

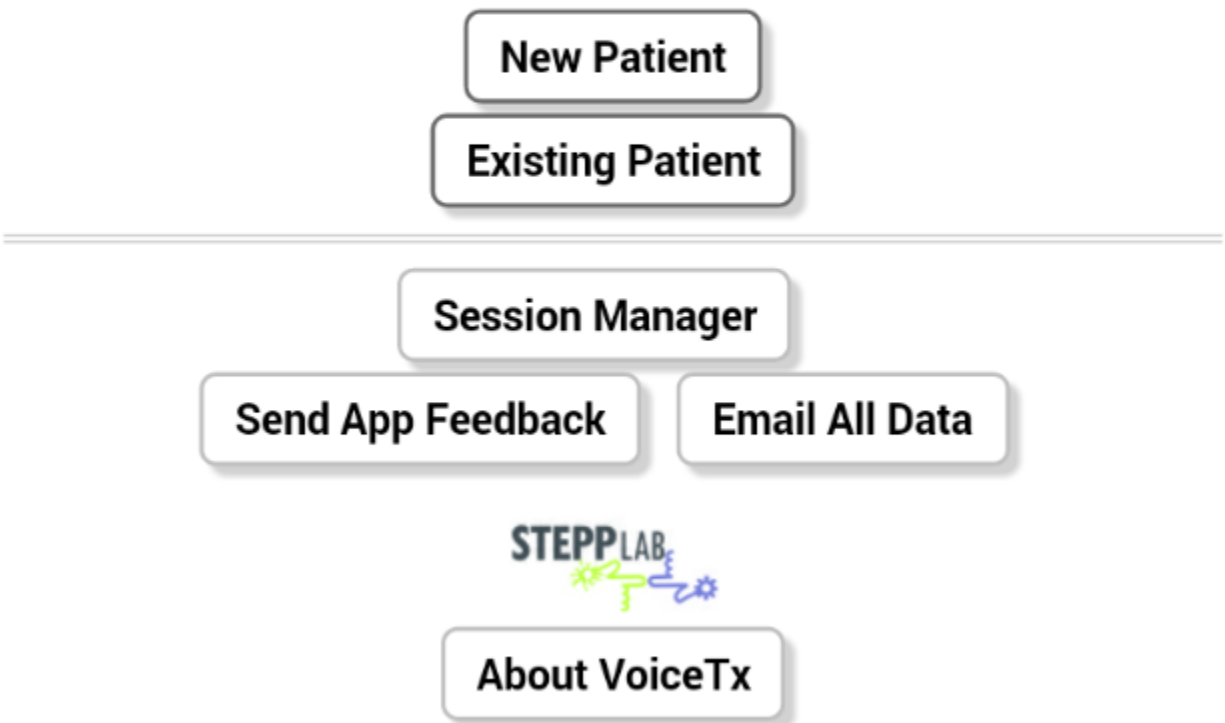


User Guide

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Start Page:



From the Start Page, the user may select:

- **New Patient** – begin a voice therapy session with a new patient by first saving basic patient information to the database
- **Existing Patient** – begin a voice therapy session with a patient that already exists in the local database
- **Session Manager** – open a session manager to organize in-session options available for all patients
- **About VoiceTx** – read the Terms of Use and Privacy Policy and learn more about the Stepp Lab and app usage
- **Send Feedback** – open a blank email addressed to the Stepp Lab where the user may direct comments, questions or feedback about the app
- **Email All Data** – send an email containing the full local database in SQL formatting and read instructions on converting raw database text to a human-readable version

Session Manager:

Session Manager

Patients

Indirect Intervention Vocal Hygiene Goals

Direct Intervention Components:

GoalsToolsUtterance LevelsDelivery Methods

HelpVoiceTxEnd Manager

Session Manager

Manage Direct Intervention Delivery Methods

Show/Hide Delivery Method text

Hide Exploration

Hide Hierarchy

Hide Modeling

Hide Psychotherapeutic

Hide Teaching

Hide Augmented feedback

Hide Deliberate practice

Hide Home program

Hide Self-evaluation

Hide Self-correction

Hide Self-cueing

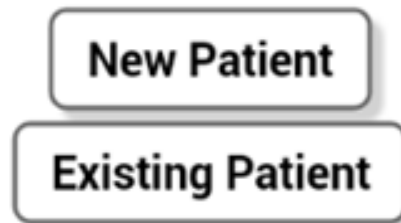
Back

HelpVoiceTxEnd Manager

The **Session Manager** allows the user to alter the visibility some of VoiceTx's saved and preset elements: patients, vocal hygiene goals, and direct intervention goals, tools, delivery methods, and utterance levels. Selecting to hide an item does **not** delete it from the database, but rather removes it from the visible selection during a VoiceTx session. A hidden item will still appear in the manager and can be reintroduced to the selection by selecting to "Show" the item again at any time. Select the **End Manager** button in the footer to return to the Start Page from anywhere in the manager.

Beginning a Voice Therapy Session:

The user may begin a new voice therapy session by either introducing a new patient to the database or searching the database for a previously saved patient by clicking **New Patient** or **Existing Patient** on the Start Page, respectively.



New Patient: Beginning a new therapy session with the **New Patient** option displays a form in which the user may input a Patient ID (required – i.e. Pt07) as well as age, gender and diagnosis or other patient health notes.

**of note: this application is not a secure system and therefore it is not recommended that you enter identifiable patient information; provide each patient with a unique identifier for his/her Patient ID.*

<p>Add Patient</p> <p>Patient ID: <input type="text" value="Pt07"/></p> <p>Age: <input type="text" value="25"/></p> <p>Gender: <input type="checkbox"/> Male <input checked="" type="checkbox"/> Female</p> <p>Diagnosis/Patient Health Notes:</p> <p><input type="text" value="Bilateral nodules"/></p> <p>Save New Patient Data</p> <p><small>Of note: this application is not a secure system and therefore it is not recommended that you enter identifiable patient information. It is recommended that you provide each patient with a unique identifier for his or her Patient ID.</small></p> <p> <input type="button" value="Help"/> <input type="button" value="VoiceTx"/> <input type="button" value="Back"/> </p>	<p>Pt07</p> <p>Add Patient</p> <p>Patient ID: <input type="text" value="Pt07"/></p> <p>Age: <input type="text" value="25"/></p> <p>Gender: <input type="checkbox"/> Male <input checked="" type="checkbox"/> Female</p> <p>Diagnosis/Patient Health Notes:</p> <p><input type="text" value="Bilateral nodules"/></p> <p>Patient added to database.</p> <p> <input type="button" value="Begin Indirect Intervention"/> <input type="button" value="Begin Direct Intervention"/> </p> <p> <input type="button" value="Help"/> <input type="button" value="VoiceTx"/> <input type="button" value="Back"/> </p>
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After saving the form, the Patient ID will appear as a header button in the top left corner of the screen, and the user will be prompted to select an intervention type with the following buttons:



Existing Patient: Conversely, selecting the **Existing Patient** button on the Start Page will display a table of patients that currently exist in the database, identifiable by their Patient ID and the date each was initially saved.

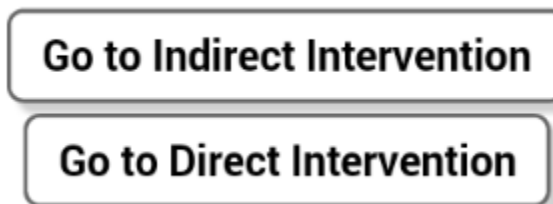
The screenshot shows a web interface for finding existing patients. At the top left, a button labeled 'Pt08' is highlighted with a red border. Below it, the heading 'Find Existing Patient' is displayed. Underneath the heading is a table with two columns: 'Patient ID' and 'Date Created'. The table contains two rows of data. Each row has a 'Select' button to its left. Below the table, the text 'Select a patient from the table above.' is displayed. At the bottom of the screen, there are three buttons: 'Help', 'VoiceTx' (with a microphone icon), and 'Back'.

	Patient ID	Date Created
Select	Pt07	04/10/2017
Select	Pt08	04/10/2017

Select a patient from the table above.

Help VoiceTx Back

Upon selection, the chosen Patient ID appears as a header button in the top left of the screen, and the patient's last saved intervention session and goal type is displayed along with any session notes. The user is prompted to begin the voice therapy session with the following options:

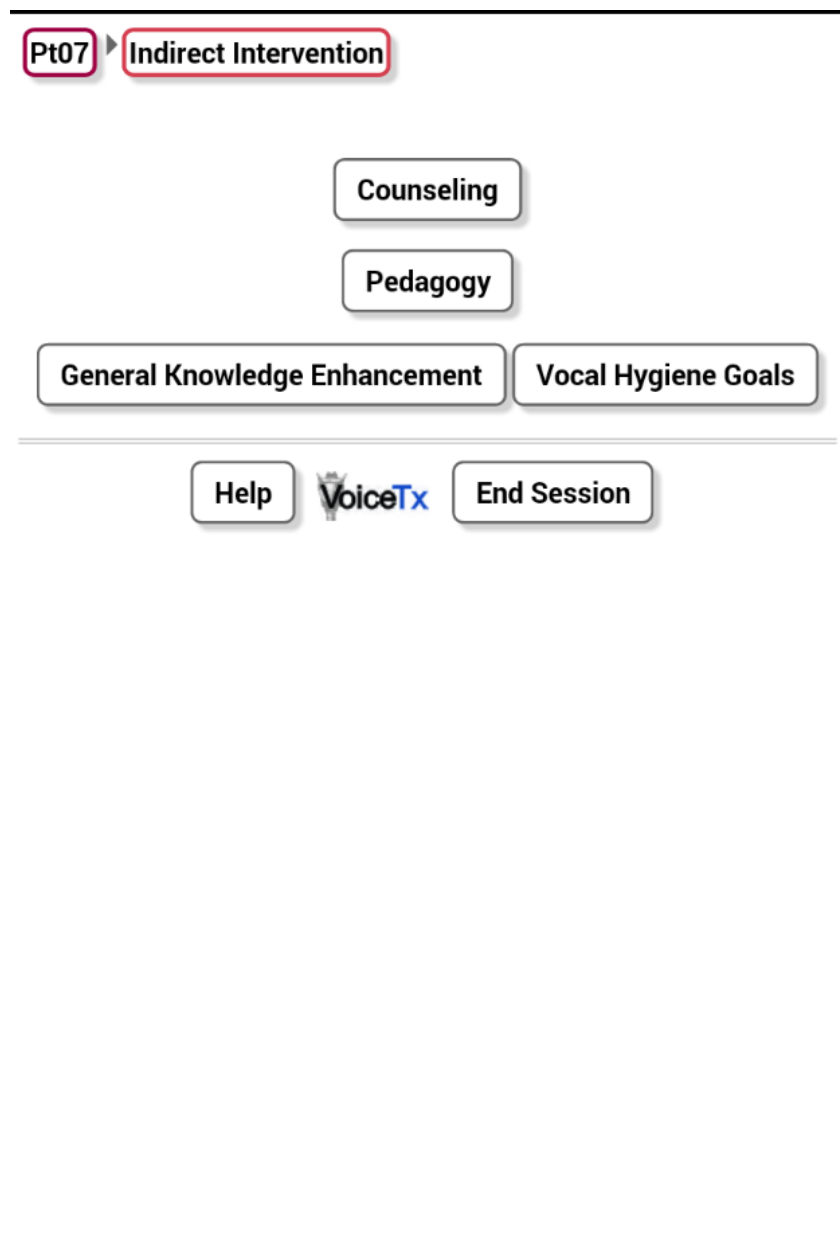


Indirect Intervention:

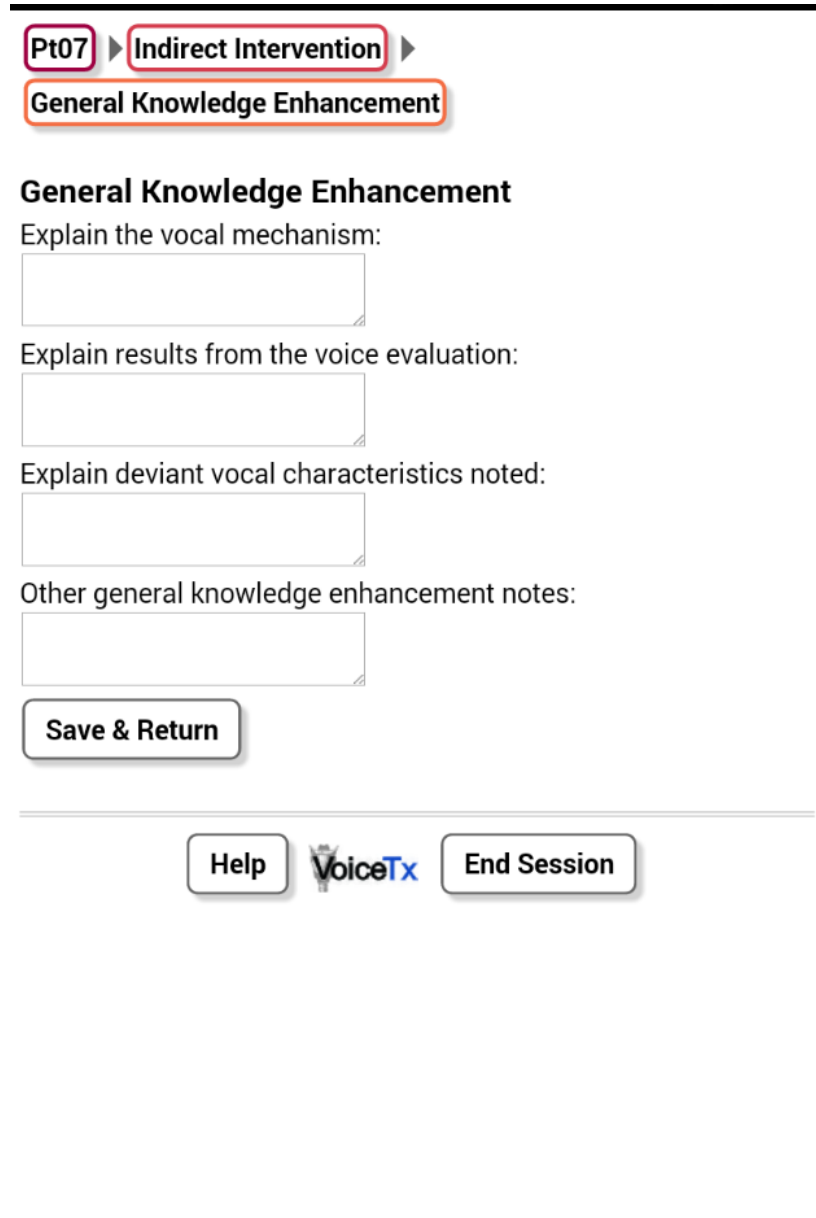
The main page for indirect intervention voice therapy contains two options: **Counseling** and **Pedagogy**.

Pedagogy

Selecting **Pedagogy** will reveal its two associated intervention methods: **General Knowledge Enhancement** and **Vocal Hygiene Goals**. Once indirect intervention has begun, the Indirect Intervention header button should also appear. The indirect intervention main page is displayed below.



General Knowledge Enhancement: The **General Knowledge Enhancement** portion of indirect intervention contains three main components: **explain the vocal mechanism**, **explain results from the voice evaluation** and **explain deviant vocal characteristics noted**. Similarly, each explanation prompt has an associated textbox, and the user is provided with a fourth textbox to make **Other** notes pertaining to the General Knowledge Enhancement session. Text from all textboxes is saved to the database.



Pt07 > Indirect Intervention > General Knowledge Enhancement

General Knowledge Enhancement

Explain the vocal mechanism:

Explain results from the voice evaluation:

Explain deviant vocal characteristics noted:

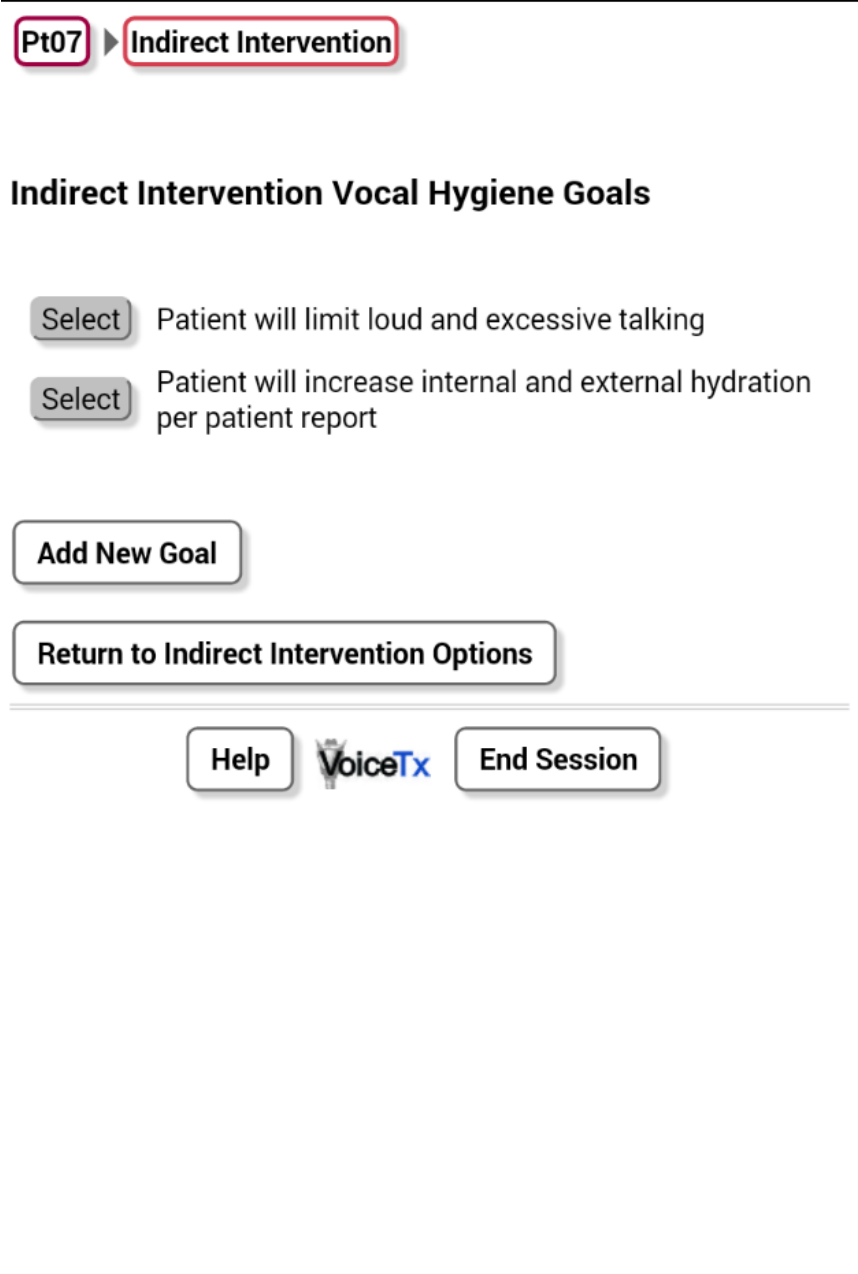
Other general knowledge enhancement notes:

Save & Return

Help VoiceTx End Session

In order to navigate away from this page, the user may either select the button labeled **Save & Return** or navigate via the header buttons. The **Save & Return** button saves the textbox data and returns to the main page of indirect intervention options. If the general knowledge enhancements session is *opened but unused*, navigation should be performed with the header buttons; an attempt to save all empty textboxes will also prompt the user to do this.

Vocal Hygiene Goals: In this section of the voice therapy session, the user can select or create their own vocal hygiene goals to be the focus of the session. The initial **Vocal Hygiene Goals** page displays a table of goals that may have been previously saved in the database for use in other patients' indirect intervention sessions. If previous goals do not exist or are hidden by the session manager, the user must create a new goal by selecting the **Add New Goal** button.



Pt07 ▶ Indirect Intervention

Indirect Intervention Vocal Hygiene Goals

Select Patient will limit loud and excessive talking

Select Patient will increase internal and external hydration per patient report

Add New Goal

Return to Indirect Intervention Options

Help VoiceTx End Session

After selecting a vocal hygiene goal, the session opens five textboxes designated for tasks related to the goal: **identify the behavior**, **describe the effect of the behavior**, **define specific occurrences**, **describe plan for modifying the behavior** and **other notes**.

Pt07 ▶

Indirect Intervention ▶

Patient will limit loud and excessive talking

Vocal Hygiene

Identify the behavior:

Describe the effect of the behavior:

Define specific occurrences:

Describe plan for modifying the behavior:

Other notes:

Save & Select Next Goal

Help



End Session

Selecting either the **Save & Select Next Goal** button or navigating via the header button with goal text will return the user to the list of indirect intervention vocal hygiene goals. In order to return to the main page of indirect intervention options, the user may select either the indirect intervention header button or the **Return to Indirect Intervention Options** button on the goal list page.

Counseling: The counseling portion of the indirect intervention session has three main components: **copng strategies**, **stress management** and **therapeutic interactions**. During discussion of any of these components in the voice therapy session, the user may take notes in the associated textbox. A textbox for **other** accompanying notes or additional information is provided as well. Text from all textboxes is saved to the database when the user selects **Save & Return**.

The screenshot shows a software interface for a counseling session. At the top, there is a navigation bar with three buttons: 'Pt07', 'Indirect Intervention', and 'Counseling'. The 'Counseling' button is highlighted with an orange border. Below the navigation bar, the title 'Counseling' is displayed. Underneath, there are four text input fields, each preceded by a label: 'Coping strategies:', 'Stress management:', 'Therapeutic interactions:', and 'Other:'. Each field is empty and has a small icon in the bottom right corner. Below the text fields is a button labeled 'Save & Return'. At the bottom of the interface, there is a footer bar with three buttons: 'Help', 'VoiceTx' (with a microphone icon), and 'End Session'.

In order to navigate away from this page, the user may either select the button labeled **Save & Return** or navigate via the header buttons. The **Save & Return** button saves the textbox data and returns to the main page of indirect intervention options. If the counseling session is *opened but unused*, navigation should be performed with the header buttons; an attempt to save empty textboxes will also prompt the user to do this.

Direct Intervention:

The **direct intervention** portion of voice therapy involves a series of direct intervention methods, tools, delivery methods and utterance levels in order to better focus the patient on a **direct intervention goal**. A direct intervention session will begin with a display of the pre-existing direct intervention goals saved to the database or will prompt the user to add new goals.

Pt07 ▶ Direct Intervention

Direct Intervention Goals

Select


 Patient will use resonant voice during 90% of utterances in conversation

Select

 Patient will independently maintain appropriate loudness 80% of the time at conversational level

Add New Goal

Help

VoiceTx

End Session

Method & Tool Selection: Upon selection of a goal, the goal text will appear as a header button, and a new selection page appears in order to guide and focus the direct intervention process. The following five **Direct Intervention Methods** of direct intervention goal approach are available: **Somatosensory, Auditory, Respiratory, Vocal Function** and **Musculoskeletal**. Each direct intervention **Method** has a list of associated **Tools**, categorized under sub-method groups. These tools are displayed in organized sub-categories upon selection of a method. A sixth option also exists, **Other**, in which the user may create a unique tool and save it to the database for use in later voice therapy sessions. More than one method and multiple tools may be selected at once.

☒ **Somatosensory**

Discrimination
☐ Effort
 ☐ Placement
 ☒ Semi-occluded vocal tract
 ☐ Tactile

Nocioception
☐ Discomfort
 ☐ Pain
 ☐ Soreness
 ☐ Thermal Stimulation

Visual Processing
☐ Drawing
 ☐ Gestures
 ☐ Mirror use
 ☐ Physical models
 ☐ Video

☐ **Auditory**

☐ **Respiratory**

☐ **Vocal Function**

☐ **Musculoskeletal**

☐ **Other**

Submit Selection & Continue

[Help](#)

[End Session](#)

If the patient has previously completed a direct intervention session with the chosen direct intervention goal and has saved a **Preset** combination of methods and tools for goal focusing, the **View Preset Trials for This Goal** button will appear. Selecting this will display a table of all of the saved preset trials corresponding to this patient and direct intervention goal. Choosing **Select Preset** will allow the user to skip the focusing pages and begin direct intervention trials.

View Preset Trials for This Goal

	Method(s):	Tool(s):	Delivery:	Utterance:
Select Preset	Somatosensory, Respiratory	Semi-occluded vocal tract, Abdominal breathing	Modeling, Teaching	Single sound

Delivery Method Selection: Choosing **Submit Selection & Continue** will bring the user to a list of the direct intervention **Delivery Methods**. Like the previous method and tool selection process, the delivery methods fall under three categories: **Extrinsic**, **Intrinsic**, and a combination of **Extrinsic/Intrinsic** applied methods. More than one intervention delivery method may be selected at once, and the user may also add a new delivery method to any of the three categories.

Pt07 ▶ Direct Intervention ▶

Patient will use resonant voice during 90% of utterances in conversation

▶ Somatosensory, Respiratory ▶

Semi-occluded vocal tract, Abdominal breathing

Select Delivery Method(s)

☒ Extrinsic

Add a new delivery method:

Submit

☐ Exploration

☐ Hierarchy

☒ Modeling

☐ Psychotherapeutic


☒ Teaching

☐ Extrinsic/Intrinsic

☐ Intrinsic

Submit Selection & Continue

Help

VoiceTx

End Session

Utterance Level Selection: Finally, the user is prompted to select an **Utterance Level**. These are also organized in a list, with the option to create a new level to be saved to the database; however, only one utterance level may be employed at a time.

Pt07 ▶ Direct Intervention ▶

Patient will use resonant voice during 90% of utterances in conversation

▶ Somatosensory, Respiratory ▶

Semi-occluded vocal tract, Abdominal breathing ▶

Modeling, Teaching

Select Utterance Level

- ☐ No stimuli
- ☐ Elicit behavior
- ☒ Single sound
- ☐ Syllables/sound: 2 syllables
- ☐ Syllables/sound: 3-4 syllables
- ☐ Phrase/sentence: 5-6 syllables
- ☐ Phrase/sentence: 7-8 syllables
- ☐ Phrase/sentence: 9-10 syllables
- ☐ Long sentence: 11-15 syllables
- ☐ Long sentence: 16-20 syllables
- ☐ Reading: paragraph
- ☐ Short response
- ☐ Long response
- ☐ Conversational
- ☐ Emotional/motivating spontaneous speech

Create new level:

Direct Intervention Trials: Once the selection is finalized, the user begins trials. A series of ten trial boxes is displayed on the screen. One click of a trial box will turn it green, indicating a successful attempt with the current direct intervention goal. A second click turns the trial box red, indicating a failed attempt, and a third click returns it to gray, indicating that the attempt was incomplete. The user may also optionally save notes pertaining to the trial in the textbox under the **Trial Notes** header.



Trial Notes:

Trial Complete

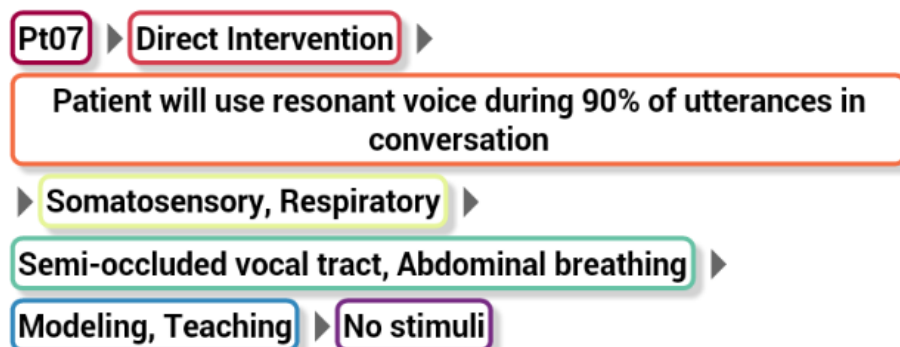
Selecting **Trial Complete** will save the trial data as a score (number of successes over number of attempts) and the trial notes. The trial score will be displayed, and the user will be prompted with a new button: **Clear Boxes & Repeat Task**. If the user would like to continue the direct intervention trials in the therapy session with all of the same direct intervention goal focusing options (as listed in the header buttons), they may select **Clear Boxes & Repeat Task**. This will clear all of the documentation in the trial boxes, and provide the user with 10 more trials of the same task. However, if the user wants to change any of the goal focusing options, they can select the given header button to navigate directly to that page. This may be done at any time during trial recording and progress will be saved in the database.

Preset Trials: If the current patient is completing a direct intervention goal with unique focusing tasks for the first time, an option to **Save Trial as Preset** will appear on the direct intervention trials page. Upon saving the trial as a preset, text will appear and indicate a successful save. If the preset has already been saved in the database, it will be indicated by an “Existing Preset” message. This and other previously saved presets will be available to the user on the Method & Tool Selection page.

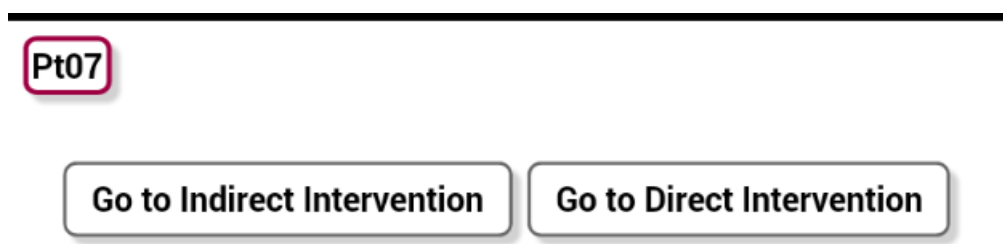
**Save
Trial as
Preset**

Header Buttons

There are 7 total **Header Buttons** which follow a hierarchy for navigation within the voice therapy session.



1. **Patient ID** (dark red) – returns the user to the start page where the user may select to begin a with new patient, existing patient or manage the session
2. **Intervention Type** (red-orange) – displays buttons to navigate between intervention types



3. **Goal Text** (orange) – returns the user to the goal selection tables for indirect intervention vocal hygiene goals or direct intervention goals (based on current intervention type) or, if clicked during the counseling or general knowledge enhancement session in indirect intervention, returns the user to the indirect intervention options page

4 header buttons exclusively present in direct intervention:

**of note: in the current version, navigating back in the direct intervention session through a given header button will allow change to the selection in that category, but will also require re-selection of the information in the succeeding categories*

4. **Direct Intervention Methods** (yellow) – returns the user to the direct intervention method and tool selection page
5. **Tools** (green) – returns the user to the direct intervention method and tool selection page
6. **Intervention Delivery Methods** (blue) – returns the user to the delivery method selection page
7. **Utterance Level** (violet) – returns the user to the utterance level selection list

Help Buttons

Help Buttons are available in the footer buttons of all intervention session pages. Clicking Help will display a list of helpful voice taxonomy definitions related to the given page. Click the **Hide Help** button to close the list.

A complete list of the definitions available in the **Help** section during the therapy session is also available in this user guide.



Ending the Therapy Session

End Session buttons are likewise available in the **Footer Buttons** of all intervention session pages. At any point in the voice therapy session, selecting **End Session** will take the user directly to the end page, where overall session notes may be saved as text, optionally, and the user is prompted to click **Save** in order to save session progress. These session notes and last completed intervention type will be displayed when the patient is next selected from the existing patient table.

Session Notes

Enter session notes below (optional) and save patient progress to end session.

Save

Upon saving, the session is complete, and the user is prompted to **View & Send Session Data**. This option will display the data from the complete session and can optionally be sent in text format via email for therapy records (recommended). The end page again also provides the option to send the complete database, in raw SQL text format via email. The method for extracting data from SQL tables is outlined in the Data Management section of the user guide.

The readable text version of the session data will state “No indirect/direct intervention activity” if the given intervention type was not utilized during the session. Indirect intervention data is mainly text-based while direct intervention data contains values for trial successes for a completed goal. (N/A) will appear if no trial data was saved by the user.

Example session data:

Session Complete

View & Send Session Data

Email Session Data

Email Complete Database

Patient ID: Pt07
02/19/2016

Indirect Intervention Data

No indirect intervention activity

Direct Intervention Data

Goal: Patient will use resonant voice during 90% of utterances in conversation

Method(s): Somatosensory, Respiratory

Tool(s): Semi-occluded vocal tract, Abdominal breathing

Delivery Method: Modeling, Teaching

Utterance Level: No stimuli

-(7/10) trials successful. Trial notes: Ready for practice with short stimuli

Session notes: Great progress!

End Session & Return to Start

The **End Session & Return to Start** button navigates the app back to the start page and closes the patient session.

Data Management

Data sent from the **Email Complete Database** option at the end of the session or **Email All Data** button on the start page is sent via email in SQL-formatted data. This database contains complete information on all existing patients and session information. In order to view this data the following steps are recommended:

- Download the appropriate DB Browser version for your computer or device at <http://sqlitebrowser.org/>
- Open DB Browser
- Click "New Database" and select a filename and location to save your document
- Click the execute SQL table
- Paste ALL text from the email in the SQL 1 textbox. It will likely paste in a single line; scroll left to view
- Click the blue arrow above the SQL textbox. A message should appear beginning with "Query executed successfully."
- Click the Database Structure or Browse Database tabs to view the upload.
- To export as a CSV file (excel readable) go to File --> Export and select "Table(s) as a CSV file"
- In the "Export data as CSV" window, highlight all database tables you wish to export, click OK, and select a folder in which to save your files; each table will save as an individual CSV file

The tables are named in capitalized letters that indicate the type of information they store. Within each table in the database, columns are titled to describe the information which they contain which is stored row-wise.

Helpful References

Article discussing the electronic documentation system:

Heller Murray, E. S., Girouard, K. L., Cler, M. J., & Stepp, C. E. (2016). Development of an Electronic Documentation System for Voice Therapy: A New Teaching and Clinical Research Tool. *Perspectives of the ASHA Special Interest Groups*, 1(3), 63-73.

Article outlining the taxonomy that is incorporated into this system:

Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125.

Helpful Definitions

Indirect & Direct Intervention

Indirect Intervention: Any intervention that modifies vocal behavior through modification of cognitive, behavioral, psychological, and physical environments in which voicing occurs.

Direct Intervention: Any intervention that modifies vocal behavior through motor execution, somatosensory feedback, and auditory feedback.

Definitions from Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125. doi: 10.1044/2015_AJSLP-14-0030

Indirect Intervention Main page

Counseling Intervention: An indirect intervention tool in which the clinician helps identify and modify psychosocial factors that negatively affect vocal health.

Pedagogy Intervention: An indirect intervention tool in which the clinician provides declarative knowledge and strategies to modify vocal health.

Definitions from Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125. doi: 10.1044/2015_AJSLP-14-0030

Indirect Intervention: Counseling

Coping Strategies: An indirect intervention tool in which the clinician attempts to identify and modify psychosocial factors that negatively affect vocal health through reinforcement of positive emotional and lifestyle adaptations or discouragement of maladaptive patterns of behavior

Stress Management: An indirect intervention tool in which the clinician attempts to identify and modify psychosocial factors that negatively affect vocal health through discussion and application of strategies to help patients manage their stress and anxiety levels in varying contexts.

Therapeutic Interaction: An indirect intervention tool in which the clinician attempts to identify and modify psychosocial factors that negatively affect vocal health through discussion with the patient regarding psychological or emotional factors and effective problem solving.

Definitions from Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125. doi: 10.1044/2015_AJSLP-14-0030

Indirect Intervention: Pedagogy

Knowledge Enhancement: An indirect intervention tool in which the clinician provides knowledge to modify vocal health through increased information.

Vocal Hygiene: An indirect intervention tool in which the clinician provides strategies to improve vocal

Definitions from Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125. doi: 10.1044/2015_AJSLP-14-0030

Vocal Hygiene

Stemple, J. C., Glaze, L. E., & Gerdeman, B. K. (2000). *Clinical voice pathology: Theory and management*. Cengage Learning.

Direct Intervention Methods

Auditory Intervention: A direct intervention that directs the patient's attention to the modification of auditory input.

Musculoskeletal Intervention: A direct intervention that directs the patient's attention to the modification of muscular, skeletal, and connective tissue.

Respiratory Intervention: A direct intervention that directs the patient's attention to the modification of respiratory function.

Somatosensory Intervention: A direct intervention that directs the patient's attention to the modification of somatic or visual input.

Vocal Function Intervention: A direct intervention that directs the patient's attention to modification of phonation.

Definitions from Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125. doi: 10.1044/2015_AJSLP-14-0030

Tools

Tool: A direct or indirect intervention that directs the patient to focus on a specific or a few specific degrees of freedom.

Conduction: A direct intervention tool that requires the modification of auditory input by directing the patient's attention to an externally degraded acoustic signal.

Discrimination: A direct intervention tool that requires the modification of somatic input by directing the patient's attention to their sense of position and movement (e.g., kinesthesia), effort, balance, tension, and fine touch such as vibrations and pressure (Fortier & Basset, 2012). This category has a neurological correlate to the posterior column/medial lemniscal neural sensory pathway. Fortier & Basset, 2012, cf. Kandel, Schwartz, Jessell, Siegelbaum, & Hudspeth, 2012

Glottal Contact: A direct intervention tool that modifies the act of phonation by directing the patient's attention toward the amount of true vocal fold tissue interaction for a prolonged time period.

Loudness Modification: A direct intervention tool that requires the modification of respiratory function by directing a patient's attention to vocal intensity for short or prolonged periods of time.

Neck Manipulation: A direct intervention tool that requires the modification of muscular, skeletal, and connective tissue by directing the patient's attention to the physical movement of their anterior, lateral, and posterior neck.

Nociception: A direct intervention tool that requires the modification of somatic input by directing the patient's attention to pain, discomfort, soreness, or temperature. Nociceptive neurons are afferent connections to the central nervous system that respond to tissue injury and provide the physical correlate to pain sensation, as well as crude touch and temperature. Bennett, 2000; Kandel et al., 2012

Orofacial Manipulation: A direct intervention tool that requires the modification of muscular, skeletal, and connective tissue by directing a patient's attention toward the physical movement of his or her face and oral cavity.

Pitch Modification: A direct intervention tool that modifies the act of phonation by directing the patient's attention to modification of pitch or maintenance of pitch.

Postural Alignment: A direct intervention tool that requires the modification of muscular, skeletal, and connective tissue by directing the patient's attention to the most efficient alignment of his or her own anatomical structures.

Respiratory Coordination: A direct intervention tool that requires the modification of respiratory function by directing a patient's attention to respiratory modification via glottal and supraglottal maneuvers.

Respiratory Support: A direct intervention tool that requires the modification of respiratory function by directing the patient's attention to subglottal airstream characteristics through exercise and modification of thoracic and abdominal muscle movements.

Sensorineural: A direct intervention tool that requires the modification of auditory input by directing the patient's attention to their perception of pitch, loudness, or more complex auditory constructs (e.g., voice quality, metaphors, descriptors, etc.).

Stretching: A direct intervention tool that requires the modification of muscular, skeletal, and connective tissue by directing the patient's attention toward external or internal forces exerting pressure on muscles and connective tissue for the purpose of increasing flexibility and range of motion. Behm & Chaouachi, 2011

Vegetative Vocalization: A direct intervention tool that modifies the act of phonation by directing the patient's attention to instinctive, physiological, or nonword communicative voicing.

Visual Processing: A direct intervention tool that requires the modification of visual input by directing a patient's attention towards visual perception.

Definitions from Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125. doi: 10.1044/2015_AJSLP-14-0030

Intervention Delivery Methods

Intervention Delivery Method: A structure applied by either the clinician or patient to deliver an intervention tool.

Augmented Feedback Structure: A structure applied by the clinician or patient to deliver an intervention that provides more information than what is typically received in a task from the sensorineural system (Schmidt & Lee, 2011). Examples include delayed/immediate, summary, blocked/random, variable, and self-controlled feedback. Chiviacowsky & Wulf, 2002; Salmoni, Schmidt, & Walter, 1984, Schmidt & Lee, 2011

Exploration Structure: A structure applied by the clinician to deliver an intervention using activities that require the patient to explore an entire aspect of their voice (i.e., the “vocal task space”; Sutton & Barto, 1998). A popular clinical example is “negative practice.” Sutton & Barto, 1998

Hierarchy Structure: A structure applied by the clinician to deliver an intervention using a series of ranked activities in order of difficulty.

Home Program Structure: A structure applied by the clinician and patient to deliver an intervention using tools outside of the therapy session (e.g., in the patient's typical environment).

Modeling Structure: A structure applied by the clinician to deliver an intervention using tools that produce examples for imitation or judgment purposes. Ferrari, 1996

Psychotherapeutic Structure: A structure applied by the clinician to deliver an intervention using activities ordered or modeled by a theory of behavior change. Van Leer, Hapner, & Connor, 2008

Self-Evaluation Structure: A structure applied by the patient to deliver an intervention using activities that increase attention to feedback inherent to the activity. Hogan & Yanowitz, 1978; Swinnen, Schmidt, Nicholson, & Shapiro, 1990

Self-Correction Structure: A structure applied by the patient to deliver an intervention using activities that increase attention to on-task variations and errors.

Self-Cuing Structure: A structure applied by the patient to deliver an intervention using activities that increase anticipatory skills and avoidance of errors. Neumann, 1996

Teaching Structure: A structure applied by the clinician to deliver an intervention using activities ordered or modeled by a theory of declarative learning.

Definitions from Van Stan, J. H., Roy, N., Awan, S., Stemple, J., & Hillman, R. E. (2015). A taxonomy of voice therapy. *American Journal of Speech-Language Pathology*, 24(2), 101-125. doi: 10.1044/2015_AJSLP-14-0030

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