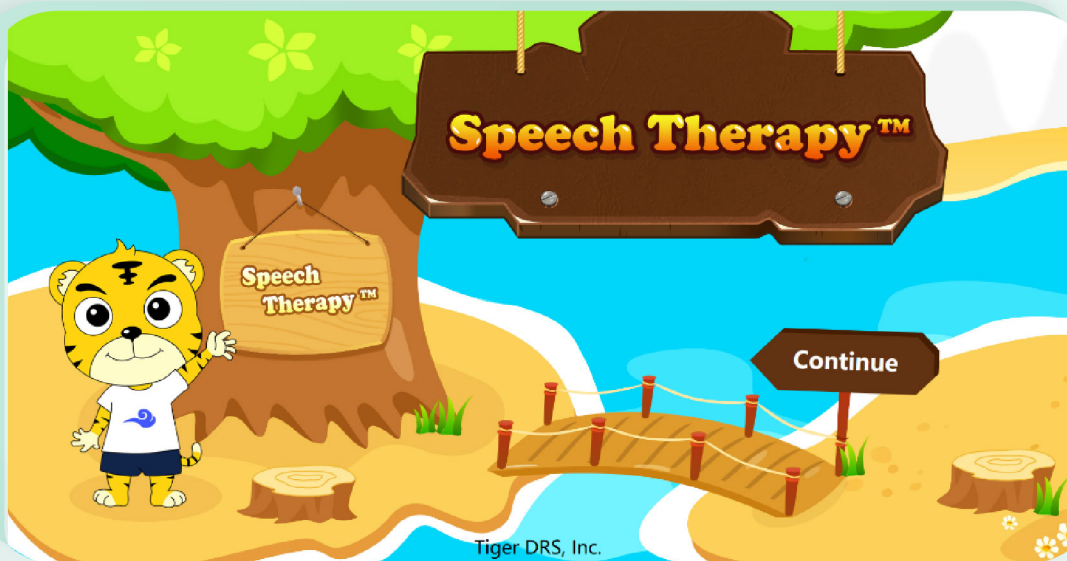


Speech Therapy



Function

Provides standardized assessment and therapy for speech, voice, and laryngeal disorders.

Target

Improves communication by combining evidence-based methods with interactive training game that is engaging, measurable, and clinically effective.



Speech Therapy



Speech Therapy is a clinical software solution designed to support patients with **dysphonia, aphonia, speech sound disorders, dysarthria, stuttering, and other related conditions.**



Using real-time audio-visual feedback game, it increases patient engagement, strengthens core speech functions, and provides a solid foundation for effective, intelligible communication.

Core Objectives



Deliver evidence-based assessment and therapy tools for speech and voice disorders.



Increase patient engagement through interactive training games.



Provide objective data and standardized measures to guide clinical decision-making.



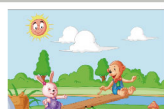
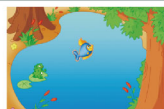
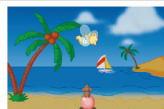
Enable personalized therapy plans tailored to individual patient needs.



Monitor progress with reliable, measurable outcomes to demonstrate effectiveness.

Software Overview

Speech Therapy provides assessment and Therapy through two modules: Awareness and Training. The Awareness Module builds perception of key speech parameters, while the Training Module develops accurate production and control. Together, they target sound, onset, pitch, loudness, and voicing, offering clinicians a comprehensive tool for evidence-based therapy.

Fundamental Speech Parameters - Sound			
Learning Modules	Perception	Indicate sound or silence through the movements of animation, to induce normal speech breathing support.	
	Train	The game can set different pronunciation duration goals to continuously improve respiratory support.	
Fundamental Speech Parameters - Onset			
Learning Modules	Perception	Induce the correct vocal fold closure pattern through the movements of cartoon characters, and enhance the coordination between breathing and vocalization.	
	Train	Within a certain period of time, complete the number of onsets set by the game, which will scientifically induce the vocal folds to start correctly.	
Fundamental Speech Parameters - Pitch			
Learning Modules	Perception	Indicate the pitch level through the flying height of cartoon characters, so as to improve the ability to control the vibration frequency of vocal folds.	
	Train	Multiple tone training modes and multiple parameter settings enable scientific tone training to promote flexible tone variation.	
Fundamental Speech Parameters - Loudness			
Learning Modules	Perception	Use the amplitude of cartoon characters' movements to represent the intensity of sound, enhancing the control of vocal fold vibration amplitude.	
	Train	The game sets different phonation intensity goals to achieve the purpose of controlling phonation intensity.	
Fundamental Speech Parameters - Voicing			
Learning Modules	Perception	The change in color indicates whether the vocal folds are vibrating, helping to distinguish between correct pronunciation of voiceless and voiced sounds.	
	Train	Complete the game objectives within the set time to improve your ability to control the pronunciation of Voiceless and voiced sounds.	

Awareness Module vs Training Module

Speech Therapy is organized into two modules: Awareness and Training. The first builds recognition of key speech features, while the second develops accurate production, creating a clear pathway for rehabilitation.

Awareness

(Can the patient detect and differentiate the sound features?)

The Awareness Module builds patients' ability to detect and differentiate key speech features. Real-time audio-visual feedback develops accurate perception skills that form the foundation for effective therapy.

- ✓ Focuses on awareness and detection.
- ✓ Patients learn to recognize the presence, absence, or quality of sound.
- ✓ Emphasizes sensory feedback: identifying pitch, loudness, onset, and whether sounds are voiced or voiceless.
- ✓ Uses visual cues (e.g., cartoon characters, color changes) to make vocal fold activity and speech parameters more concrete.
- ✓ Goal: Build accurate auditory and visual perception of speech features, which is the foundation for later production.

Training

(Can the patient produce and control these features in real speech?)

The Training Module translates awareness into active production. Through game-based exercises, patients practice core speech functions, strengthen coordination, and build consistent, accurate speech.

- ✓ Focuses on active production and practice.
- ✓ Patients apply perception skills to improve their own speech output.
- ✓ Uses game-based tasks with specific targets (e.g., number of onsets, sustained phonation time, intensity levels).
- ✓ Promotes motor control and coordination of respiration, phonation, resonance, and articulation.
- ✓ Goal: Strengthen and automate speech production abilities through repeated, structured practice.

Fundamental Speech Parameters

Each training component focuses on a key speech parameter through interactive game-based tasks with evidence-based methods.

Sound (Phonation Duration)

Patients practice sustaining sound over set time intervals, with adjustable goals that strengthen respiratory support and phonatory endurance.

Onset (Voice Initiation)

Training develops accurate, timely phonation by guiding breath support and vocal fold closure for stable voice onset.

Pitch (Intonation Control)

This module builds control of pitch and intonation. Training modes target accuracy, range, and flexibility to support natural prosody.

Loudness (Intensity Regulation)

Patients practice sounds at varying intensity levels, using visual targets to regulate loudness, strengthen projection, and ensure appropriate speech intensity.

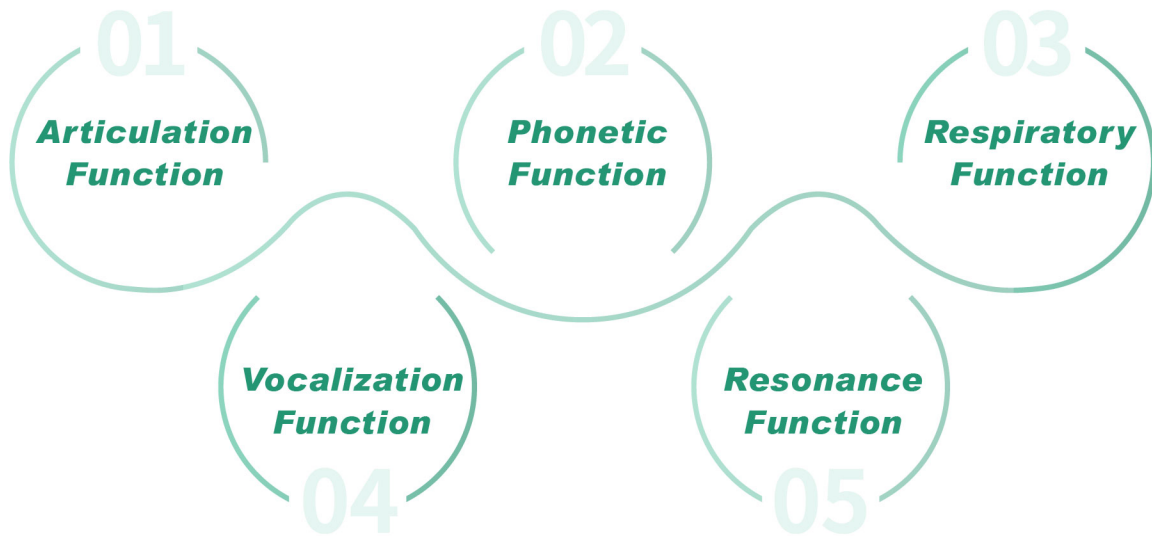
Voicing (Phonatory Contrast)

Exercises develop control of vocal fold vibration to distinguish voiced and voiceless sounds, improving consonant clarity and overall intelligibility.

Clinical Applications

Speech Therapy integrates evidence-based methods with interactive training to address the full spectrum of speech and voice functions.

Five Real-Time Training Areas



1

Articulation Function Training

Targets precision and clarity of speech sounds. Phonetic support tasks refine articulation, strengthen prosody, and prepare patients for fluent speech.

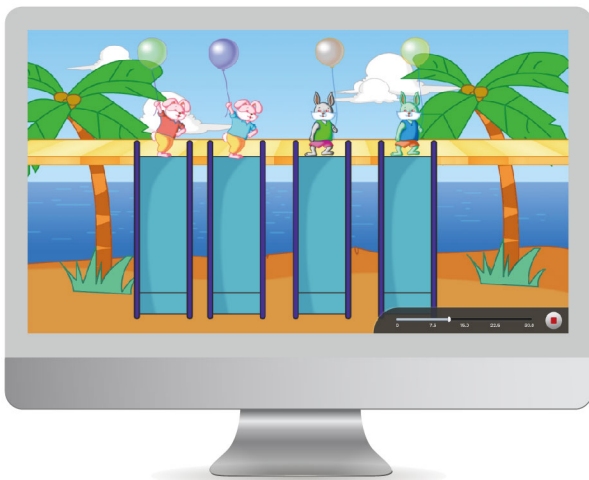


Diagram of Phonetic Support for Articulation Training

2

Phonetic Function Training

Focuses on vocabulary growth and word production. Core vocabulary is practiced through voice-controlled, game-based exercises that support functional acquisition and promote fluent language use.

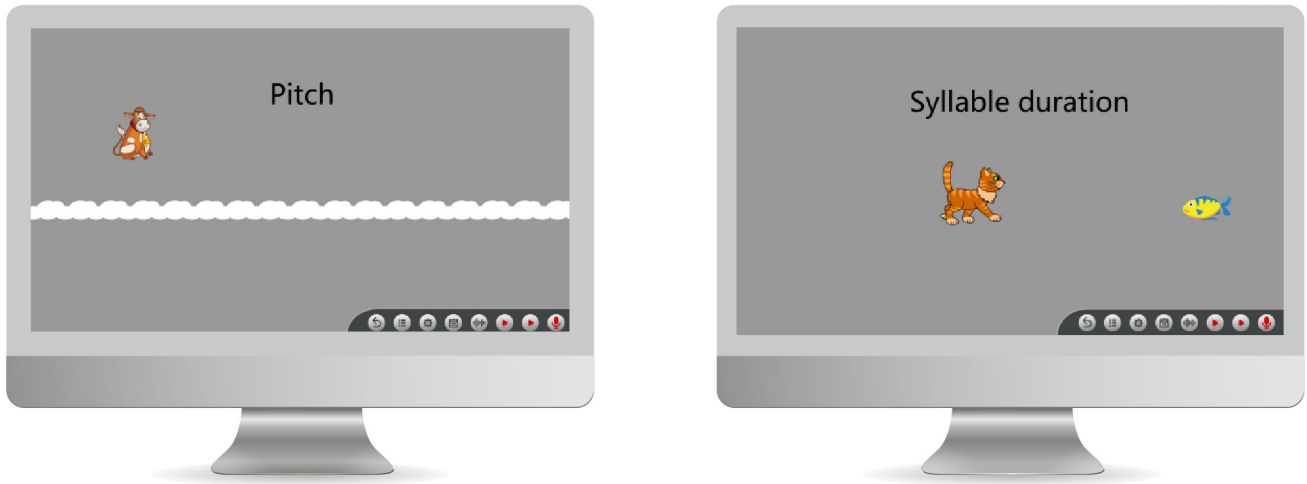


Diagram of Early Vocabulary Expansion Training

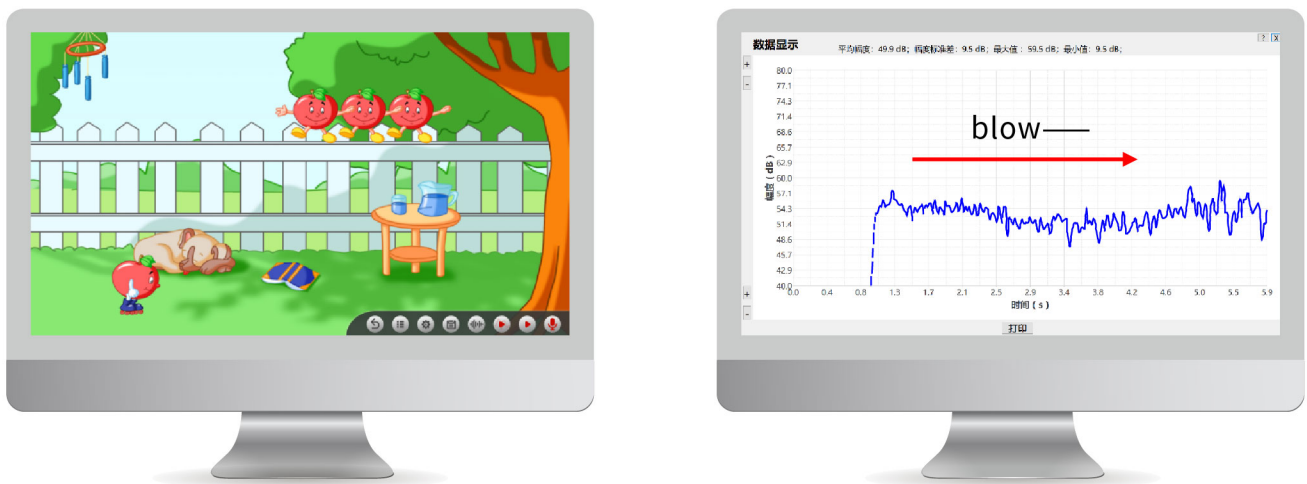
3

Respiratory Function Training

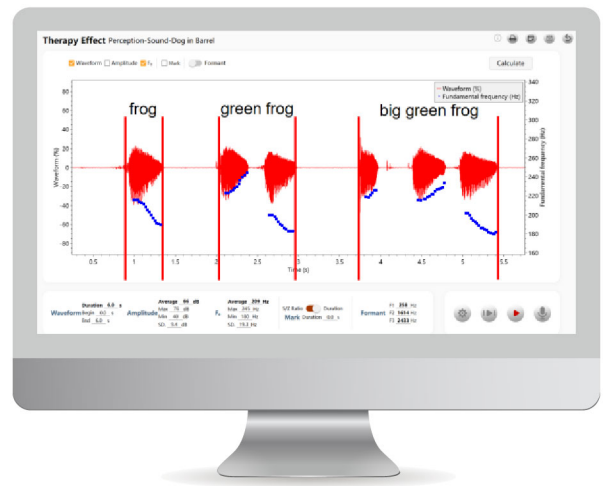
Enhances breath support and control for speech. Exercises build respiratory endurance and improve coordination with phonation, forming the foundation for sustained, intelligible speech.

**Insufficient
Breath Support**

Inadequate respiratory support is addressed with exercises like controlled exhalation, steady airflow, and sentence lengthening, reinforced by real-time visual feedback.



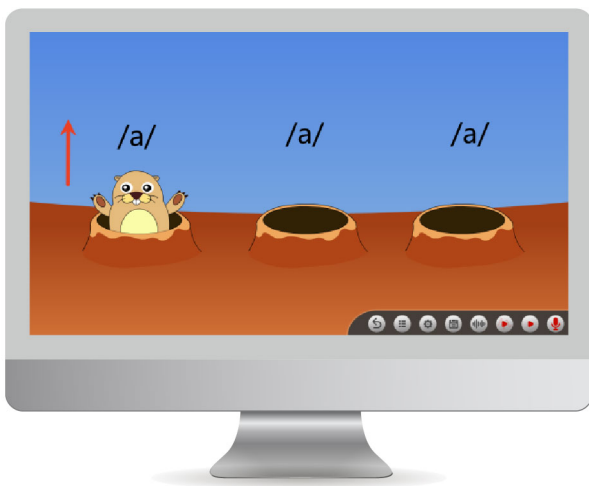
Real-Time Feedback Training for Controlled Exhalation



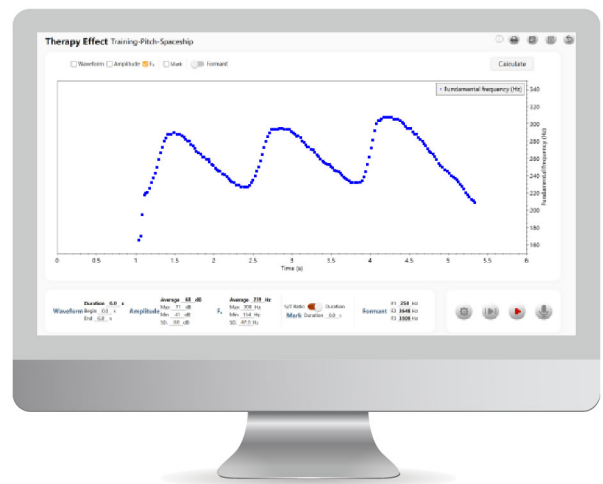
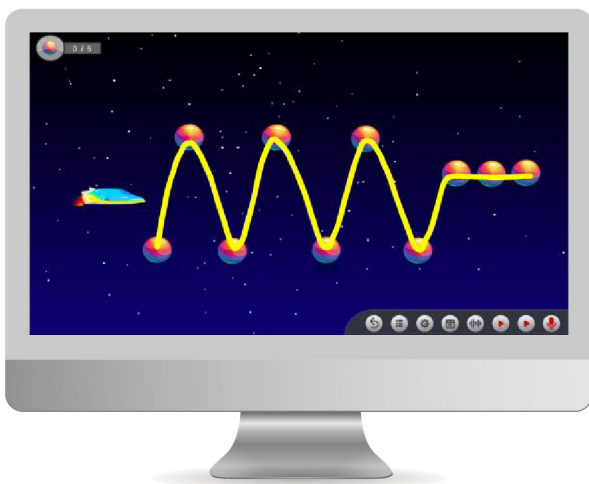
Real-Time Feedback Training for Incremental Sentence Lengthening

Breathing and Vocalization Coordination

Breathing-phonation incoordination are addressed with tasks that synchronize respiration and voice initiation. Methods such as singing, pitch variation, and breathy voice practice, supported by real-time feedback, promote smoother vocal onset.



Real-Time Feedback Training for Singing



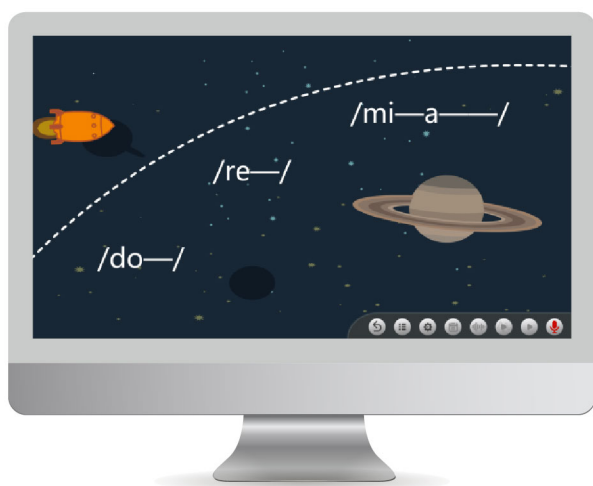
Real-Time Feedback Training for Melisma

Vocalization Function Training

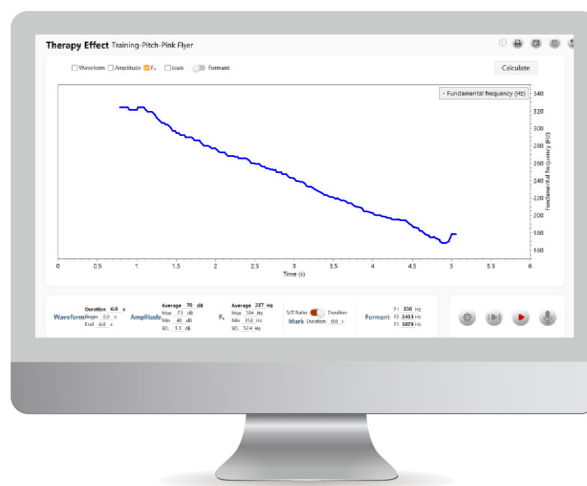
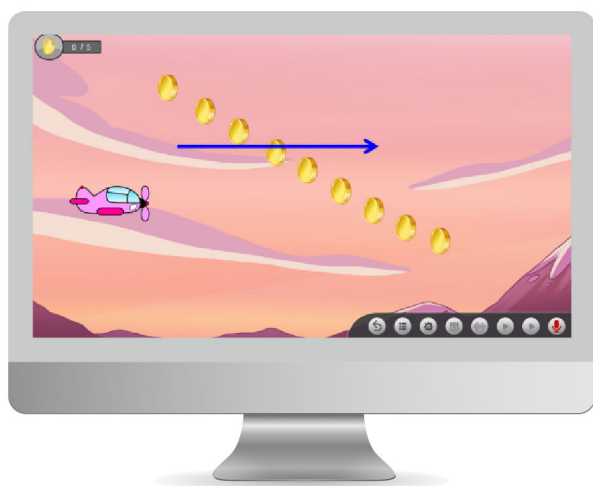
Targets pitch, loudness, and voice quality. Training develops control of vocal fold vibration, improves prosody, and addresses disorders such as dysphonia, pitch irregularity, and inappropriate loudness.

Pitch Control

Patients practice pitch accuracy, variation, and modulation through exercises that strengthen vocal fold control and support natural intonation.



Real-Time Feedback Training for Pitch Enhancement



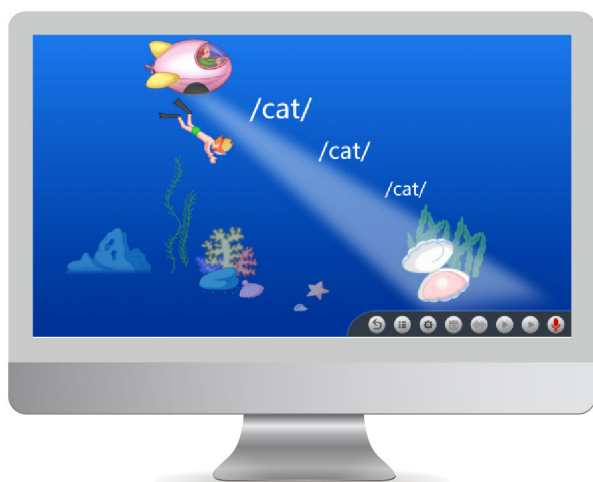
Real-Time Feedback Training for Pitch Variation and Lowering

Loudness Regulation

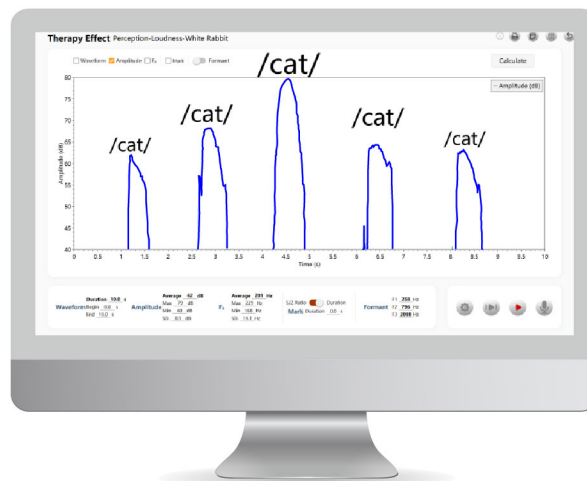
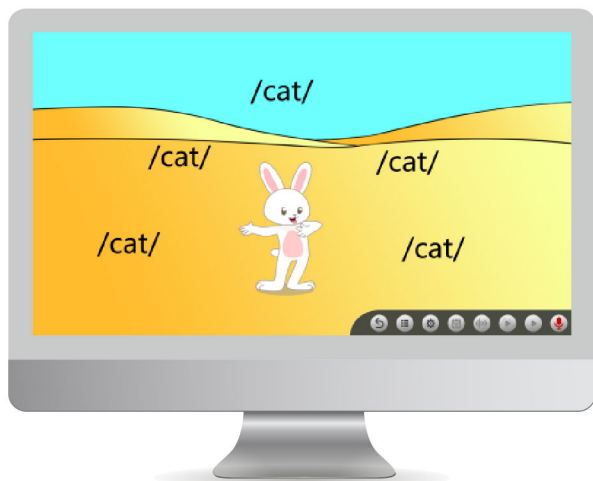
Training develops the ability to increase, reduce, and stabilize vocal intensity, with visual feedback ensuring appropriate loudness in different contexts.



Real-Time Feedback Training for Increasing Loudness



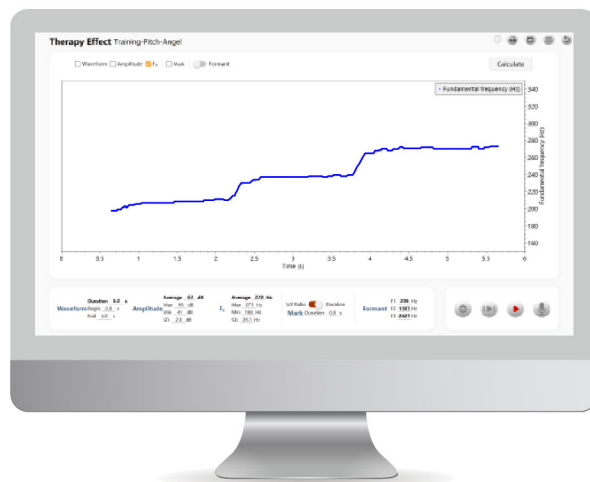
Real-Time Feedback Training for Reducing Loudness



Real-Time Feedback Training for Loudness Variation

Abnormal Voice Quality

Exercises target strained, breathy, or rough voice quality, using interactive tasks to promote healthier vocal fold vibration and clearer resonance.



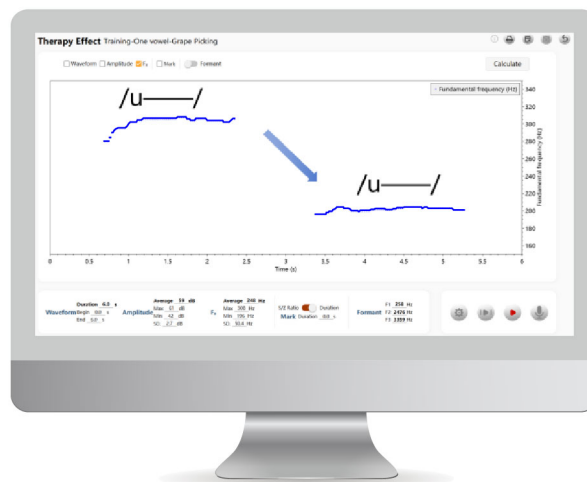
Real-Time Feedback Training for the Humming Method



Real-Time Feedback Training for the Chanting Method

Abnormal Resonance Quality

Interactive tasks build head, chest, and oral resonance control for a more stable, natural voice.



Real-Time Feedback Training for Transitioning from Head Voice to Chest Voice in /u/

Standardized Assessment Tool

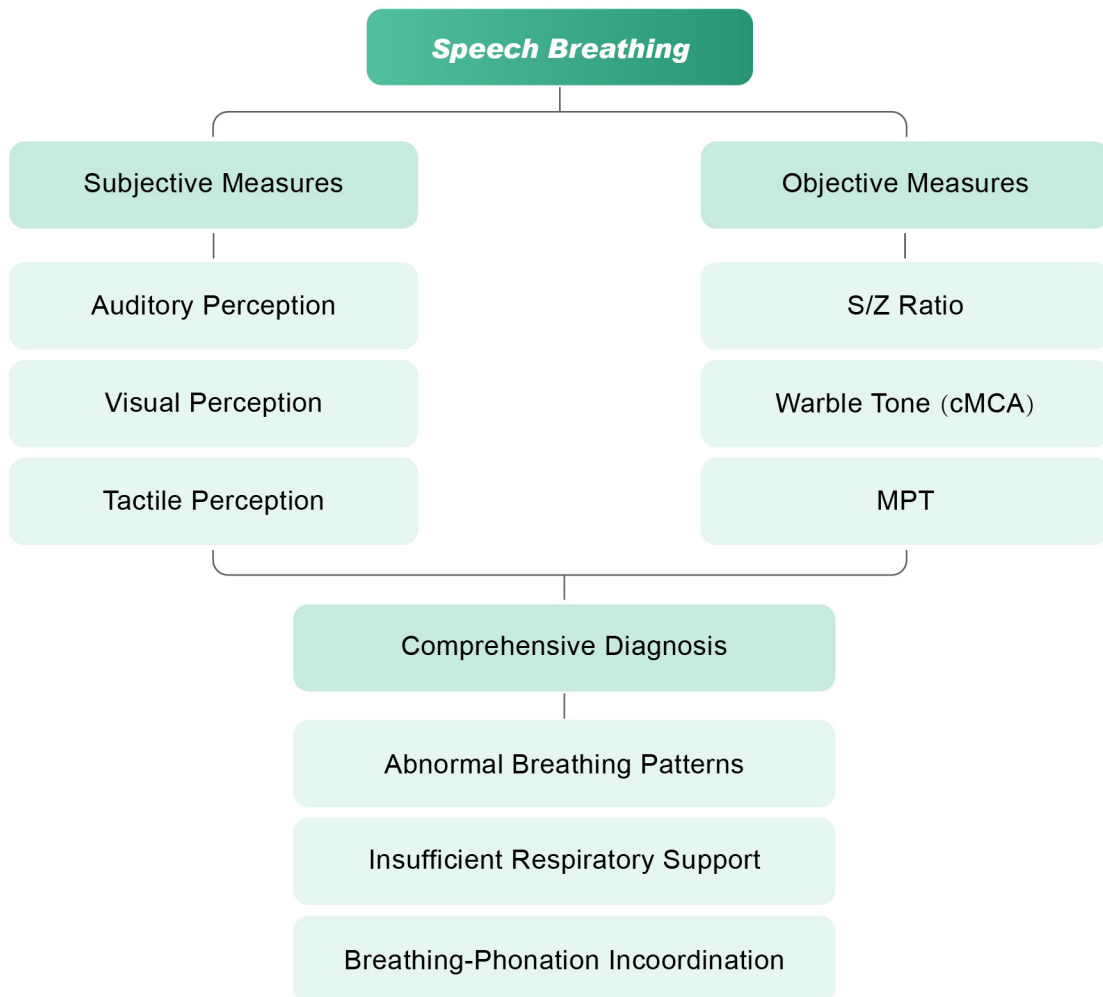
Speech Therapy uses standardized, ICF-based protocols to evaluate speech, voice, and laryngeal function. Assessments deliver reliable data to guide diagnosis, track progress, and support individualized treatment.

Physical Function=The degree of impairment in the physiological functions of the human body systems			None	Mild	Moderate	Severe	Complete	Unspecified	N/A
			0	1	2	3	4	8	9
b3100	Voice Production	Maximum Phonation Time (MPT)	☐	☐	☐	☒	☐	☐	☐
		Speech Fundamental Frequency (F ₀)	☐	☐	☒	☐	☐	☐	☐
		Warble Tone (cMCA), Energy Concentration (Ec), Fundamental Frequency Tremor (Fot), Contact Quotient (CQ), Contact Quotient Perturbation (CQP)							
Problem Description:									
1. Sustained and stable phonation time is more than 4 seconds, relatively for a 4-year old child.									
• The ability of respiratory support is severely impaired. • Further Description: The minimum required maximum phonation time is 8.6 seconds. • Training Suggestions: Real-time biofeedback therapy combined with traditional treatment methods, such as breathing relaxation training, quick forceful exhalation method, and slow steady exhalation method should be selected to promote effective treatment.									
b3101	Voice Quality	Jitter	☐	☐	☒	☐	☐	☐	☐
		NNE	☐	☐	☐	☐	☒	☐	☐
		Shimmer	☐	☐	☒	☐	☐	☐	☐

Objective Measurement and Feedback

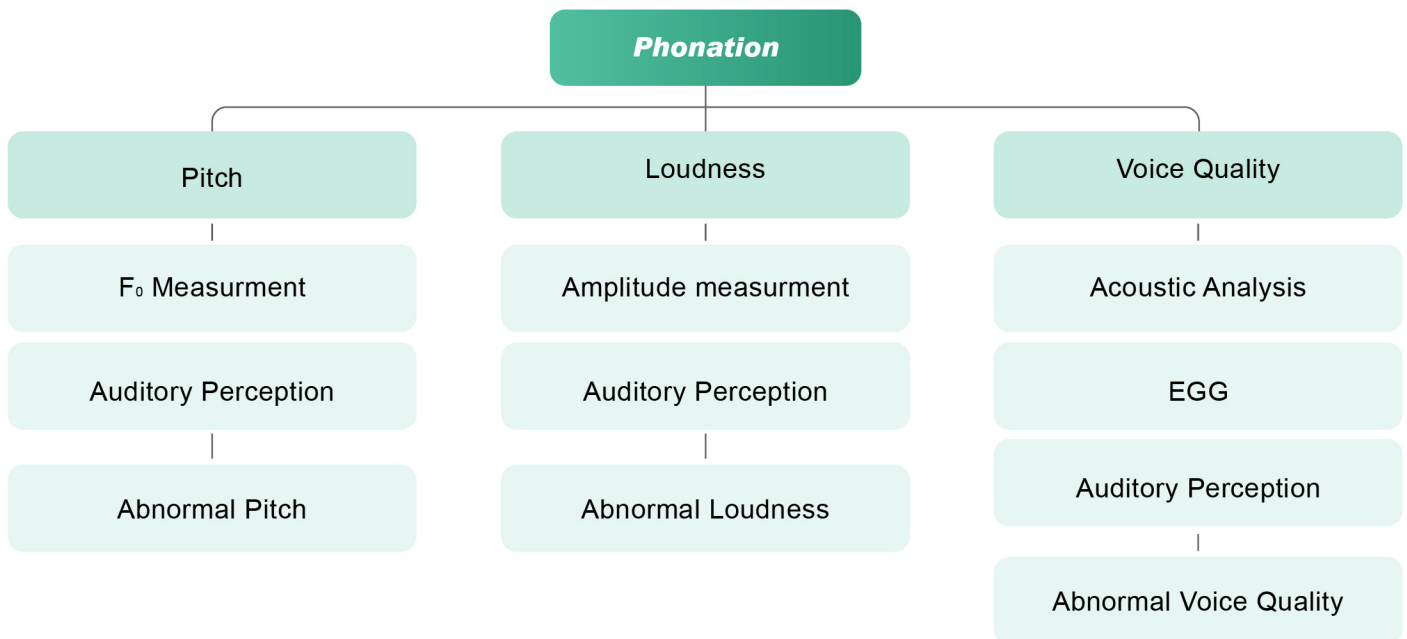
Real-time audio-visual feedback measures breathy support, phonatory control, resonance, and voice quality. Parameters including phonation time, pitch, loudness, jitter, shimmer, and resonance are analyzed with validated methods to ensure reliable results.

Real-Time Measurement of Respiratory Function

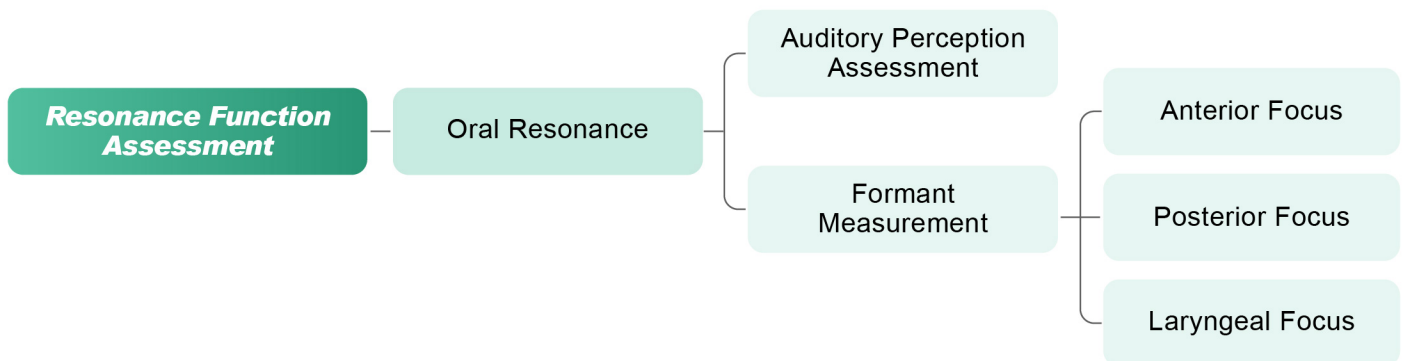


Graphs show the measurement of fundamental frequency and amplitude during maximum sustained phonation and maximum counting ability.

Real-Time Measurement of Vocalization Function



Real-Time Measurement of Resonance Function

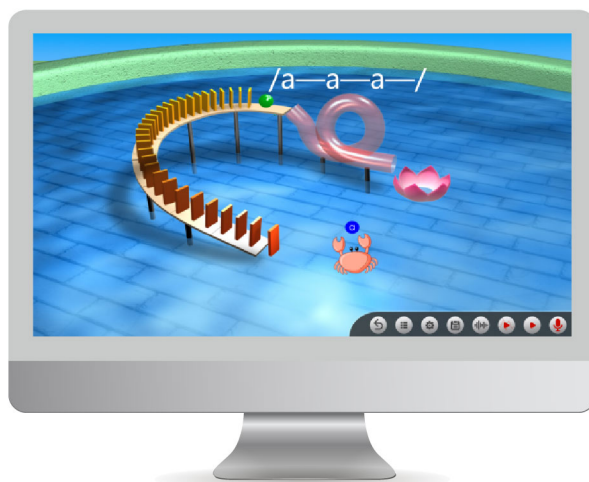


Formant analysis of the monophthong /i/ using linear predictive spectrum, illustrating frequency and amplitude characteristics

Progress Tracking and Reporting

Dynamic evaluation tools track progress over time, providing clinicians with detailed reports, data curves, and outcome metrics to adjust treatment as needed.

Evidence-based assessment combined with interactive monitoring keeps therapy targeted, personalized, and measurable.



Rehabilitation Monitoring Report

User information

Name: Ella Date of Birth: 2023-02-09 Gender: Female
 Examiner: 薄珏 Evaluation Date: 2025-09-06 Number:

Record

Waveform		Amplitude		F ₀		Formant	
Duration	6.0 s	Average	67 dB	Average	191 Hz	F1	193 Hz
Begin	0.0 s	Max	70 dB	Max	205 Hz	F2	1485 Hz
End	6.0 s	Min	24 dB	Min	184 Hz	F3	2648 Hz
		SD.	7.8 dB	SD.	2.8 Hz		
Measurement duration					0.0 s		
S/Z Ratio					0.00		

Graph

