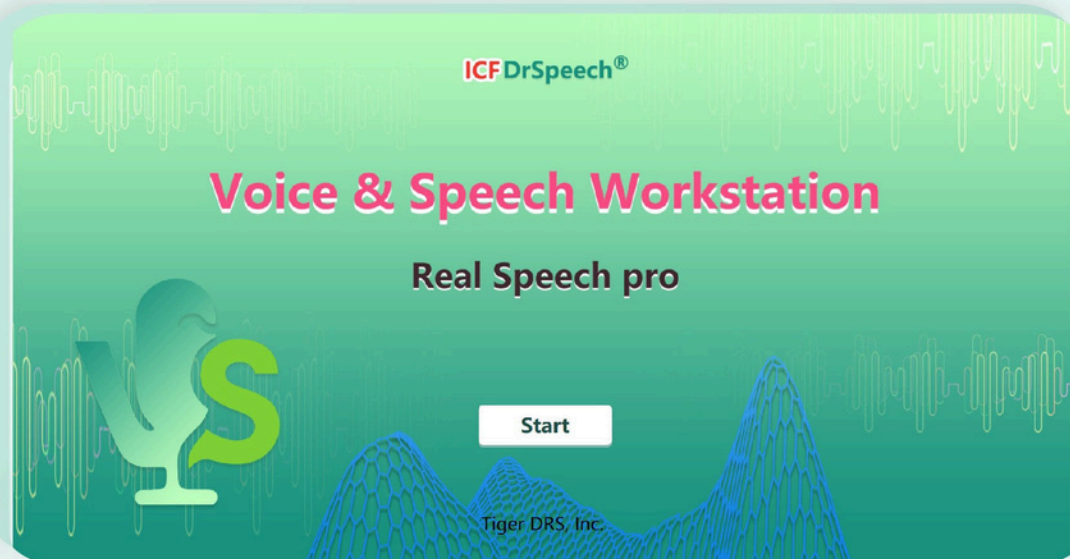


Real Speech pro

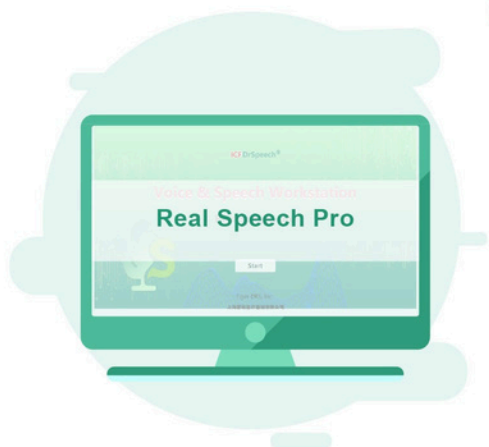


Function

Assessment and therapy for speech, voice, and laryngeal disorders.

Target

To address communication challenges caused by speech and voice disorders.



An all-in-one solution for speech disorders, combining precise assessment with effective therapy

Assessment

Delivers real-time, objective assessments across key speech functions, helping clinicians identify challenges in respiration, phonation, resonance, articulation, and prosody.

- Real-Time Respiration Assessment
- Real-Time Phonation Assessment
- Real-Time Resonance Assessment
- Real-Time Articulation Assessment
- Real-Time Prosody Assessment

Therapy

Provides interactive, personalized training programs with real-time audiovisual biofeedback to strengthen speech, language, and communication skills.

- Real-Time Respiration Biofeedback Training
- Real-Time Phonation Biofeedback Training
- Real-Time Resonance Biofeedback Training
- Real-Time Prosody Biofeedback Training

ICF Speech and Voice Function Assessment

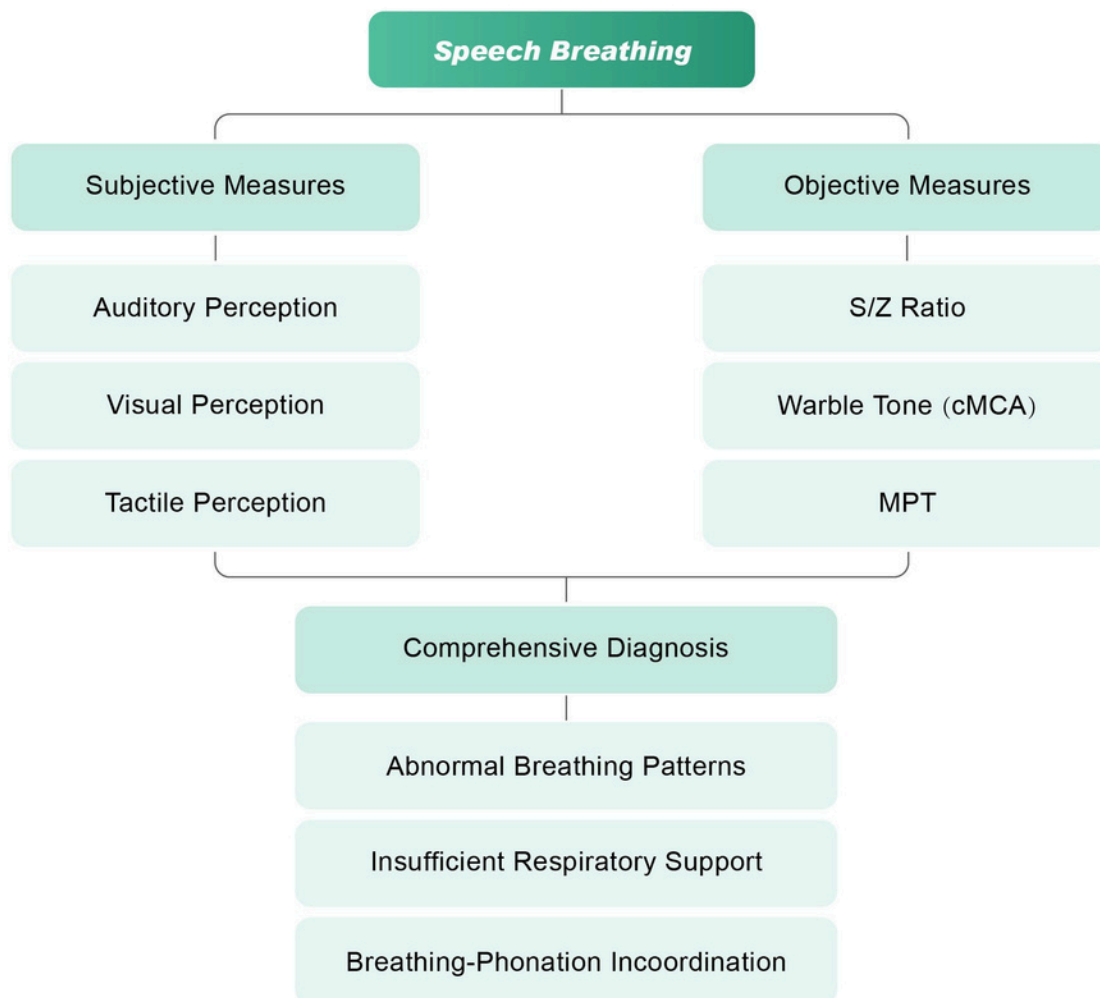
Body Function = Degree of Impairment of Physiological Functions			None	Mild	Moderate	Severe	Complete	Unspecified	N/A
			0	1	2	3	4	8	9
b3100	Voice Production	Maximum Phonation Time (MPT)	☐	☐	☐	☒	☐	☐	☐
		Speech Fundamental Frequency (F ₀)	☐	☐	☒	☐	☐	☐	☐
		Warble Tone (cMCA), Energy Concentration (Ec), Fundamental Frequency Tremor (Fot), Contact Quotient (CQ), Contact Quotient Perturbation (CQP)							
Problem Description:									
1. Sustained phonation: 4 seconds (norm ≥ 8.6s for age 4).									
• Respiratory support is severely impaired.									
• Further detail: The minimum requirement for maximum phonation time (MPT) is 8.6 seconds.									
• Training recommendation: Real-time biofeedback therapy combined with traditional methods, such as relaxation breathing, rapid forceful breathing, or slow controlled breathing techniques, to promote improvement. (See detailed therapy protocol with speech-bridge device).									
b3101	Voice Quality	Jitter	☐	☐	☒	☐	☐	☐	☐
		NNE	☐	☐	☐	☐	☒	☐	☐
		Shimmer	☐	☐	☒	☐	☐	☐	☐

Based on standardized protocols and evidence-based benchmarks, providing comprehensive assessment of speech, voice, and laryngeal function with targeted rehabilitation guidance.

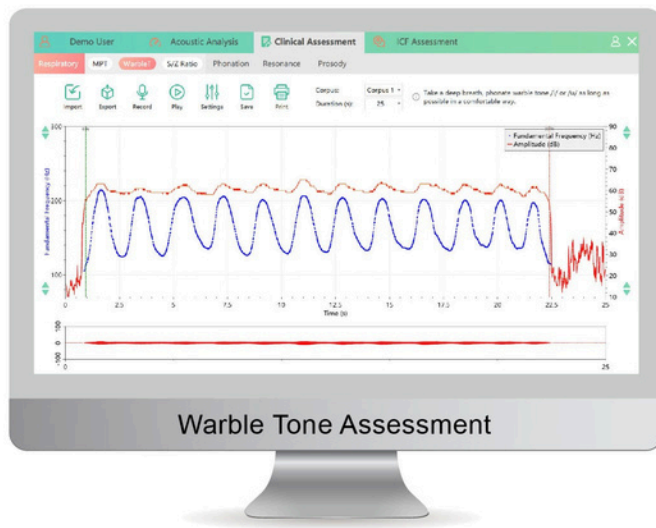
Assessment

✓ **Real-Time Speech Breathing Function Assessment:**

- Supports measurements of MPT, Warble Tone (cMCA), and S/Z ratio.



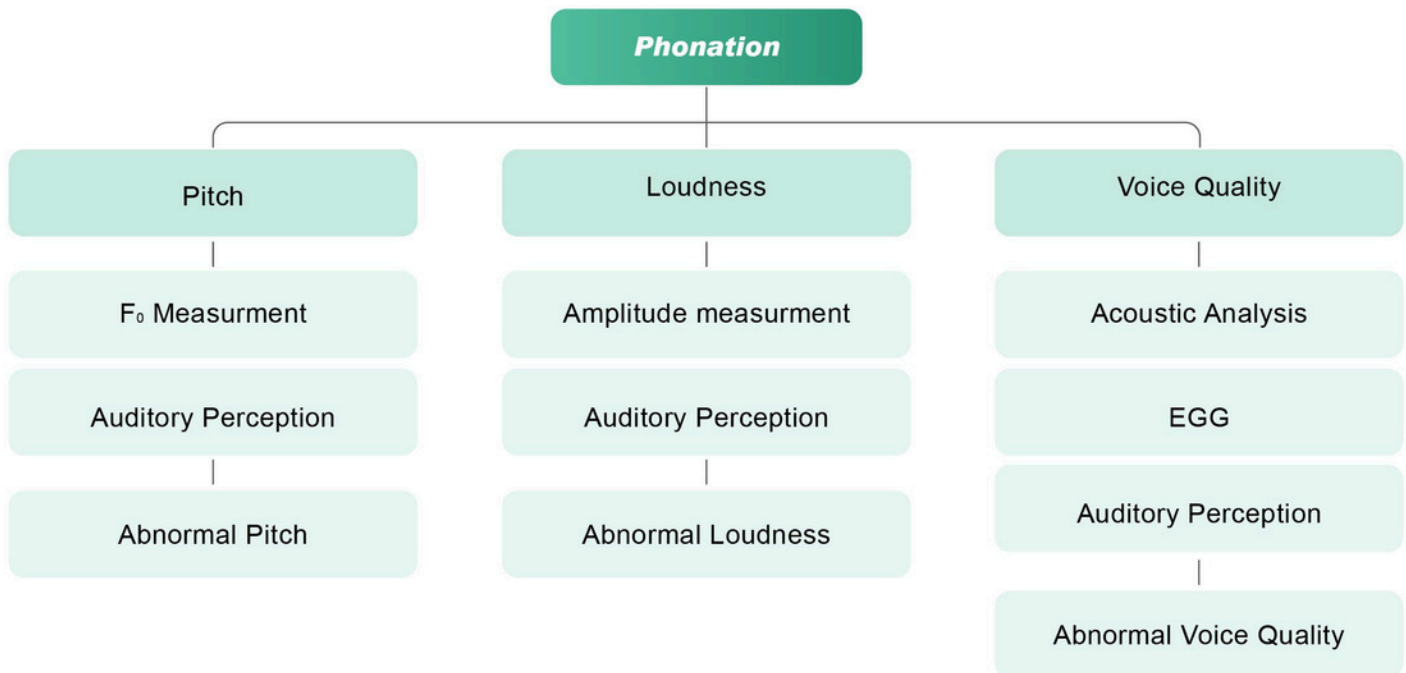
MPT 17.8 s



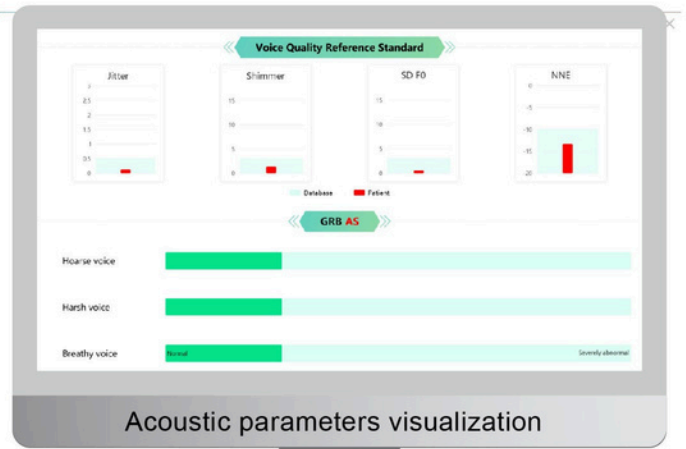
Warble Tone 21.4 s

✓ **Real-Time Phonation Assessment:**

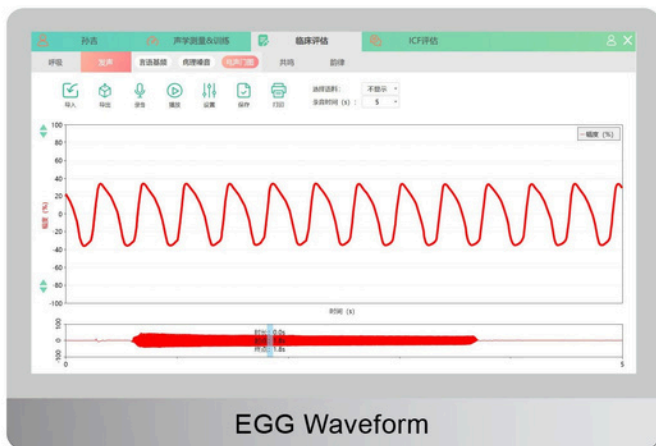
- Supports measurement of fundamental frequency (F_0), pathological voice parameters, cepstral analysis, and electroglottography (EGG).



Fundamental Frequency (F_0)
164 Hz



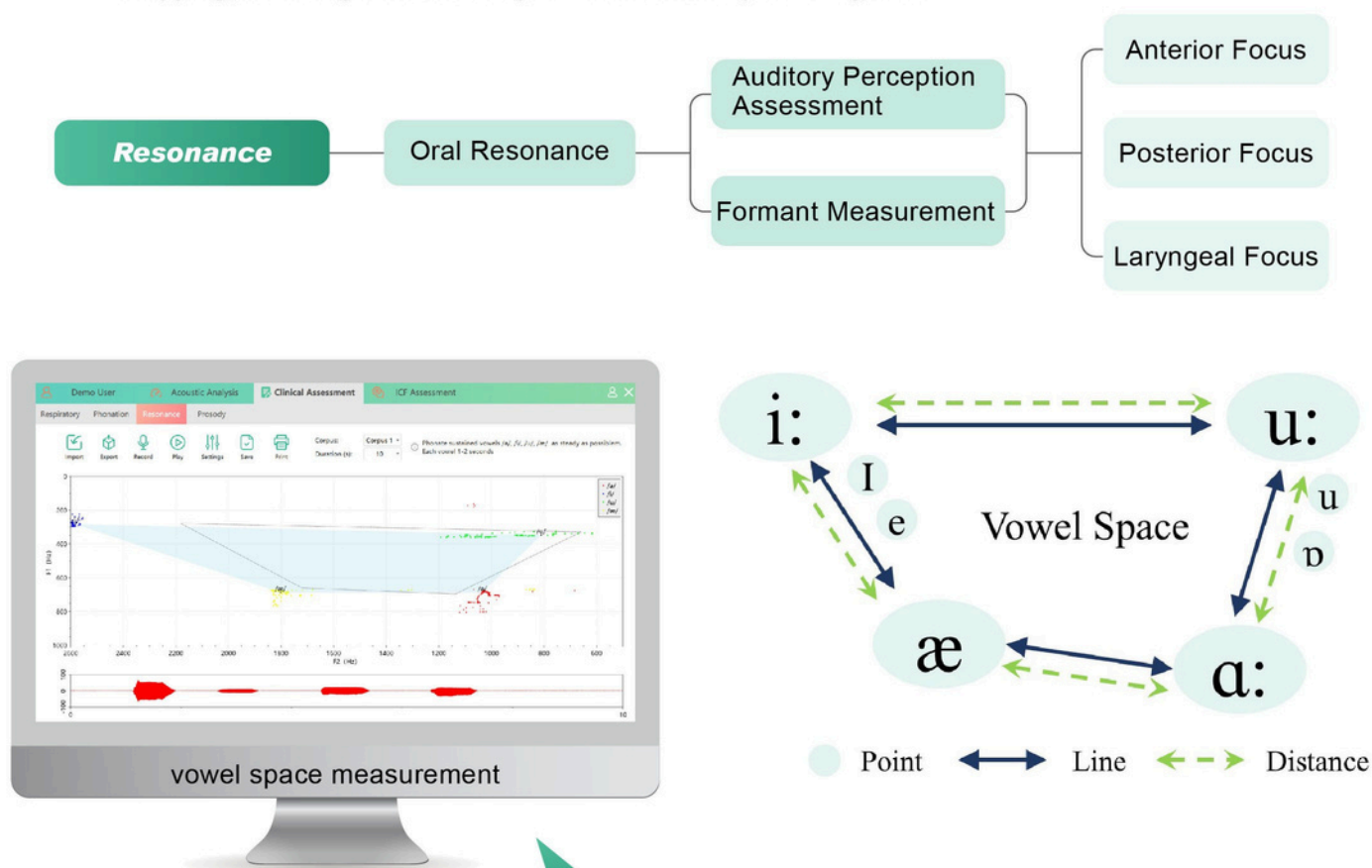
Jitter (PPQ)	0.23 %	Fundamental Frequency Tremor (Fot)	13.2 Hz	SNR	26.16 dB
NNE	-16.2 dB	Energy Concentration (Ec)	46 %	CPPs	16.66 dB
HNR	27.28 dB	Shimmer (APQ)	1.06%		



Contact Quotient (CQ)	69.8%	Contact Quotient Perturbation (CQP)	-0.1%	EGG-HNR	26.16 dB
Contact Index (CI)	- 0.08	Contact Index Perturbation (CIP)	6%	EGG-SNR	40.12 dB
EGG Shimmer (APQ)	0.21%	EGG Jitter (PPQ)	0.14%		

✓ Real-Time Resonance Assessment

- Supports measurement of speech formants with Linear Predictive Coding (LPC) and resonance focus mapping, including formant analysis and formant space diagrams.



F ₁ /a/	687 Hz	F ₁ /i/	283 Hz	F ₁ /u/	347 Hz	F ₁ /æ/	687 Hz
F ₂ /a/	1035 Hz	F ₂ /i/	2583 Hz	F ₂ /u/	811 Hz	F ₂ /æ/	1802 Hz
VSA	178018 Hz ²	VSA Ratio	1.01	FCR	0.75	VAI	1.32

✓ Real-Time Prosody Assessment:

- Conducting measurement and analysis of prosodic parameters, including speech rate, articulation rate, and standard deviation of fundamental frequency (F₀SD).



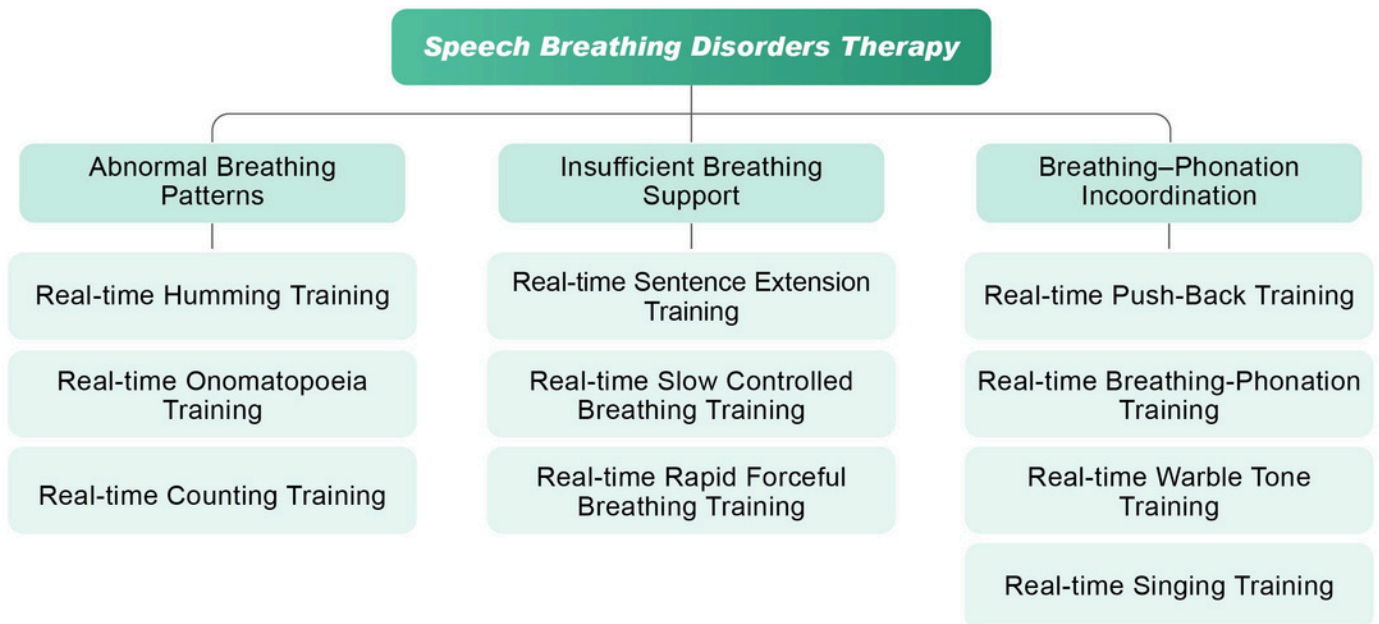
Number of Syllables	10
Total Duration	4230 ms
F ₀	187 Hz
Speech Rate	2.3 /s
Articulation Rate	3.2 /s
F ₀ SD	45.0 Hz

Treatment

Using real-time audiovisual feedback combined with facilitative therapy techniques, this system provides targeted intervention for disorders of the respiration, phonation, and resonance systems involved in speech. The system emphasizes voice and speech therapy as a foundation to improve overall speech intelligibility.

Key Parameters	Description
Waveform	Time-domain representation of the speech signal showing amplitude changes over time.
Voiced & Unvoiced	Classification of speech segments based on the presence (voiced) or absence (unvoiced) of vocal fold vibration.
F ₀	The primary frequency of vocal fold vibration, corresponding to perceived pitch.
Amplitude	The magnitude of the acoustic signal, corresponding to perceived loudness.
F ₀ and Amplitude	Simultaneous display of pitch and intensity contours across an utterance.
Spectrogram	Frequency-domain display of speech showing time, frequency, and intensity, used to visualize speech dynamics.
Formants (LPC)	Resonant frequencies of the vocal tract estimated using Linear Predictive Coding, critical for vowel identification and speech clarity.
Cepstrum	An acoustic analysis that captures both periodic and aperiodic components of the voice signal, used to assess voice quality and stability.

✓ Real-Time Speech Breathing Biofeedback Training

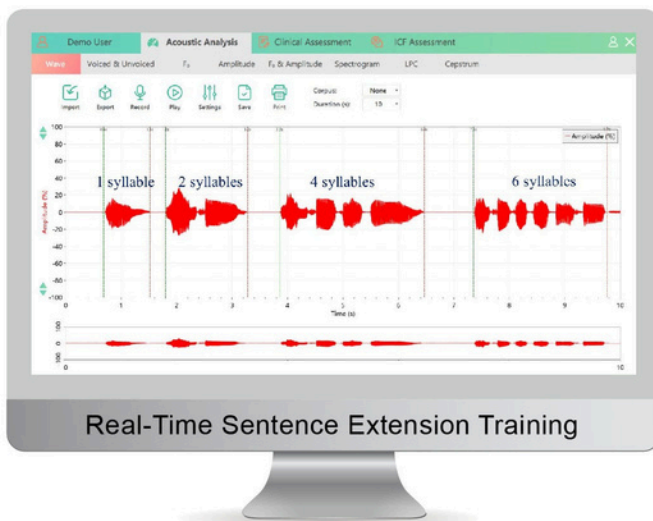


• **Insufficient Respiratory Support**

Therapy focuses on strengthening breath support through rapid forceful breathing, slow controlled breathing, and sentence-length extension, supported by real-time audiovisual feedback to improve breath–voice coordination and carryover into speech.



No.	1	2	3	4
Duration (s)	0.7	0.8	0.7	0.8
F ₀ Avg (Hz)	141	129	137	140
F ₀ SD (Hz)	26.8	35.4	29.9	33.2
Amplitude Avg (dB)	58	61	62	59
Amplitude SD (dB)	9.9	11.2	11.0	13.7
F ₁ (Hz)	152	152	147	210
F ₂ (Hz)	527	726	703	714
F ₃ (Hz)	644	1042	936	1031



No.	1	2	3	4
Duration (s)	0.5	1.2	1.6	2.0
F ₀ Avg (Hz)	133	147	135	151
F ₀ SD (Hz)	17.7	19.4	23.7	15.6
Amplitude Avg (dB)	68	65	61	64
Amplitude SD (dB)	12.5	11.7	11.7	5.5
F ₁ (Hz)	236	269	316	257
F ₂ (Hz)	431	474	571	386
F ₃ (Hz)	857	760	867	636

• Breathing-Phonation Incoordination

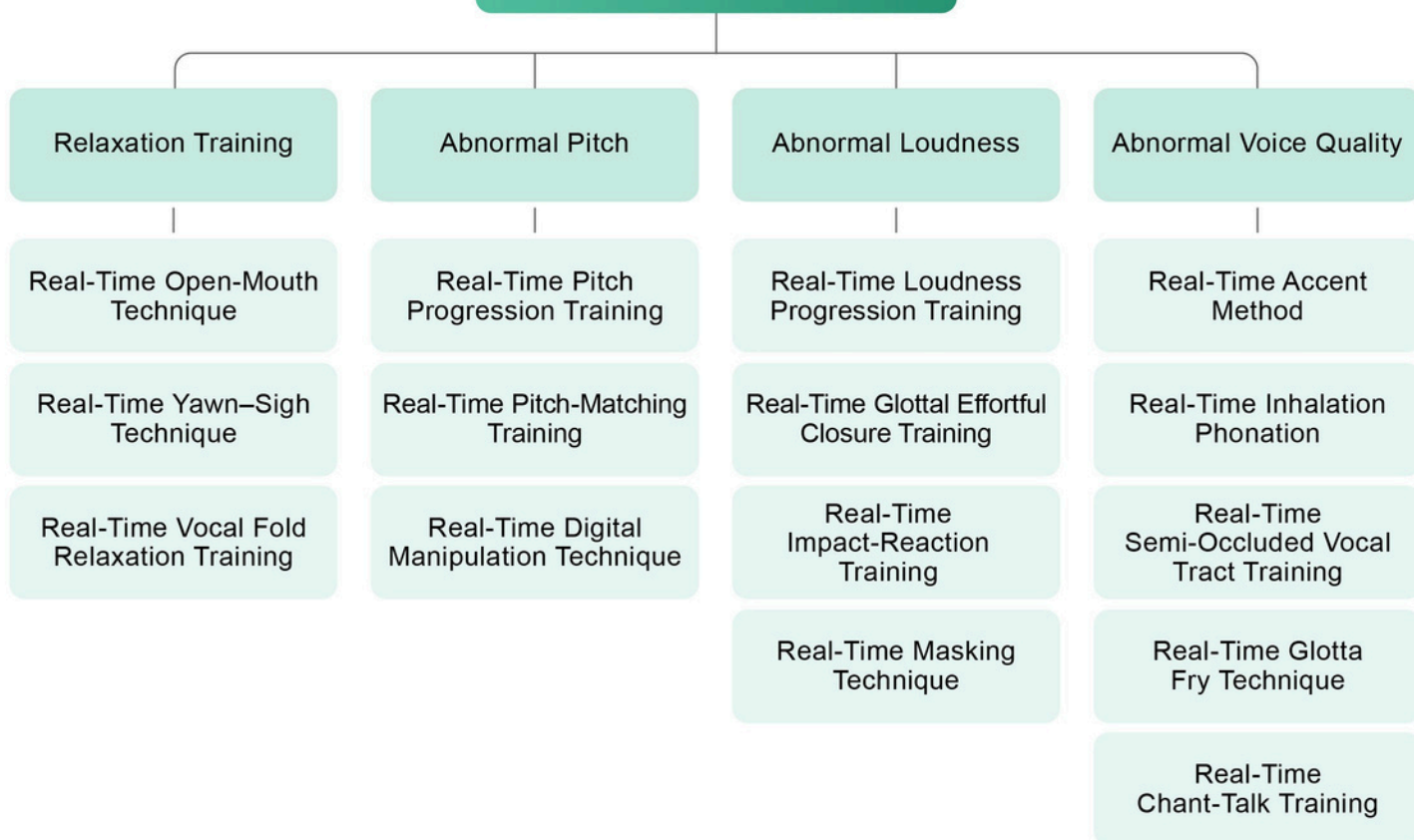
Therapy focuses on using chanting, humming/warble, breathy onset, and the push-back technique, supported by real-time audiovisual feedback to improve coordination and carryover into speech.



No.	1	2	3
Duration (s)	0.9	3.3	0.8
F₀ Avg (Hz)	136	170	148
F ₀ SD (Hz)	17.3	13.2	23.7
Amplitude Avg (dB)	58	62	61
Amplitude SD (dB)	12.1	12.7	10.7
F ₁ (Hz)	316	269	316
F ₂ (Hz)	632	644	667
F ₃ (Hz)	1157	960	867

✓ Real-Time Phonation Biofeedback Training

Dysphonia Therapy



• Abnormal Pitch

Treatment for pitch disorders includes digital laryngeal techniques, pitch-matching exercises, and pitch progression practice, supported by real-time audiovisual feedback.



No.	1	2	3	4
Duration (s)	0.9	1.0	1.3	1.3
F₀ Avg (Hz)	106	138	175	216
F₀ SD (Hz)	1.2	1.7	4.4	9.3
Amplitude Avg (dB)	62	64	66	72
Amplitude SD (dB)	1.1	8.2	9.1	7.1
F ₁ (Hz)	609	609	199	234
F ₂ (Hz)	996	1066	679	644
F ₃ (Hz)	2765	2835	1066	1101



No.	1
Duration (s)	7.8
F₀ Avg (Hz)	156
F₀ SD (Hz)	28.7
Amplitude Avg (dB)	63
Amplitude SD (dB)	8.2
F ₁ (Hz)	222
F ₂ (Hz)	351
F ₃ (Hz)	433

• Abnormal Loudness

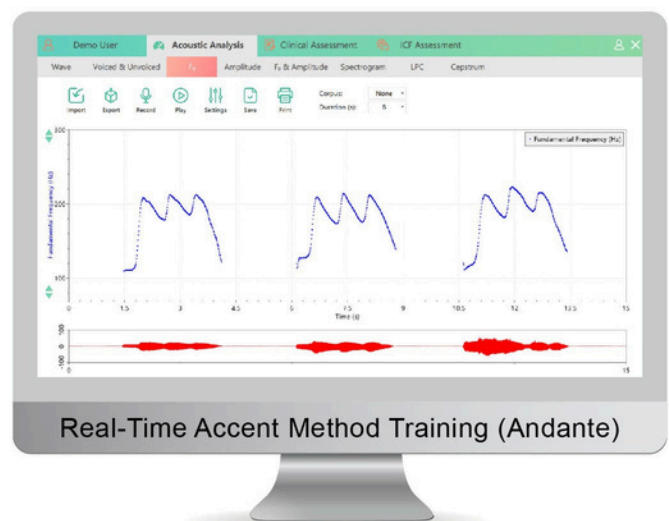
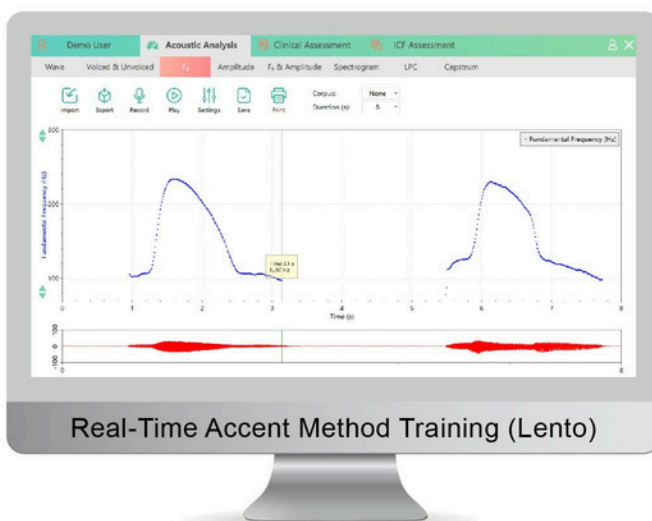
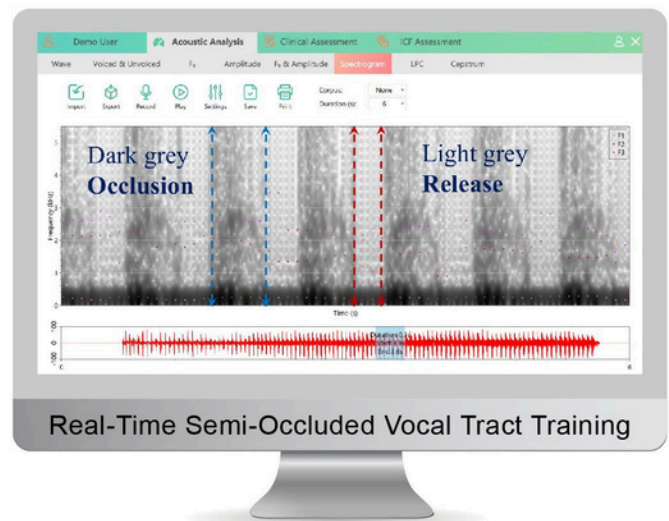
Treatment for loudness disorders includes, masking, impact-reaction exercises, effortful closure, and loudness progression, supported by real-time audiovisual feedback.



No.	1	2	3	4
Duration (s)	0.4	0.6	0.7	0.8
F ₀ Avg (Hz)	121	133	187	244
F ₀ SD (Hz)	0.2	0.7	2.6	7.4
Amplitude Avg (dB)	38	49	65	77
Amplitude SD (dB)	9.0	11.3	11.3	11.5
F ₁ (Hz)	738	632	738	878
F ₂ (Hz)	1230	1054	1148	1230
F ₃ (Hz)	2519	2113	2625	2519

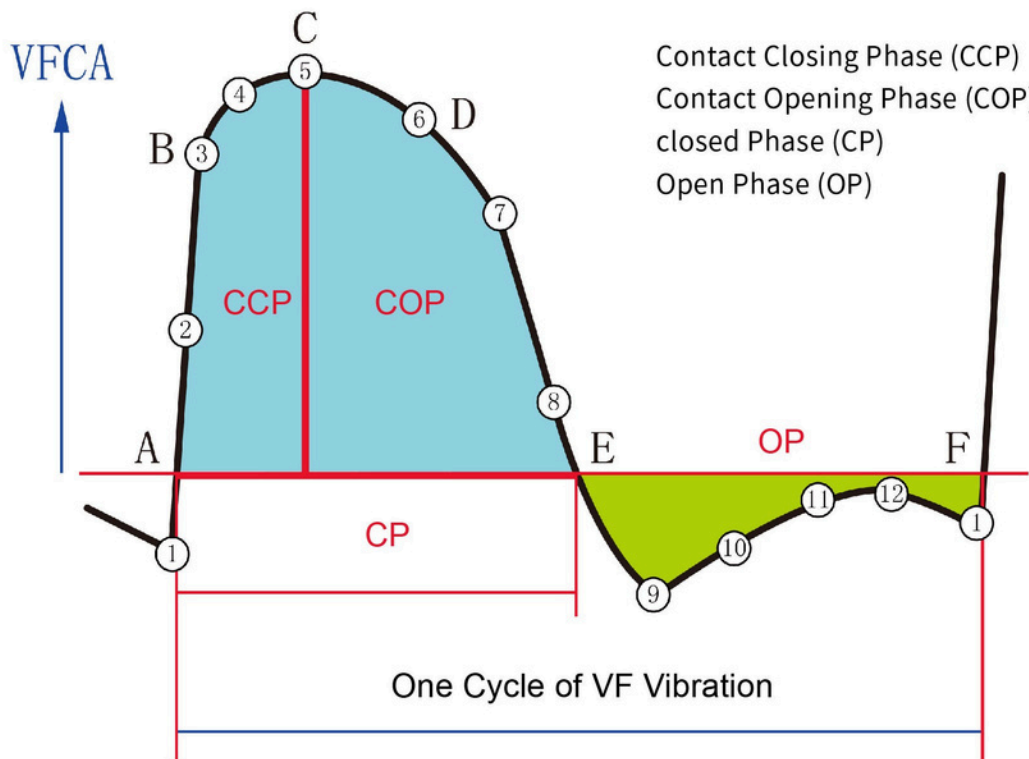
• Abnormal Voice Quality

Treatment for voice quality disorders includes laryngeal massage, the chewing technique, chant-talk, glottal fry, semi-occluded vocal tract exercises, inhalation phonation, resonant voice therapy, and the accent method, all supported by real-time audiovisual feedback.

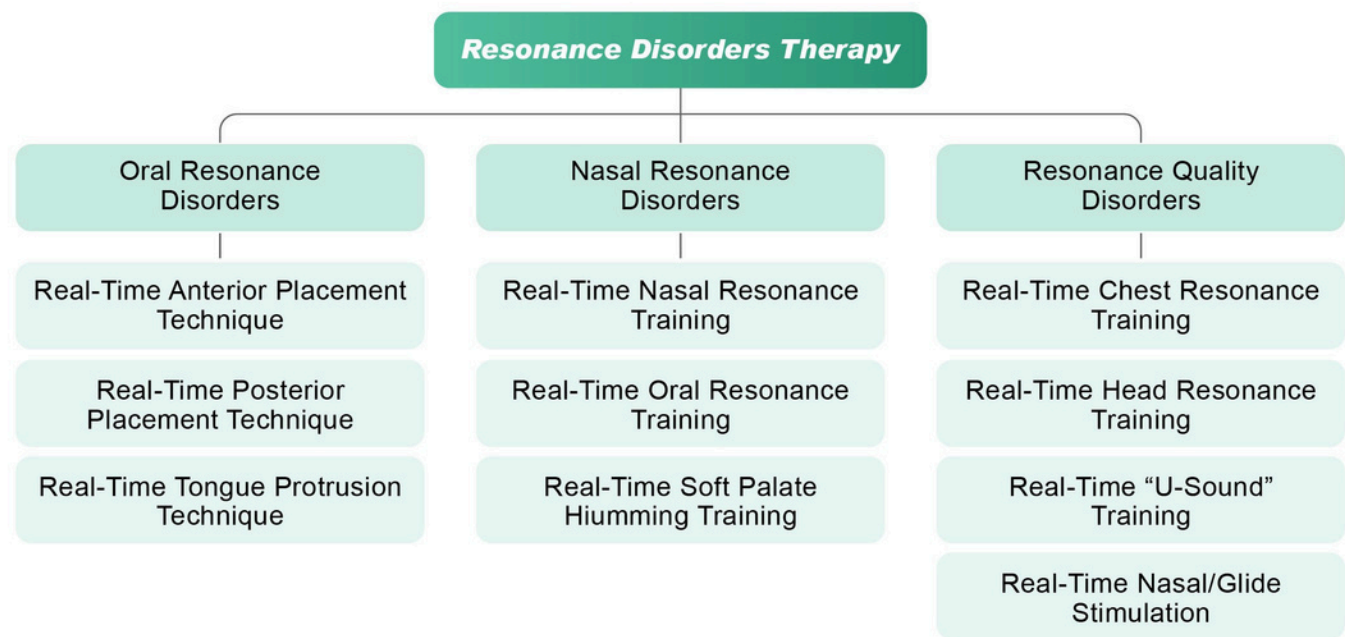


Speech-EGG Therapy

- ✓ Conduct laryngeal function (vocal cords) speech rate and intonation training based on parameters such as fundamental frequency and duration.
- ✓ Conduct laryngeal function (glottis) closure movement and swallowing movement training based on parameters such as CQ and NNE.
- ✓ During the swallowing process, the larynx will rise, the glottis will close, and then the larynx will descend. The electroglottograph can indirectly reflect the information of laryngeal elevation and descent, swallowing safety, and swallowing reflex.
- ✓ In articulation and phonological training, observe whether there are changes in the vocal cord closure pattern when pronouncing velar consonants, such as stronger closure or longer closure time.

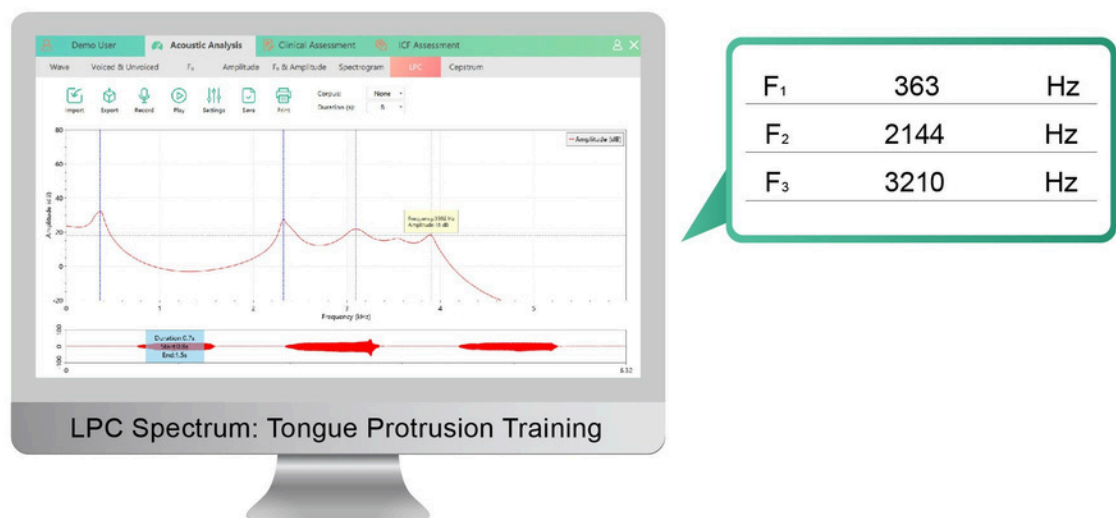


✓ **Real-Time Resonance Biofeedback Training**



• **Oral Resonance Disorders**

Treatment for oral resonance disorders includes the tongue protrusion technique, posterior placement, and anterior placement, supported by real-time audiovisual feedback.



• Nasal Resonance Disorders

Treatment for nasal resonance disorders includes soft palate training, oral resonance exercises, and nasal resonance exercises, supported by real-time audiovisual feedback.

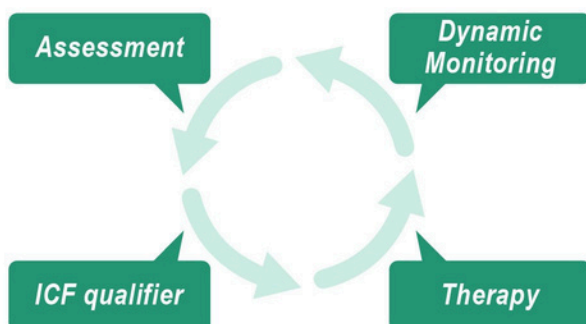


• Resonance Quality Disorders

Treatment for resonance quality disorders includes nasal/glide stimulation, head resonance exercises, chest resonance exercises, and the U-sound technique, supported by real-time audiovisual feedback.



Integrated Speech and Voice Therapy Pathway



The process begins with Diagnosis, followed by an ICF-based Assessment to identify functional impairments. A tailored Therapy Program is then implemented, with Dynamic Assessment and Monitoring ensuring continuous progress tracking and therapy refinement.

ICF Speech and Voice Function Assessment

An ICF-based speech and voice function evaluation report can be generated from clinical assessment parameters, with impairment levels classified according to normative data and ICF standards.

The screenshot displays the ICF Assessment software interface. At the top, there are tabs for 'Demo User', 'Acoustic Analysis', 'Clinical Assessment', and 'ICF Assessment'. Below these, a 'Short-term Monitoring' section shows various assessment categories: All, MPT, WarbleT, Pitch, Pathological Voice, EGG, Resonance, and Prosody. A 'Generate Report' button is highlighted with a blue arrow. The main table lists assessment items with columns for Number, Date, Type, and Action. Item 8 is selected, and its details are shown on the right.

Number	Date	Type	Action
☒ 4	2025-08-22 13:55:38	Resonance	
☐ 5	2025-08-22 12:58:25	Resonance	
☐ 6	2025-08-22 12:54:38	Pathological Voice	
☐ 7	2025-08-22 12:53:28	Electroglottography	
☒ 8	2025-08-22 12:41:17	Pathological Voice	
☐ 9	2025-08-22 12:27:45	Pathological Voice	
☒ 10	2025-08-22 12:19:18	Fundamental Frequency	
☒ 11	2025-08-21 21:19:57	Warble Tone	
☒ 12	2025-08-21 21:18:44	Maximum Phonation Time	
☐ 13	2025-08-21 20:42:21	Pathological Voice	
☐ 14	2025-08-21 20:39:44	Maximum Phonation Time	

Details for Item 8 (Pathological Voice):

- Maximum...** ☒ MPT 17.8 s
- Warble To...** ☒ cMCA 21.4 s
- Fundame...** ☒ F₀ 164 Hz
- ☒ Jitter(PPQ) 0.14 %
- ☒ Pitch Tremor 1.0 Hz
- Pathologi...** ☒ Shimmer(APQ) 2.10 %
- ☒ NNE -18.1 dB
- ☒ Ratio 39.0 %
- Electrogl...** ☒ CQ 71.5 %
- ☒ CQP 0.1 %
- Resonance** ☒ Formant F₂/i/ 2562 Hz
- ☒ Formant F₂/u/ 673 Hz

ICF-Based Speech, Language, and Cognitive Function Assessment Form

The screenshot displays the ICF Assessment Form Functional. The form is titled 'ICF Assessment Form Functional' and includes a table for assessing speech and voice functions. The table has columns for Physical Function = Degree of physiological impairment, No, Mild, Moderate, Severe, Complete, Unspecified, and N/A. The rows are organized by function: Production of Voice (b3100) and Quality of Voice (b3101).

Physical Function = Degree of physiological impairment...		No	Mild	Moderate	Severe	Complete	Unspecified	N/A	
		0	1	2	3	4	8	9	
b3100	Production of Voice	MPT							
		cMCA							
		F ₀							
		EC							
		F ₀ t							
		CQ							
		CQP							
b3101	Quality of Voice	Jitter							
		NNE							
		Shimmer							
		Formant F ₂ /u/							

Buttons at the bottom: Export, Print, Save, Back.

Dynamic assessment and therapy monitoring

- ✓ In speech and voice rehabilitation, regular assessments provide dynamic evaluation and continuous monitoring of therapy outcomes.

Therapy monitoring of a High-Pitched Male Voice

Date	F ₀		F ₀ SD		Real Age	Development Age	Pitch Disorder	ICF	
3.9	241	↑	28	—	29	/	Y	Begin	2
								Target	0
3.14	192	↑	26	—	29	/	Y	Dynamic Assessment	2
3.20	163	↑	23	—	29	/	Y		1
3.27	142	—	24	—	29	/	N		0

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