or who can't say words). Say “P” (sounds like the letter name “p”), 10 times. The “pinched” speech production is accomplished by lightly pinching the nose to determine if there is nasal resonance. Score 10 productions. Click on the *I*, incorrect checkbox, for each nasal emission then click on the *C*, correct checkbox, to indicate no nasal emission. The results page will give a percentage of scored productions. The computer does not score these, the clinician makes the judgment of Correct or Incorrect.

There should **not** be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

These exercises will allow you to evaluate the vocal qualities and resonance of the speaker. There are both subjective and objective values to consider when determining what is normal or deviant in vocal quality. The physical structure, culture, and projections of emotion, attitude and mood can all subtly and overtly change the vocal quality.

This is a tool to use to allow you and your client to make those judgments. The tasks suggested are typical activities found in Voice textbooks.

### SOAP Note Rules

O: The client produced the letter P. Their unpinched production of the sound had nasal emission \_\_\_\_% of the time (Nasal/Total Unpinched) and their pinched production of the sound had nasal emission \_\_\_\_% of the time (Nasal/Total Pinched). There should not be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

A: Same as Syllable Stress and Sequencing: Assessment Exercise 1.

### Assessment Exercise 2: Pressure Consonants

Say each word at least once. It is okay to alternate between a pinched nose-closed production and an open-nose production. Click on the *I* (incorrect) counter, for each nasal emission then click on the *C* (correct) counter, to indicate no nasal emission.

There should **not** be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

Unpinched	Pinched
beet	beet
bit	bit
bet	bet
bait	bait
bat	bat
but	but
bought	bought
boat	boat
boot	boot
bite	bite
butte	butte
bout	bout
Bert	Bert
Bart	Bart

### Therapist Note

These exercises will allow you to evaluate the vocal qualities and resonance of the speaker. There are both subjective and objective values to consider when determining what is normal or deviant in vocal quality. The physical structure, culture, and projections of emotion, attitude and mood can all subtly and overtly change the vocal quality.

Score each production. Click on the *I* (incorrect) counter, for each nasal emission then click on the *C* (correct) counter, to indicate no nasal emission. The results page will give a percentage of scored productions. Note: The computer does not score these, the clinician makes the judgment of Correct or Incorrect.

There should **not** be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

This is a tool to use to allow you and your client to make those judgments. The tasks suggested are typical activities found in Voice textbooks.

### SOAP Note Rules

O: The client produced \_\_\_\_ pinched/unpinched word pairs. Their unpinched production of the sound had nasal emission \_\_\_\_% of the time (Nasal/Total Unpinched) and their pinched production of the sound had nasal emission \_\_\_\_% of the time (Nasal/Total Pinched). There should not be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

### Clinician Selected Check Boxes

A: Same as Syllable Stress and Sequencing: Assessment Exercise 1.

### Assessment Exercise 3: /i, u/ “ee, oo” Contrast

Say the following vowel sounds with pinched and unpinched nostrils. It is okay to alternate between a pinched nose-closed production and an open-nose production. Click on the *I* (incorrect) checkbox, for each nasal emission then click on the *C* (correct) checkbox, to indicate no nasal emission.

There should **not** be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

Unpinched	Pinched
ee, oo, ee, oo, ee, oo	ee, oo, ee, oo, ee, oo

### Therapist Note

Same as Syllable Stress and Sequencing: Assessment Exercise 2.

### SOAP Note Rules

O: The client produced the sounds "ee, oo, ee, oo, ee, oo". Their unpinched production of the sound had nasal emission \_\_\_\_% of the time (Nasal/Total Unpinched) and their pinched production of the sound had nasal emission \_\_\_\_% of the time (Nasal/Total Pinched). There should not be a difference between the pinched and unpinched productions. If there is, there may be velopharyngeal incompetence.

### Clinician Selected Check Boxes

A: Same as Syllable Stress and Sequencing: Assessment Exercise 1.

## Assessment Exercise 4: Paragraph Test

Read this paragraph aloud using your typical speech. All nasal consonants are excluded.

Count the number of nasal emissions produced on the vowel sounds and enter in *Nasal on Vowel*

Count the number of nasal emissions produced on any consonant sounds and enter in *Nasal on Consonant*

### The Zoo Passage

(Fletcher, 1972)

Look at this book with us.

It's a story about a zoo.

That is where bears go.

Today it's very cold out of doors, but we see a cloud overhead that's a pretty, white, fluffy shape.

We hear that straw covers the floor of cages to keep the chill away; yet a deer walks through the trees with her head high.

They feed seeds to birds so they are able to fly.

Total Words in Passage: 72

### Therapist Note

These exercises will allow you to evaluate the vocal qualities and resonance of the speaker. There are both subjective and objective values to consider when determining what is normal or deviant in vocal quality. The physical structure, culture, and projections of emotion, attitude and mood can all subtly and overtly change the vocal quality.

As the client says the paragraph, keep track of the nasal emissions—the computer does not score these productions. Enter the number of nasal emissions for consonants and vowels in the boxes on the sidebar. The results page will give a percentage of scored productions for the nasal emission on the consonants and on the vowels.

The passages we have selected do not have nasal consonants in standard American English—though they may in regional dialects. The following is our count of consonants and vowels for each passage. Note: ch, th, wh, etc. are counted as one sound and vowel + R is counted as a vowel sound. You may change the counts for each paragraph on the sidebar.

### The Zoo Passage

C(10);V(6) Look at this book with us.  
C(7);V(8) It's a story about a zoo.  
C(7);V(5) That is where bears go.  
C(12);V(8) Today it's very cold out of doors,  
C(10);V(8) but we see a cloud overhead  
C(13);V(8) that's a pretty, white, fluffy shape.  
C(10);V(6) We hear that straw covers  
C(7);V(4) the floor of cages  
C(7);V(6) to keep the chill away;  
C(7);V(4) yet a deer walks  
C(6);V(3) through the trees  
C(6);V(4) with her head high.  
C(10);V(5) They feed seeds to birds  
C(7);V(6) so they are able to fly.

## SOAP Note Rules

O: The client's speech for The Zoo Passage, a 72 word passage that eliminates nasal sounds, contained \_\_\_\_ vowel nasal emissions (\_\_\_\_%) and \_\_\_\_ consonant emissions (\_\_\_\_%). This indicates that vocal resonance for vowels is Normal/Good/Fair/Poor/Impaired and vocal resonance for consonants is Normal/Good/Fair/Poor/Impaired. Individuals with greater than 10% nasalization of non-nasal sounds should be referred to an ENT for evaluation.

## Clinician Selected Check Boxes

A: Same as Syllable Stress and Sequencing: Assessment Exercise 1.

## Assessment Exercise 5: Counting “60–100” (Mason and Grandstaff, 1971)

Say the following group of numbers. Count the number of nasal emissions. After the client has completed their production enter the number of nasal productions.

Numbers 60-901			
60	70	80	90
61	71	81	91
62	72	82	92
63	73	83	93
64	74	84	94
65	75	85	95
66	76	86	96
67	77	87	97
68	78	88	98

## Therapist Note

The 60's have high pressure consonants that could be difficult for those with velopharyngeal incompetence. A score of 0 would indicate no assimilation nasality and a score of 4 or more would indicate noticeable nasality.

The 70's are heavily loaded with nasal sounds and the vowels may show assimilation nasality. This will be the most difficult group to score as it is not an all or nothing score. You should hear nasality on the seventy portion but not on the one, two, three, etc. Score the second part of the production for nasality.

The 80's should sound normal if there is no problem with velopharyngeal closure.

The 90's should sound normal because both typical speakers and those with closure problems will produce these nasal sounds the same.

## SOAP Note Rules

O: The client's speech for “numbers 60-68” contained \_\_\_\_ nasal emissions. This indicates that vocal resonance is \_\_\_\_\_. The client's speech for “numbers 70-78” contained \_\_\_\_ nasal emissions. This indicates that vocal resonance is \_\_\_\_\_. The client's speech for “numbers 80-88” contained \_\_\_\_ nasal emissions. This indicates that vocal resonance is \_\_\_\_\_. The client's speech for “numbers 90-98” contained \_\_\_\_ nasal emissions. This indicates that vocal resonance is Normal/Good/Fair/Poor/Impaired. Significant nasal emissions may be indicative of velopharyngeal incompetence.

## Clinician Selected Check Boxes

A: Same as Syllable Stress and Sequencing: Assessment Exercise 1.



## Therapy Exercise 1: Using the Soft Palate on Nasal and Non-nasal Sounds

Say the following pairs of words. Stress clean, non-nasal production of the vowel before any nasal sound (m, n, ng). Make an effort to have nasal resonance only on the consonants m, n, ng not on the adjacent vowel. Click on the *I* (incorrect) counter, for each nasal production of a vowel sound and click on the *C* (correct) counter, to indicate no nasal emission on a vowel sound. Since this is a therapy activity multiple productions may be scored.

### Hypernasality

If you hear a shift in tone between the two productions, then the sound is resonating in the nose. Typical speakers resonate less than 10-20% of the oral sounds in the nose. Consistent, frequent nasal resonance is called hypernasality. The only three English speech sounds that have nasal resonance are m, n, ng.

<b>-m</b>	<b>+ m</b>	<b>-n</b>	<b>+n</b>	<b>-ng</b>	<b>+ng</b>
as	am	at	an	bat	bang
clap	clam	pat	pan	hat	hang
crack	cram	that	than	sat	sang
jet	gem	cat	can	rat	rang
brick	brim	red	wren	kit	king
jig	Jim	deck	den	bridge	bring
hip	him	bet	Ben	clip	cling
tot	Tom	bit	bin	dish	ding
hut	hum	sit	sin	sock	song
plus	plum	got	gone	lock	long
drug	drum	jaw	John	got	gong
chug	chum	too	tune	pod	pong
guff	gum	Sue	soon	stuck	stung
gave	game	play	plane	rug	rung
ache	aim	be	bean	hug	hung
beat	beam	shy	shine	spritz	spring
I'll	I'm	toe	tone	rug	rung
hope	home	soup	soon	stick	sting
glue	gloom	coil	coin	boil	boing
life	lime	oat	own	rod	wrong

### Therapist Note

Same as Syllable Stress and Sequencing: Assessment Exercise 2.

### SOAP Note Rules

O: The client produced \_\_\_\_ nonnasal/nasal word pairs. Their production of words without a nasal sound had nasal emission on the vowel \_\_\_\_% of the time (Nasal Emissions/Total) and their production of words with m, n, or ng had nasal emission on the vowel \_\_\_\_% of the time (Nasal Emissions/Total). This indicates that nasal emission is Normal/Good/Fair/Poor. Significant nasal emissions may be indicative of velopharyngeal incompetence, an ENT referral may be indicated.

Normal	Consistently accurate, rarely heard nasality < 10%	5
Good	Mostly accurate, but some assimilation nasality heard in 11- 15%	4
Fair	Frequently accurate, but noticeable nasality 16 - 25%	3
Poor	Infrequently accurate, nasality affects communication 26 - 80%	2
Impaired	Inaccurate, accurate vocal quality or resonance was not observed > 81% nasal emission	1

### **Therapy Exercise 2: Speech in Context**

Say the following passages, stress the vowel before any nasal sound (m, n, ng) and make an effort to have nasal resonance only on the consonants m, n, ng.

Count the number of nasal emissions produced on the vowel preceding the consonant sounds “m, n, ng” and enter into *Nasal on Vowel*.

Count the number of correct nasal productions made when saying the consonant sounds “m, n, ng” and enter into *Nasal on Consonant*.

#### **The Muffin Man**

Oh, do you know the muffin man,  
The muffin man, the muffin man,  
Oh, do you know the muffin man,  
Who lives on Drury Lane?

Oh, yes, I know the muffin man,  
The muffin man, the muffin man.  
Oh, yes, I know the muffin man,  
Who lives on Drury Lane!

#### **Ten Little Monkeys**

Ten little monkeys jumping on the bed  
One fell off and bumped his head.  
Mama called the doctor and the doctor said,  
“No more monkeys jumping on the bed!”  
Continue, if desired, with 9, 8, 7 etc. to 1.

#### **Matilda Jane Meets The New Neighbor**

Once upon a time there was a nice mutt named Matilda Jane.  
She lived on Monkey Song Lane in Montana.  
She spent most of her mornings running, jumping,  
and merry making on Monkey Song Lane.  
Never had a nice mutt had a nicer time being a mutt.

One morning a moving van neared Monkey Song Lane.  
Many, many noises were emanating from the moving van,  
nasty sounds, made by one angry mutt.  
Matilda Jane, being interested, navigated behind the van  
as it moved down Monkey Song Lane.

When the moving van stopped, Matilda Jane made her way to the front of the van, following the angry, nasty sounds. She saw a monstrous Mastiff, growling and drooling from the front of the van.

Matilda Jane smiled. "I'm Matilda Jane. Maybe you might like to come running and jumping and merry making with me on Monkey Song Lane" she said. "Never!" muttered the Mastiff "I don't want a mutt around me!" So while the Mastiff sat making angry noises and being mad, Matilda Jane was singing and dancing down Monkey Song Lane and never had a nice mutt had a nicer time being a mutt.

### **Kalamazoo**

An old man from Kalamazoo  
Once dreamed he was eating his shoe,  
He awoke late that night  
In a terrible fright.  
Now instead of one tongue, he has two.

### **Quotes**

I never did a day's work in my life.  
It was all fun.

Thomas Edison

Every morning I get up and look through the Forbes list of the richest people in America.  
If I'm not there, I go to work.

Robert Orben

Mama exhorted her children at every opportunity to 'jump at the sun.' We might not land on the sun, but at least we would get off the ground.

Zora Neale Hurston

### **Definitions**

Rattlesnake: A tattle tail  
Caterpillar: An upholstered worm  
Zebra: A horse behind bars  
Big Ben: The tock of the town  
Acrobats: People who turn a flop into a success  
Harpist: A plucky musician  
Organic Farm: Tilling it like it is  
Astronaut: A whirled-traveler  
Fishing Enthusiast: A finatic  
Long distance runner: A landscape panter  
Astronomy: A science over your head

## Therapist Note

These exercises will allow you to evaluate the vocal qualities and resonance of the speaker. There are both subjective and objective values to consider when determining what is normal or deviant in vocal quality. The physical structure, culture, and projections of emotion, attitude and mood can all subtly and overtly change the vocal quality.

As the client says the paragraph, keep track of the nasal emissions—the computer does not score these productions. Enter the number of nasal emissions for consonants and nasalized vowels that precede a nasal consonant in the boxes on the sidebar. The results page will give a percentage of scored productions for the nasal emission on the consonants and on the vowels that precede a nasal consonant. There should be nearly 100% nasalization for m, n, ng, i.e. *Nasal on Consonants* and there should be less than 10% nasality on the vowels preceding m, n, ng, unless there is a regional dialect that includes more. Hypernasality suggests velopharyngeal insufficiency and Hyponasality suggests an obstruction of the nasopharynx. A referral to an ENT is indicated for both issues.

The following is our count of consonants and vowels for each passage based on their pronunciation in Standard American English—they may vary in regional dialects. You may change the counts for each paragraph on the sidebar.

### The Muffin Man

C(5);V(4) Oh, do you know the muffin man,  
C(8);V(6) The muffin man, the muffin man,  
C(5);V(4) Oh, do you know the muffin man,  
C(2);V(2) Who lives on Drury Lane?

C(5);V(4) Oh, yes, I know the muffin man,  
C(8);V(6) The muffin man, the muffin man.  
C(5);V(4) Oh, yes, I know the muffin man,  
C(2);V(2) Who lives on Drury Lane!

### Ten Little Monkeys

C(6);V(5) Ten little monkeys jumping on the bed  
C(3);V(3) One fell off and bumped his head.  
C(3);V(2) Mama called the doctor and the doctor said,  
C(7);V(5) "No more monkeys jumping on the bed!"

### **Matilda Jane Meets The New Neighbor**

C(9);V(6) Once upon a time there was a nice mutt named Matilda Jane.  
C(8);V(7) She lived on Monkey Song Lane in Montana.  
C(9);V(7) She spent most of her mornings running, jumping,  
C(9);V(7) and merry making on Monkey Song Lane.  
C(7);V(5) Never had a nice mutt had a nicer time being a mutt.

C(12);V(8) One morning a moving van neared Monkey Song Lane.  
C(11);V(9) Many, many noises were emanating from the moving van,  
C(6);V(4) nasty sounds, made by one angry mutt.  
C(7);V(5) Matilda Jane, being interested, navigated behind the van  
C(6);V(4) as it moved down Monkey Song Lane.

C(7);V(5) When the moving van stopped, Matilda Jane made her  
C(6);V(6) way to the front of the van, following the angry, nasty sounds.  
C(5);V(4) She saw a monstrous Mastiff, growling and drooling  
C(3);V(3) from the front of the van.

C(6);V(3) Matilda Jane smiled. "I'm Matilda Jane.  
C(9);V(7) Maybe you might like to come running and jumping and merry  
C(8);V(5) making with me on Monkey Song Lane" she said.  
C(8);V(5) "Never!" muttered the Mastiff "I don't want a mutt around me!"  
C(7);V(5) So while the Mastiff sat making angry noises and being mad,  
C(12);V(10) Matilda Jane was singing and dancing down Monkey Song Lane  
C(7);V(6) and never had a nice mutt had a nicer time being a mutt.

### **Kalamazoo**

C(5);V(4) An old man from Kalamazoo  
C(3);V(3) Once dreamed he was eating his shoe,  
C(1);V(0) He awoke late that night  
C(1);V(1) In a terrible fright.  
C(4);V(3) Now instead of one tongue, he has two.

### **Quotes**

C(3);V(2) I never did a day's work in my life.  
C(1);V(1) It was all fun.  
C(2);V(2) Thomas Edison

C(3);V(4) Every morning I get up and look through the Forbes  
C(2);V(2) list of the richest people in America.  
C(2);V(1) If I'm not there, I go to work.  
C(1);V(1) Robert Orben

C(4);V(3) Mama exhorted her children at every opportunity to  
C(7);V(6) 'jump at the sun.' We might not land on the sun,  
C(1);V(1) but at least we would get off the ground.  
C(2);V(2) Zora Neale Hurston

## Definitions

C(1);V(0)	Rattlesnake: A rattlesnake
C(2);V(2)	Caterpillar: An upholstered worm
C(1);V(1)	Zebra: A horse behind bars
C(2);V(2)	Big Ben: The tock of the town
C(2);V(2)	Acrobats: People who turn a flop into a success
C(2);V(2)	Harpist: A plucky musician
C(2);V(2)	Organic Farm: Tilling it like it is
C(1);V(1)	Astronaut: A whirled-traveler
C(2);V(2)	Fishing Enthusiast: A fanatic
C5();V(5)	Long distance runner: A landscape panter
C(3);V(2)	Astronomy: A science over your head

## SOAP Note Rules

O: The client's speech for the passage \_\_\_\_, a passage that includes nasal sounds, contained \_\_\_\_ nasalized vowel productions on vowels before m, n, and ng (\_\_\_\_%) and contained \_\_\_\_ nasal productions on the nasal consonants (\_\_\_\_%). This indicates that vocal resonance for vowels is Normal/Good/Fair/Poor/Impaired and vocal resonance for consonants is Normal/Good/Fair/Poor/Impaired.

Individuals with greater than 10% nasalization of non-nasal sounds should be referred to an ENT for evaluation. Hypernasality suggests Velopharyngeal Insufficiency/Incompetence. Velopharyngeal Incompetence (VPI) is the inability of the velum to close the nasopharynx. VPI usually has a physiological origin. The "nasal snort" or "posterior nasal fricative" may be a functional disorder and may be related to misuse of the velum.

Individuals with hyponasality for nasal sounds may have an obstruction and are unable to open the nasopharynx sufficiently for breathing and for the production of the m, n, and ng sounds. The cause can be hypertrophic adenoids, a narrowed nasopharynx, etc. and a referral to an ENT is recommended.

### Vowel Productions on Vowels before m, n, and ng

Normal	Consistently accurate, rarely heard nasality < 10%	5
Good	Mostly accurate, but some assimilation nasality heard in 11- 15%	4
Fair	Frequently accurate, but noticeable nasality 16 - 25%	3
Poor	Infrequently accurate, nasality affects communication 26 - 80%	2
Impaired	Inaccurate, nasal resonance/nasal emission observed > 81%	1

### Nasal Production on Nasal Sounds m, n, and ng

Normal	Consistently accurate, correct nasality 90 - 100%	5
Good	Mostly accurate, but some denasalization on m, n, ng heard in 85-89%	4
Fair	Frequently accurate, but noticeable nasality 75 - 84%	3
Poor	Infrequently accurate, denasality affects communication 20 - 74%	2
Absent	Inaccurate, hyponasal vocal quality or lack of nasal resonance observed > 19%	1

### Clinician Selected Check Boxes

A: Same as Syllable Stress and Sequencing: Assessment Exercise 1.

## Check boxes that are available for each session

The following checkboxes are available to assist in creating SOAP notes. They are found on the Session Summary page.

### ***Subjective Observations***

S: During this session the client was observed to be:

- Alert
- Confused
- Oriented
- Disoriented
- Attentive
- Distracted
- Cooperative
- Uncooperative
- Putting forth good effort
- Putting forth minimal effort
- On time to appointment
- Late to appointment

### ***Objective***

O: The raw scores and percentage scores from the the computer-assisted exercises will be recorded automatically. You may add additional objectives, such as carryover activities or non-computer exercises that were completed in the session. In *Client Manager* click on the *Objective* tab for the session and enter the information in the blank space.

### ***Non-speech Sounds and Movements***

A: When non-speech sounds occur frequently, the communicative message can be overshadowed and unintentional messages about connectedness to the speaker/listener communication may be sent. During this session the client exhibited:

- Belching noises
- Cough
- Chronic throat clearing
- Talking with food in the mouth
- Hiccup
- Laugh
- Lip smacking
- Body movements
- Sneezing
- Yawning
- Place holder “um”
- Starter “um”
- Loud breathing
- Sighing
- Teeth chattering
- Humming
- Nasal emissions
- Idiosyncratic sound effects



### ***Plan of Treatment***

P: The follow-up plan of treatment should:

- Provide information and education concerning the clinical findings
- Determine treatment readiness and assess insight and motivation for change
- Determine if the client is unwilling or unable to make changes to improve speech, then provide information concerning the issues of change
- Assist client with committing to the need for change
- Delineate client and clinician goals and roles in treatment
- Modify abnormalities of posture, tone and strength
- Modify respirations
- Modify phonation, voice onset, and voicing
- Modify resonance
- Modify volume
- Modify articulation
- Modify syllable stress and sequencing
- Modify rate
- Modify suprasegmentals, prosody, rhythm, and intonation
- Provide alternative modes of communication
- Establish and reinforce a maintenance plan
- Provide follow-up care and recommendations to necessary professionals
- Determine current level of functioning at discharge
- Assess for communication satisfaction

## Guide - Functional Uses of Metronome Pacing

Metronome pacing is a timing tool that can help the speaker either speed up or slow down their speech to produce each word in time with the beat.

### *Metronome Pacing*

Beats: 10-600 beats per minute (bpm)  
60 bpm default

children speak at approximately: 240-360 syllables per min  
read at approximately: 60-180 WPM

teens speak at approximately: 140-200 WPM  
read at approximately: 140-180 WPM

adults speak at approximately: 174 WPM  
read aloud at approximately: 140-180 WPM  
read at approximately: 200-350 WPM

speed reading and skimming 700 – 1000 WPM

books on tape read at approximately: 150-175 WPM

auctioneer 250 WPM

rap fastest rap 723 syllables in 51.27 seconds (14.1 syllables per second) by Ricky Brown

## Description of Terms

**Consonants** are sounds that are classified according to the place of articulation. (Palate, teeth, lips are places of articulation.)

**Manner** of articulation refers to the air flow.

- *Plosives* (Stops) have a complete closure of oral passage of air – (p, b, t, d, k, g).
- Fricatives have a forcefulness of air passing through a constricted air space – (f, v, th, th, s, z, sh, zh, h).
- *Affricates* are a blend of a plosive and a fricative – (ch, j)
- *Glides* have continuous gliding motion, (semivowels) – (w, wh, l, r, y).
- *Nasals* have air passing through the nose. Nasalization indicates the presence or absence of nasal resonance – (m, n, ng).

**Vowels** are speech sounds in which air from the lungs passes through the mouth with minimal obstruction and without audible friction.

**Articulation** is the shaping of the vocal tract (larynx and pharynx) and oral and nasal cavities by positioning the articulators (lips, tongue, palate, teeth) to stop air or modify air as it passes through the mouth and/or nose.

**Syllable** is a segment of speech that usually consists of a vowel with or without a consonant sound. Every syllable must have a vowel, but every syllable does not need a consonant. “A” is a syllable and a word, “an” is a Vowel/Consonant syllable.

**Multi-syllable or polysyllabic** means more than one syllable in a word. “Baseball” is a two-syllable word.

**Loudness** is a subjective measure of decibel levels. The divisions made will be:

0–10 dB	= too quiet
11–19	= whisper
20–79	= normal speaking voice
80–89	= party or playground voice
90 and louder	= too loud

**Voicing** indicates the presence or absence of vocal fold vibration (voiced/noisy - voiceless/quiet).

When the vocal folds vibrate the sound can be described as noisy. The vowel sounds are always noisy because the voice is “on”. Some consonant sounds that are noisy are “b, d, g, v, z”.

Some consonant sounds that are quiet or “off” are “p, t, k, f, s”. A quick way to determine if a sound is noisy or quiet is to feel for a vibration or buzzing on the throat.

**Inspiration/ Expiration** Inspiration is the sound of air going into the lungs. The sound of air leaving the lungs, or a loud “sigh” is expiration.

**Rate** is a description of the speed of speech. A slow rate is typical when the information being spoken is very complex, scientific or requires the listener to take time to understand the information. A conversational rate varies by speaker, situation and topic. Some fast-talking teenagers can speak with a very rapid pace and maintain intelligibility for their peers, but others may have a difficult time understanding them. Tables are available in the Timing, Rate, and Rhythm section.

**Pitch** is the auditory sensation of a tone that is placed in a scale of high to low. The pitch range is the band of notes that a person typically uses for speech. Men typically have a lower pitch and women a higher pitch. The computer will measure the fundamental frequency of the voice and give a “typical” range for a male adult, teen and child voice as well as a range selection for a female, adult, teen and child voice. The table used to compile the ranges comes from D.K. Wilson *Voice Problems of Children* (3<sup>rd</sup> ed.). Baltimore: Williams & Wilkins, 1987.

**Falsetto** includes the upper ranges of the person’s normal pitch range.

**Vocal fry or Glottal fry** includes the lowest ranges of the person’s normal pitch range and sometimes is described as “gravelly”.

**Optimum pitch range** is where the physical features of the vocal tract are most comfortable for vibration. It can usually be found by humming “uh-humm” (yes) and using that tone as the midline for 8 notes.

**Prosody** characteristics convey information about intention and meaning. We will use the following to describe these speech aspects.

*Segmental* aspects refer to articulation of each speech sound, precision.

*Suprasegmental* aspects refer to all of the aspects of prosody that signal meaning.

*Grammatical* prosody can be used to signal whether a word is to be understood as a noun or a verb. The stress on a word changes the meaning of the word, “*pre’sent* or *present*”.

*Pragmatic* prosody includes emphatic or contrastive stress that calls attention to new content in the speech utterance. “You bought the *blue* dress?”

*Affective* prosody includes the speaker’s mood, recognition of status between the listener and speaker (i.e. adult to young child, peer to peer), and the person’s typical speech style. “Whatever” spoken by a frustrated teen has a different prosody than the same utterance spoken by a person lounging at the beach on a casual afternoon.

## Rate

**Speech Rate** is the number of words produced divided by the time taken to produce them. It is reported as Words per Minute (WPM). Silence at the beginning and at the end of the sample is not included in the time.

**Articulatory Rate** is the number of words spoken per minute during segments of perceptually fluent speech. The program cannot tell if the speech is fluent or correct, so it uses number of words in the sample. It calculates the time by measuring total time for the speech sample and subtracting the silence. Silence is defined as no measurable amplitude for 250 ms within the sample. Silence of any duration at the beginning and the end of the sample is not counted.

**Vocal Quality** is the description of the sound of your voice and what it communicates to others about you. There are qualities that some individuals prefer to accentuate and others may wish to reduce. Breathiness is one of these. A common example is the starlet’s breathy “sexy” voice as compared to an individual with Parkinson disease attempting to decrease the non-vocalized air gaps.

**Harshness** describes a narrow-ranged, low-pitched strained, gruff voice.

**Strident** describes a narrow-ranged, high-pitch, sharp, and metallic voice.

**Hoarseness** is a raspy, harsh, grating sound made by irregular vocal fold vibration and escaping glottal noise.

**Whisper** or the whispered voice, has an unnaturally low volume that may indicate weak breath support or vocal pathology if the individual is unable to raise the volume of the voice by choice.

**Breathiness** is used to describe when vocal cords are vibrating, but there is also air escaping through the glottis causing turbulence.

**Roughness** is an irregularity of the voice source which is measured by the irregular fluctuation of the fundamental frequency. Terms used to describe roughness include: Too Harsh/ Irregular voicing/ Laryngeal/ Creaky / Tremor.

**Strain** and muscular tension produces effortfulness and excessive energy in the laryngeal area. Some describe it as forced or pushed. Running out of breath can also produce a laryngeal strain. Terms used to describe roughness include: Too high pitched/ Strangled/ Tense.

**Dysarthric** quality is a result of impaired motor/muscular control of the speech mechanisms. It is often breathy, slow, with limited pitch range. The breathiness may be from the weak musculature or the weak breath support or irregular phrasing due to running out of air. There are many types of dysarthria.

**Nasality** is used to describe speech that has resonance in the nose for sounds usually made orally. The air is escaping through the nose.

**Hypernasal** speech has excessive sound resonating in the nasal cavity. The sounds that are supposed to be produced using nasal resonance are: m, n, and ng. When vowels or other consonant sounds resonate in the nose most listeners perceive this to be “Hypernasal”.

**Denasality** is used to describe speech that stops air from going through the nose on the typical nasal sounds of m, n and ng. “Hyponasality” is the term used to describe this type of “cold in the nose” sound. Other common terms are “twangy” and “denasal”.

**Monotone** Individuals that demonstrate problems with prosody have been described as having “robot-like” speech or speak in a monotone with a very limited pitch range (4 or less notes). Sometimes the stress is inconsistent with the intention of the sentence or there are pauses in unexpected places and rapid speech where pauses were anticipated. Treatment should include: complete exercises to increase awareness; imitate the typical production of sounds without over or under-articulation; place correct stress on the target syllables; make appropriate pausing between words and content “meaning groups”; match the rate, quality, and loudness of the modeled speech.

**Pitch – Too high/ Normal/ Too low** (The mean fundamental frequency for pitch - based on age, gender, and referent culture is - 128 Hz for men, 256 Hz for women.) Pitch variations contribute to vocal variety and can clarify and emphasize meaning. There are many terms that have been used to describe pitch variations. “Biphonic” means that there are two independent pitches produced. One made with the true vocal folds, the other with the false folds and there may be a whistling sound as they are produced. “Diphonic” also has two pitches, generally 1 octave apart. “Intonation” is the

term used to describe meaningful pitch changes; they convey context and intention. “Vocal Fry” or “Glottal Fry” is the term used to describe using a pitch that is too low and gravelly. This is often the case for someone who has been speaking too far below their optimum pitch and drops into fry at the end of the sentence. This happens when the context of the sentence indicates that there should be a lower pitch to give the correct meaning to the sentence. Sometimes the cause is inadequate breath support. The individual runs out of air and talks on the residual air. Pitch levels that are “Too low” may also be described as “Hoarse” this is the sound made when you have laryngitis. “Gravelly” is also used to describe a pitch that is too low.

**Loudness – Too high/ Normal/ Too low** (The loudness level is the intensity or amplitude of the waveform. The determination of too loud, normal, or too low/quiet is based on the situation, age, gender, and culture of the speaker and listener. Suprasegmental information features can be conveyed by altering the loudness of the speech in appropriate places.) Speech that has no vocal fold vibration is called, “Aphonic” it is whispered speech. Speech that is excessively loud is perceived as offensive. Modulating the loudness based on the intention to be conveyed is an important aspect of speech communication. A whisper conveys a different message than a shout.

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# Voice Care and Treatment

## Environmental Interventions

- ◆ Change things at work, home, sibling rivalry
- ◆ Avoid noise and smoke
- ◆ Get away from noise, move self.
- ◆ Talk in small groups.
- ◆ Sit closer to the listener.
- ◆ Diaphragmatic breathing.
- ◆ Talk softer than you think is necessary.
- ◆ Use exaggerated diction. Let the crispness of the sounds cut through the noise.
- ◆ Make maximum use of amplification
- ◆ Get feedback. (A person is most likely to abuse the voice if there is no monitoring of volume.)

## Physical Hygiene

- ◆ Drink water!!!! Cool room temperature is best. Avoid extremes of temperature. (Purpose is to hydrate the tissues-- local and systemic benefits.)
- ◆ Take a steam bath or use a humidifier.
- ◆ No coffee, no tea. (Non-herbal teas have tannins, which dry the throat. Fruit and herbal teas are okay as long as regular tea is not added.)
- ◆ Avoid medications that dry out the mouth and throat. (They take away lubrication) Xerostomia is the name for dry mouth. Some commercial products like Biotene mouthwash and lubricating spray can be helpful.
- ◆ Avoid aspirin if possible. (It's a vasodilator that affects the thin walls and membranes.)
- ◆ Valium, use judiciously. Check other medications that may cause dryness.
- ◆ Alcohol has a drying effect and is also a vasodilator. One may also lose cortical control over speech.
- ◆ Avoid spicy foods. Very hot foods can irritate the folds. If there is a problem with regurgitation at night, don't eat too soon before bed, sleep with the head inclined. Get an evaluation for possible Gastroesophageal Reflux Disease, GERD.
- ◆ Lozenges, anything with glycerin is okay. Glycerin has a coating action that retains fluid in the tissues. Those lozenges with eucalyptus or mint *are not* helpful; they seem to have a drying effect.

## Uses of the Vocal Exercises

- ◆ Heal the throat. (If your ENT says you have a tissue (growth) that can be gotten rid of, vocal exercises will help.
- ◆ Prevent recurrence of the nodule. If you go through therapy, do well, continue to use the techniques, it is unlikely that the nodules will return.
- ◆ Warm up the voice.
- ◆ Recuperate the voice. Once in a while you may have problems even if using the voice correctly. Rest the voice and do the exercises before bed.

## Goals of Voice Therapy

### I. Physiologic

1. Activate breathing
2. Proper laryngeal tonus (increase or relax)
3. Distribute resonance
4. Eliminate all medical problems.
  - Evaluation by an otolaryngologist is important to determine if there is pathology including vocal nodules, polyps, contact ulcers, or paralysis of one fold.
  - Eliminate colds, allergies, environmental contributors
5. Stop vocal abuse
6. Reduce edema

### II. General

1. Best pitch possible
2. Best loudness possible
3. Best quality possible
4. Most flexible (consider all three areas)
5. Create normal healthy tissue (replace granuloma, etc.)
6. Normalize throat feelings
7. Provide a voice that satisfies the patient's needs, especially the work voice.

## Vocal Hygiene Exercises

	S	M	T	W	T	F	S
Good posture during all exercises. Stand or sit tall with both feet flat on the ground. Pull your shoulders back to open up your chest.							
Warm up your voice every morning in the bath, shower or bed.							
1. Warm up by saying "u-hum" or "m-hm". You may expand to "u-hum one, " "u-hum two, " "u-hum three" etc.							
2. Glide up and down the scale with easy onset vowels, "ah", "ee", "oh", "oo", "ie". Glide low to high pitch 5 times, then high to low pitch 5 times. This exercise will increase your pitch range, which will aid in inflection.							
3. Shoulder Shrug: Inhale as you lift your shoulders towards your ears. Hold for a count of five. Feel the tension. Then, exhale as you pull your shoulders downwards. Feel the stretch in your neck and shoulders. Repeat 5 times. This exercise stretches the muscles that extend from the base of your skull to the top of your shoulders.							
4. Slowly rotate your shoulders in a circular motion. Inhale as you raise your shoulders and exhale as you lower them. Do five forward circles and five backward circles. Feel the stretch in your shoulders, upper chest and upper back.							
5. Let your head slowly fall forward. Keep your chin to your chest for 10-15 seconds. Rotate your head to the left and right, holding each side for 10-15 seconds. Support your head with your hand in order to not over stretch your side neck muscles. Repeat all three positions 5 times.							
6. Slowly rotate your head in a circular motion, not allowing your head to fall backwards. Rotate 5 times clockwise and 5 times counterclockwise. This exercise loosens the muscles in the sides and back of your neck.							
7. Lie on your back, sit upright or stand with your back flat against a wall. Place your hands on your abdomen. Move your abdomen in and out without breathing. Localize the movement to your abdomen; do not lift your shoulders or chest. Repeat 10-15 times. You are exercising your diaphragm muscle.							

## Vocal Hygiene Exercises

	S	M	T	W	T	F	S
8. In one of the positions mentioned above, slowly inhale moving your abdomen outward. Then, slowly exhale allowing your abdomen to move inward again. Relax your abdomen on inhalation and contract on exhalation. You may also choose to do this exercise while bending over from the sitting or standing position with your arms hanging loosely downward. Again, do not let your shoulders or chest rise; all of the movement should be in your abdomen. Repeat 10-15 times.							
9. Add phonation to the exercise above. Say "ah", "ee", "oh", "oo" and "ie" with an easy onset during exhalation. The goal is to increase the amount of time between breaths during conversational speech. This is called "breath support".							
10. Gently massage your jaw muscle at the joint, working forward to mid-jaw. Let your mouth hang open slightly. Massage each side for 30-60 seconds. This exercise will reduce tension in your jaw.							
11. Using one or two fingers on your bottom teeth, gently pull your bottom jaw downward. Let your jaw completely relax and do not resist the movement. Repeat 5 times, holding each stretch for 5-10 seconds. This exercise, as well as #10, are good exercises to do in the shower. Warm water hitting the muscles increases flexibility.							

## History: Voice Disorders Intake Checklist

The following checkboxes are available to assist in the initial evaluation of the client.

### Medical Records

#### *Medical Records*

A: Medical records indicate:

- Subglottal stenosis
- Vocal fold nodules on one or both cords
- Vocal fold polyps
- Vocal cord paralysis
- Contact ulcers on the vocal cords
- Papilloma
- Laryngeal papillomatosis
- Intracordal cysts
- Sulcus vocalis
- Vascular ectasia
- Cancer
- Edema
- Hemangioma
- Laryngeal or Interarytenoid cleft
- Other cleft \_\_\_\_\_
- Laryngeal trauma
- GERD (Gastroesophageal Reflux Disease)
- Dysphagia
- Stroke/Brain Injury
- \_\_\_\_\_

### Medical History

#### *Medical History*

A: Medical history includes:

- Smoking – quantity \_\_\_\_\_
- Thyroid disease
- Caffeine use and/or tea tannins
- Phonotrauma
- Overuse, misuse, abuse of voice
- Caustic chemical ingestion
- Overuse of eucalyptus, or other drying agents
- Overuse of alcohol
- Recent surgery
- Physical trauma to the neck or throat
- \_\_\_\_\_

### Family and Vocational History

A: The client reports:

- Current or previous employment as as teacher, public speaker, cheerleader, singer, or salesperson
- Employment or vocation: \_\_\_\_\_
- Significant stress in the home, at work, or interactions with others
- Recent significant loss of spouse, parent, child or friend
- \_\_\_\_\_

## History of the Communication Disorder

### *Professional Voice training or SLP Intervention*

A: Professional voice training or SLP intervention was:

- Never received
- Received but not practiced
- Received but not completely successful
- Other Observations: \_\_\_\_\_

### *Client's description of the communication disorder*

A: The client's description of the communication disorder included:

- Possible causes: \_\_\_\_\_
- Related surgeries: \_\_\_\_\_
- Current level of stress: \_\_\_\_\_
- Previous treatments: \_\_\_\_\_
- General health: \_\_\_\_\_
- Other Observations: \_\_\_\_\_

### *Situations that make the symptoms...*

A: The client reported situations that made the situation:

- Better: \_\_\_\_\_
- Worse: \_\_\_\_\_
- Other Observations: \_\_\_\_\_

### *Client's rating of the functional impact of the communication disorder on their daily life.*

A: The client rated the functional impact of the communication disorder on their daily life as:

- None
- Minimal – Tolerable
- Mild – Affects home, work, or social life
- Moderate – Affects more than one area
- Severe – Significantly impacts ADL's (Activities of Daily Living)
- Profound – Not able to function in one or more area of ADL's of home, work, or social life
- Other Observations: \_\_\_\_\_

### *Observation of the Client*

A: The client was observed to have:

- Clavicular breathing
- Abdominal breathing
- Thoracic breathing
- Shortness of breath
- Audible breathing
- Other observations: \_\_\_\_\_

***Inappropriate Vocal Behaviors or Reinforcers***

A: The client exhibited or reported the following inappropriate vocal behaviors or reinforcers.

- Talking over noise
- Talking too loudly
- Yelling or screaming
- Coughing too much
- Crying too much
- Imitating vehicles and animals
- Talking in an unusually high or low pitch
- Talking excessively even when the client has laryngitis
- Client thinks the funny/raspy/hoarse voice is acceptable
- Other people reinforce the client's voice as “cute” or “sexy.”
- Client gets undue attention for voice disorder
- Secondary gains apparent for keeping the voice disorder (time off, less demands, etc.)
- Reports stressful or tension-filled life
- Frequent bouts of laryngitis
- Chronic throat clearing



## History: Hearing Acuity

### *Hearing Acuity*

A: Hearing Acuity was not tested—

- appears normal
- possible hearing loss, referral indicated

A: Hearing Acuity was tested—

- Air Conduction - WNL
- Air Conduction Loss—Right Ear - 4 frequency average \_\_\_\_\_
- Air Conduction Loss—Left Ear - 4 frequency average \_\_\_\_\_

### *Degree (based on pure tone average)*

A: The degree of loss for the Right Ear was—

- normal range 0-25 dB
- mild loss 26-40 dB
- moderate 41-55 dB
- moderate severe 56-70 dB
- severe 71-90 dB
- profound 91 dB or >

A: The degree of loss for the Left Ear was—

- normal range 0-25 dB
- mild loss 26-40 dB
- moderate 41-55 dB
- moderate severe 56-70 dB
- severe 71-90 dB
- profound 91 dB or >

A: Evaluation of

- Bone Conduction – indicated WNL
- Bone Conduction – indicated a Loss:
  - Right Ear -Air/Bone Gap \_\_\_\_\_
  - Left Ear - Air/Bone Gap \_\_\_\_\_
- Other Observations: \_\_\_\_\_

A: Results of the Tympanogram indicated:

Right Ear

- Pressure \_\_\_\_\_
- Shape \_\_\_\_\_
- Compliance \_\_\_\_\_

Left Ear

- Pressure \_\_\_\_\_
- Shape \_\_\_\_\_
- Compliance \_\_\_\_\_

A: Other Observations of Hearing Acuity:

- \_\_\_\_\_

## Structure: Oral-Peripheral Evaluation

The following checkboxes are available to assist in the initial evaluation of the client.

### *Oral-Peripheral Evaluation—Face*

Face

A: The oral-peripheral evaluation indicated that the face was:

- Symmetrical- Normal
- Asymmetrical and droops to the right
- Asymmetrical and droops to the left
- Other Observations: \_\_\_\_\_

Movement/ Breathing

A: The following movement/ breathing patterns were also observed:

- Normal
- Grimaces/ abnormal movements/ tics
- Mouth breathing
- Audible inspiration
- Tongue protrusion
- Labored breathing
- Other Observations: \_\_\_\_\_

Tone

A: The facial tone was:

- Normal
- Flaccid
- Mask-like
- Tense
- Other Observations: \_\_\_\_\_

Lips - Protrusion

A: Lips for a pucker (Protrusion) was:

- Symmetrical (even) Normal
- Asymmetrical (uneven) with a weakness on right (unilateral)
- Asymmetrical (uneven) with a weakness on left (unilateral)
- Asymmetrical (uneven) with a bilateral droop
- Other Observations: \_\_\_\_\_

Lips - Retraction

A: Lips for a smile (Retraction) was:

- Symmetrical (even) - Normal
- Asymmetrical (uneven) with a weakness on right (unilateral)
- Asymmetrical (uneven) with a weakness on left (unilateral)
- Asymmetrical (uneven) with a bilateral droop
- Other Observations: \_\_\_\_\_

Lips - strength

A: When asked to puff cheeks and hold air the lip strength was:

- Normal
- Weak/ reduced/ air escaped
- Other Observations: \_\_\_\_\_
- Normal

Nasal emission

A: Nasal emission was:

- Normal- not present
- Abnormal- nasal emission present
- Other Observations: \_\_\_\_\_

Drooling

A: Drooling was:

- Absent - Normal
- Present - Constant
- Present - Intermittent
- Other Observations: \_\_\_\_\_

***Oral-Peripheral Evaluation—Teeth***

Teeth

A: The Teeth were:

- Normal
- Missing/ Edentulous -- \_\_\_ teeth present
- Jumbled/ spaces/ misaligned/ crowded teeth
- Chewing surfaces were adequate for all food textures
- Chewing surfaces were inadequate for some food textures
- Other Observations: \_\_\_\_\_

Occlusion

A: The Occlusion appeared to:

- be Normal - molars touch
- have an Underbite
- have an Overbite
- have a Crossbite
- Other Observations: \_\_\_\_\_

Dentures

A: The client wears dentures,

- they fit well
- they don't fit well
- and client consistently wears them
- and client doesn't consistently wear them
- Other Observations: \_\_\_\_\_

Oral Hygiene

A: The client's Oral Hygiene:

- is Normal and independent
- Requires assistance
- is Poor and may contribute to poor health
- Other Observations: \_\_\_\_\_

Mucosa

A: The client's Mucosa

- is Healthy – gingiva (scalloped, firm, knife-like margins, stippled texture)
- is Diseased gingiva (inflammation, rolled margins, no stippling, gingiva is erythematous, edematous and/or painful)
- Other Observations: \_\_\_\_\_

## Saliva

A: The client's Saliva

- is Healthy – watery, clear
- is Diseased – thick, discolored - yellow, green, black, red
- is Absent - xerostomia – dry mouth – painful mouth
- Other Observations: \_\_\_\_\_

## ***Oral-Peripheral Evaluation—Jaw***

Mandibular Movement

A: The evaluation of Mandibular Movement for:

Range of Motion

- was Normal
- was Reduced

Symmetry of Jaw

- was Normal
- Deviates to the right
- Deviates to the left

Movement of Jaw was

- Normal
- Jerky
- Groping
- Slow
- Asymmetrical

Tempromandibular Joint

A: Tempromandibular Joint (TMJ) Noises

- were Absent - Normal
- included Grinding and/or Popping

Other Observations of the jaw:

- \_\_\_\_\_

## ***Oral-Peripheral Evaluation—Palate***

A: Evaluation of the Hard and Soft Palate indicated:

Color

- Normal color
- Abnormal color

Arch

- Normal arch
- High arch
- Low arch
- Wide arch
- Narrow arch

Growths

- No growths
- Growths present
- Location of growths \_\_\_\_\_

Fistula

- No fistulas
- Fistulas present
- Location of fistulas \_\_\_\_\_

## Cleft

- No clefts
- Repaired clefts
- Location of repaired clefts \_\_\_\_\_
- Unrepaired clefts present
- Location of unrepaired clefts \_\_\_\_\_

## A: Soft Palate symmetry at rest was:

- Normal (symmetrical) soft palate symmetry at rest
- Bifid soft palate symmetry at rest
- Asymmetrical uvula deviates to the right
- Asymmetrical uvula deviates to the left

## A: Soft Palate symmetry on "Ah" was:

- Normal (symmetrical) soft palate symmetry on "Ah"
- Asymmetrical uvula deviates to the right on "Ah"
- Asymmetrical uvula deviates to the left on "Ah"

## A: Nasality was:

- Normal
- Hypernasal
- Hyponasal

## A: Gag Reflex was:

- Normal
- Hyperactive
- Hypoactive
- Absent

## A: Other Observations of the palate:

- \_\_\_\_\_

## ***Oral-Peripheral Evaluation—Tongue***

### A: Evaluation of the tongue indicated:

#### Tongue Size

- Normal tongue size
- Large tongue size
- Small tongue size

#### Tongue Tone

- Normal tongue tone
- Flaccid tongue tone
- Fasciculations/spasms/writhing movements of the tongue

#### Color and Texture

- Normal color and texture
- Coated
- Grooved
- White
- Red
- Ulcerated
- Pierced
- Bifurcated

## Tongue

### A: The client's Tongue

- is Healthy – (pink, moist)
- is Diseased - ( coated, blistered, cracked, ridged)
- is often protruding with open-mouth breathing
- is protruding because of enlarged Adenoids
- Other Observations: \_\_\_\_\_

### Lingual Frenulum (the tissue that attaches the tongue to the floor of the mouth)

- Normal frenulum
- Short frenulum - Tongue cannot protrude past lips
- Surgical history of frenulum: \_\_\_\_\_
- Bifurcated frenulum

### A: Movement of the Tongue— Vertical (up/down) indicated:

- Normal range, movement, and speed
- Cannot move tongue tip up
- Cannot move tongue tip down
- Can move, but groping observed
- Limited range
- Limited speed

### A: Movement of the Tongue— Horizontal (right/left) indicated:

- Normal range, movement, and speed
- Cannot move tongue tip right
- Cannot move tongue tip left
- Can move, but groping observed
- Limited range
- Limited speed

### A: Movement of the Tongue— Protrusion/Retraction (in/out) indicated:

- Normal range, movement, and speed
- Cannot move tongue tip out
- Cannot move tongue tip in
- Can move, but groping observed
- Limited range
- Limited speed
- Limited strength
- Bifurcates on protrusion

### A: Other Observations of the tongue:

- \_\_\_\_\_
- Insufficient movement to remove food particles from mouth
- Tongue motility problems contribute to oral stage dysphagia

## Tension Sites

### *Tension Sites*

A: Musculature tension was evaluated at the following sites:

Face

- Facial tension present
- Facial tension absent

Mandible

- Mandible tension present
- Mandible tension absent

Neck

- Neck tension present
- Neck tension absent

General Body

- General body tension present
- General body tension absent

A: Other Observations of Tension Sites:

- \_\_\_\_\_

## **Risk Assessment: GERD or LRD**

### ***Indicators of GERD or LRD - Gastroesophageal or Laryngeal Reflux Disease*** (Friedman, 2006)

A: Follow-up evaluation or screening by a physician for a possible reflux disorder is indicated. The following symptoms were reported or observed in the course of treatment:

- Heartburn
- A feeling of a “lump in the throat”
- Burning sensation when swallowing
- Nighttime choking/coughing episodes
- Black tar-like stools
- Loss of voice
- Asthma-like reactions
- Chest discomfort
- Persistent cough, rhinitis
- Inspiratory stridor (noise when breathing in)
- Recent Upper Respiratory Infection (URI) with lingering symptoms
- Stridor worse with increased activity or feeding
- Noisy breathing while sleeping
- Mouth breathing
- Regurgitation

### ***High risk behaviors***

A: Follow-up evaluation or screening by a physician for a possible reflux disorder is indicated. The following high risk behaviors were reported or observed in the course of treatment:

- Singing professionally
- Smoking
- Drinking large amounts of caffeinated beverages
- Drinking large amounts of alcoholic beverages
- Overeating or eating to full satiation
- Frequently eating spicy foods
- Eating then lying down
- Being sedentary or on bedrest
- Medications not taken with food when indicated
- Decline in functional reserve (failure to thrive)



# Risk Assessment: Dysphagia

## ***Clinical Features to trigger a referral for further evaluation*** (Daniels, et al., 1997)

A: 2/6 symptoms indicate a referral for further evaluation is indicated. Pulse-Oxygen levels may also be used to determine current functioning.

- Dysphonia (hoarseness)
- Dysarthria (speech disorder due to muscle weakness)
- Abnormal Volitional Cough (can't or doesn't sound productive)
- Bilateral absence of a gag reflex
- Person coughs after swallowing
- Voice changes after swallowing (gurgle, wet sounding)

P: This client demonstrated

- two or more symptoms this indicates a need for further evaluation. Client will likely need a Modified Barium Swallow (MBS) study.
- fewer than 2 symptoms and normal Pulse-Ox levels. No further evaluation is necessary. Oral feeding is okay. Reassess with any change in clinical status (e.g., new stroke, coughing episode, refusal of foods...)

## ***Dysphagia Triggers*** (Bailey, 2006)

A: Follow-up evaluation or screening for a possible swallowing disorder is indicated. The following dysphagia triggers were reported or observed in the course of treatment:

- Coughing w/ signs of struggle
- Wheezing
- Wet vocal quality or respirations
- Excessive drooling
- Pocketing of food in the mouth
- Sudden change of color around the lips and face
- Fever (24-48 hours post suspected incident)
- Refusal of foods or liquids
- Watering eyes
- Gagging
- Facial grimacing
- Smell of formula on breath
- Increased residuals

## ***Dysphagia Risk Levels*** (Bailey, 2006)

A: Follow-up evaluation or screening for a possible swallowing disorder is indicated. The following dysphagia risks were reported or observed in the course of treatment.

### **Level 1:**

- Patient enterally fed
- Patient with a risk of aspiration as determined by MBS, result greater than 3 on eight-point aspiration risk scale
- Patient with a history of aspiration pneumonia within the past 2 years
- Patient with Asthma

### **Level 2:**

- Patient determined to be a high choking risk by the IDT (Interdisciplinary Dysphagia Team) (behaviors, etc.)
- Patient with pharyngeal and esophageal phase dysphagia
- Patient with a history of aspiration pneumonia in the past 3-5 years.

**Level 3:**

- Patient with oral phase dysphagia
- Patient with GERD hiatal hernia, reflux, rumination, erosive esophagitis or gastritis
- Patient with a history of aspiration pneumonia

**Level 4:**

- All other patients
- This level has no diagnosis of dysphagia, GERD, or choking risk

Proposed Diet Levels (National Dysphagia Diet)

A: Follow-up evaluation or screening for a possible swallowing disorder is indicated. The following dysphagia risks were reported or observed in the course of treatment.

- NPO Nothing by mouth
- Intravenous
- Nasogastric (N-G tube)
- Gastrostomy (PEG tube)
  
- NDD Level 1: Dysphagia-Pureed (homogeneous, very cohesive, pudding-like, requiring very little chewing ability).
- NDD Level 2: Dysphagia-Mechanical Altered (cohesive, moist, semisolid foods, requiring some chewing).
- NDD Level 3: Dysphagia-Advanced (soft foods that require more chewing ability).
- NDD Level 4: Regular (all foods allowed).

Orientation (Check all that apply)

A: The patient was observed to be:

- Non-responsive
- Disoriented, confused
- Agitated
- Emotional, labile
- Oriented
- Alert
- Cooperative

# Differential Diagnosis: Dysarthria

## *Dysarthria*

A: The following behaviors were reported or observed in the course of evaluation and/or treatment. Follow-up evaluation by a physician for a possible neurogenic disorder is indicated. (Information compiled from Darley, Aronson, and Brown, 1975; Chamberlin and Narins, 2005; Johns, 1978.)

## *Spastic dysarthria*

A: The client exhibited the following symptoms consistent with Spastic Dysarthria:

- Upper Motor Neuron damage
- Abnormally excessive nasal speech quality
- Imprecise articulation behaviors, slurring, periods of speech unintelligibility
- Slow-labored rate of speech
- Strained or strangled voice quality
- Limited vocal pitch
- Difficulty with loudness, range, and volume control
- Overall disruptive speech breathing patterns (incoordinated, shallow, forced, or uncontrolled)
- Co-occurring weakness and paralysis of all four limbs.
- Widespread involvement of the tongue, lip, jaw, soft palate, larynx, and respiratory muscles
- Emotionally labile
- Swallowing difficulties – dysphagia

## *Unilateral Upper Motor Neuron (UMN) Dysarthria*

A: The client exhibited the following symptoms consistent with Unilateral UMN Dysarthria:

- Damage to either the left or right UMN tract
- Mild to moderate weakness and paralysis of the lower face, tongue, arm, and leg on the side of the body opposite the damaged UMN tract - unilateral problem
- Mild speech production and swallowing difficulties
- Opposite half of the lips and tongue often compensate
- Typically normal breathing and inflection
- Typically normal nasal resonance
- Aphasia
- Apraxia

## *Ataxic Dysarthria*

A: The client exhibited the following symptoms consistent with Ataxic Dysarthria:

- Damage to the cerebellum or brain stem
- Difficulty regulating the force, timing, rhythm, speed, and overall coordination of all bodily movements
- Drunk-like motor patterns
- Gait disorders, wide and reeling gait
- Slurred articulation
- Intermittently explosive voice, pitch, and loudness outbursts.
- Intention tremors during purposeful movements
- Tremors disappear at rest
- Swallowing is usually normal

### ***Hypokinetic dysarthria***

A: The client exhibited the following symptoms consistent with Hypokinetic Dysarthria:

- Damage to the upper brain stem, extrapyramidal system
- Imprecise articulation of sounds
- Harsh-hoarse voice quality
- Abnormal bursts of speech that sound like the individual is tripping over his or her tongue
- Widespread rigidity (i.e., stiffness and limited range of motion -hypokinesia)
- Tremors
- Incoordination of the tongue, lip, jaw, and laryngeal muscles
- Trunk and limb disturbances
- Rest tremors of the hands
- Stooped posture
- Shuffling gait
- Mask-like facial expressions
- Swallowing difficulties

### ***Hyperkinetic dysarthria***

A: The client exhibited the following symptoms consistent with Hyperkinetic Dysarthria:

- Damage to nerve pathways and centers within the depths of the brain (subcortex) known as the basal ganglia, extrapyramidal system
- Difficulty maintaining posture, muscle tone, bodily adjustments, and overall stability during gross voluntary movement patterns
- Rigidity - Increased muscle tone and very slow movement
- Dystonia - involuntary, excessive, and uncontrollable quick-jerky, slow-twisting, or trembling limb and speech musculature behaviors
- Articulation is inconsistent and imprecise
- Voice is hoarse-harsh in quality
- Rhythm of speech is flat and irregular
- Breathing patterns are sudden, forced, and shallow
- Speech intelligibility is significantly reduced
- Swallowing difficulties can be a significant problem

### ***Flaccid dysarthria***

A: The client exhibited the following symptoms consistent with Flaccid Dysarthria:

- Lower Motor Neuron damage to nerves that emerge from the brain stem (cranial) or spinal cord and travel directly to muscles that are involved in speech production
- Cranial nerves V,VII, X, and XII may be involved
- Trigeminal V – Sensation to forehead, cheek and jaw, mandible - chewing
- Facial VII -Eyes, mouth, lips, cheeks
- Vagus X – swallowing, phonation, uvula, soft palate
- Hypoglossal XII - tongue protrusion, lateralization
- Nerves to diaphragm and thoracic spinal nerves that stimulate the chest and abdominal wall muscle may be involved
- Paralysis
- Weakness
- Reduced speed of movement
- Depressed tactile feedback
- Limited reflex behaviors
- Atrophy or shrinkage of muscle tissue.

- Fasciculations or twitch-like behaviors
- Tongue fasciculations at rest. This pathologic feature is an important differential diagnostic sign of damage to the cranial nerve XII.
- Articulation imprecision
- Hypernasal voice
- Hoarse
- Breathy vocal quality
- Slow-labored speech rate
- Swallowing problems may occur

### **Mixed Dysarthrias**

Simultaneous damage to two or more primary motor components of the nervous system.

#### ***Spastic-flaccid Dysarthria***

A: The client exhibited the following symptoms consistent with Spastic-flaccid Dysarthria:

- Imprecise consonants
- Hypernasality,
- Harsh voice quality
- Slow rate
- Monopitch
- Short phrases
- Distorted vowels
- Low pitch
- Monoloudness
- Excess and equal stress
- Prolonged intervals

#### ***Spastic-ataxic-hypokinetic Dysarthria***

A: The client exhibited the following symptoms consistent with Spastic-ataxic-hypokinetic Dysarthria:

- Upper Motor Neuron, cerebellar, extrapyramidal
- Reduced stress and intonation
- Monopitch
- Imprecise consonants
- Slow rate
- Excess and equal stress
- Low pitch
- Irregular articulatory breakdown

#### ***Spastic-ataxic-flaccid Dysarthria***

A: The client exhibited the following symptoms consistent with Spastic-ataxic-flaccid Dysarthria:

- Upper Motor Neuron, cerebellar, Lower Motor Neuron
- Irregular articulatory errors
- Irregular difficulty with rate, quality, harshness
- Variable spasticity
- Slow movement
- Limited range of movement
- Inaccurate movement

## Follow-up: Further evaluation

A: During the course of the voice evaluation other possible communication problems were observed. Further evaluation is indicated in the following areas:

### *Language Disorders*

Language Disorders–Expressive

- Syntax
- Morphology
- Semantics
- Pragmatics
- Written

Language Disorders–Receptive

- Auditory
- Written
- Gestures—Non-verbal language

### *Speech Disorders*

Speech Disorders

- Phonology
- Articulation
- Intelligibility

### *Voice Disorders*

- Voice Disorders

### *Dysfluency*

- Dysfluency
- Cluttering

### *Sensory Motor*

Sensory Motor

- Hearing
- Vision
- Motor
- Smell/Taste

## Troubleshooting

T1. The recording area is too small to see the sound and I can't select portions of it.

*Speech Visualization* requires a minimum monitor resolution of 1024x768 to fit all of the sounds on the screen. If you have a larger monitor, you can drag the bottom right-hand corner to make the window larger.

T2. Nothing happens when I click on the record button.

First make sure that your microphone is plugged into the correct port on your computer. Then make sure that if your microphone has volume slider that it is at the maximum level. Then check the input level for the microphone.

To check the input level on Windows machines, right-click on the speaker icon at the bottom right side of the screen and choose the "Levels" option. Slide the level for Microphone and Line In to the top. Open the speech recording program on your computer. (On most Windows machines it is found in Programs:Accessories:Entertainment:Sound Recorder. Record a sound and watch the line bounce around. If no sound is recorded then open the Sound Control Panel and select a different Sound Recording device and repeat the above steps. Additional sound issues are discussed at [www.learningfundamentals.com/support/windows.php#Sound](http://www.learningfundamentals.com/support/windows.php#Sound).

To check the input level on Macs, open the Sound Control Panel and select the Input tab and slide the level button all the way to the right. Talk into the microphone and you will see the level meter bounce around. If it doesn't bounce, check that the microphone is connected to the right port, then pick a different input source. *Speech Visualization* can usually find your microphone but sometimes it will pick an input device that is not available. You will need to select a different microphone in the Microphone Setup Wizard found in the Tools menu.

T3. The tables in the documents are garbled.

*Client Manager* saves the documents in Rich Text Format (.rtf) and opens them in your default program for handling RTF files. Some older word processing programs do not handle RTF files well. Change your default program to a more modern word processor and they will display fine. If you do not have one installed on your computer you can download OpenOffice.org, a free and open office suite at [www.openoffice.org](http://www.openoffice.org). Macintosh users might prefer NeoOffice, a Mac friendly version of OpenOffice from [www.neooffice.org](http://www.neooffice.org) or Bean, a small easy to use word processor available for free at <http://www.bean-osx.com/>.

T4. The program does not highlight sound or report pitch information properly.

*Speech Visualization* needs to know what the noise level in the room is in order for it to tell what is speech and what is silence. If you are using a noisy computer with a built-in microphone the noise level of the fans and hard drives might overwhelm the speech level. Use the Calibration Wizard to let *Speech Visualization* know about the noise in the room. You can also run into problems if you are close to heating/cooling vents and the fan starts up. We recommend that you use a headset/microphone combination similar to those used by phone operators to minimize extraneous sounds.

T4. I saved the sound samples but now I can't find them.

*Speech Visualization* saves the sound samples in the Client Manager folder. The path to a specific sample would be Data/Client Name/Saved Data/Communication Area,/Game/Word. As an example,

if you had a client named Sara who produced the word *cake* in the *Screening CVC* exercise the speech sample would be saved in the file Client Manager/Data/Sara/Saved Data/Phonological Accuracy/Dx 1/cake 2010-08-02 135122. They should be sorted by date and time. (Note: The time is given without the separating colons. In this example the time is 1:51 and 22 seconds P.M.)

An easy way to find the path on your computer is to open a session in *Client Manager* and click on the *Show Saved Files* button. The dialog box will show the start of the path on your computer where *Speech Visualization* files are saved.

#### T5. How much room does it take if I choose to save all my samples?

That's not an easy question to answer, but we can give you some guidelines. We recorded a male and female voice for each of the exercises on the CD (except the reading passages) and it takes up 230 MB of space. During a typical session, you might use up 30-50 MB of space on your computer. If you have lots of clients and you save each session you could easily run out of space on your computer. You can navigate to the directory where *Speech Visualization* saves the files or use *Client Manager* find the files and delete the ones you no longer need.

#### T5. How do I set a *Client Manager* password?

Login to Client Manager as you normally would. Go to the "File" menu and select "Preferences...". Type your new password in the "Change Password" box at the bottom of the window. Click "OK".