COMMON VOICE THERAPY TECHNIQUES: PHYSIOLOGICAL PRINCIPLES, CLINICAL INDICATIONS, AND EVIDENCE OF EFFECTIVENESS A STRUCTURED CLINICAL REVIEW

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ABSTRACT

Objective: To describe the voice therapy techniques most often evaluated in clinical research and to examine how treatment selection relates to physiological rationale, study design, diagnostic group, and reported outcome.

Methods: PubMed/MEDLINE and reference lists were searched for original clinical studies published from January 2002 through July 2026. Studies were retained when they evaluated a defined voice therapy intervention in adults with dysphonia or a neurological voice disorder and reported perceptual, acoustic, aerodynamic, laryngoscopic, or patient-reported outcomes. Twenty-one studies were included in a structured clinical synthesis. Because treatment protocols, diagnoses, and outcome measures were heterogeneous, no pooled effect estimate was attempted.

Results: Sixteen studies were randomized trials. Most work came from North America, Asia, and Europe, and no African study was represented in the final corpus. Functional and behavioral disorders, particularly muscle tension dysphonia and occupational dysphonia, accounted for 15 of 21 studies. Semi-occluded vocal tract exercises and resonant/flow-based approaches were the most frequently investigated intervention families. Across these studies, improvement was most consistently demonstrated in Voice Handicap Index scores, perceived phonatory effort, maximum phonation time, cepstral measures, and auditory-perceptual ratings. Acoustic perturbation measures were less consistent. LSVT LOUD had the strongest disease-specific evidence in Parkinson-related dysarthria, whereas electrical stimulation remained supported by small neurogenic cohorts.

Conclusions: Voice therapy is most defensible when the technique is selected to address a demonstrable physiological impairment rather than applied as a generic exercise set. Current evidence supports SOVT, resonant and flow phonation, vocal function exercises, manual therapy, and intensive loudness treatment in appropriately selected patients. Vocal hygiene alone is usually insufficient as definitive therapy, and the evidence base remains geographically uneven.

Keywords: voice therapy; dysphonia; semi-occluded vocal tract exercises; resonant voice therapy; muscle tension dysphonia; LSVT LOUD; vocal function exercises.

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I. INTRODUCTION

Voice therapy is not a single treatment. It is a group of behavioral and physiologic interventions intended to alter respiratory drive, vocal fold vibration, glottal closure, supraglottic configuration, or the way a

patient uses the voice in daily life. The same perceptual symptom may arise from different mechanisms: a breathy voice may reflect glottal insufficiency, respiratory weakness, or compensatory under-adduction, whereas a strained voice may arise from primary hyperfunction or from supraglottic compensation for an underlying glottal gap. A useful treatment plan therefore begins with mechanism, not with the sound of the voice alone.

The clinical literature has expanded beyond traditional vocal hygiene and imitation-based exercises. Physiologic methods such as semi-occluded vocal tract exercises (SOVT), resonant voice therapy (RVT), vocal function exercises (VFE), and flow phonation attempt to improve the efficiency of the source-filter interaction or reduce excessive laryngeal resistance. Manual circumlaryngeal therapy addresses extrinsic muscle tension. LSVT LOUD uses intensive, high-effort practice to recalibrate reduced vocal amplitude in Parkinson disease. Other approaches reduce occupational vocal load, modify maladaptive cognitions, provide visual or electromyographic feedback, or stimulate weak laryngopharyngeal musculature [1-21].

These treatments are frequently discussed as if they were interchangeable. They are not. Their physiological targets, treatment intensity, indications, and risks differ. The present review was designed to organize the published clinical evidence around questions encountered in routine practice: Which disorders have been studied? Which techniques have been tested in controlled designs? What is the proposed therapeutic principle? Which outcome domains improve most consistently, and where does the evidence remain uncertain?

II. METHODS

2.1. Search strategy and study selection

A structured search of PubMed/MEDLINE was conducted for studies published between January 2002 and July 2026. Search terms combined voice therapy, dysphonia, muscle tension dysphonia, semi-occluded vocal tract, straw phonation, water resistance therapy, resonant voice, vocal function exercises, flow phonation, manual circumlaryngeal therapy, LSVT LOUD, vocal hygiene, biofeedback, and neuromuscular electrical stimulation. Reference lists of relevant trials were screened to identify additional clinical studies.

Original studies were eligible when they involved adults with a diagnosed voice disorder or Parkinson-related dysarthria, evaluated a defined therapeutic protocol, and reported at least one clinical outcome. Randomized trials were preferred, but prospective cohorts and small controlled pilot studies were retained when they represented an important technique or diagnostic group. Studies limited to healthy participants, immediate laboratory effects without a treatment course, purely surgical interventions, and reports without extractable clinical outcomes were excluded.

2.2. Data extraction and synthesis

For each study, the country and continent of the treated cohort, study design, diagnostic group, intervention, comparator, treatment dose, and main outcome were recorded. Each study was assigned one principal intervention class and one primary diagnostic category to permit descriptive counting. This classification necessarily simplifies multimodal protocols; for example, a study combining SOVT with electromyographic biofeedback was classified according to its principal experimental component. The synthesis was descriptive because treatment schedules and outcome instruments differed substantially across studies.

III. RESULTS

Twenty-one studies met the review criteria. Sixteen were randomized trials,

while five used prospective, cohort, pilot-controlled, or non-randomized designs. The geographical distribution was broad but uneven. North America contributed the largest number of studies, followed by Asia and Europe. The absence of an African study in this focused corpus limits the generalizability of language-specific and service-delivery conclusions.

Table 1. Geographic distribution and research design of the included studies (n = 21)

Region	Countries represented	Studies, n (%)	Randomized trials	Other designs	Typical populations
North America	United States	8 (38.1)	8	0	Teachers, primary MTD, dysphonia/vocal fatigue, Parkinson disease, presbyphonia
Asia	Vietnam, Taiwan, Japan, Republic of Korea, Iran	5 (23.8)	2	3	Teachers with MTD, mixed dysphonia, neurogenic dysphonia, occupational hyperfunction
Europe	United Kingdom, Belgium, Italy	4 (19.0)	3	1	Functional dysphonia, mixed dysphonia, teachers, Parkinson disease
South America	Chile, Brazil	3 (14.3)	3	0	Behavioral dysphonia
Oceania	New Zealand	1 (4.8)	0	1	Parkinson disease
Total	—	21 (100)	16	5	—

The region was assigned according to the site of patient recruitment rather than the nationality of the first author. "Other designs" comprised prospective pre-post studies, a consecutive cohort, a controlled pilot study, and a non-randomized two-arm trial.

Table 2. Voice disorder groups represented in the included literature

Primary clinical group	Studies, n (%)	Common diagnoses or settings	Most frequently evaluated interventions	Frequently reported outcomes
Functional, behavioral, or occupational dysphonia	15 (71.4)	Primary MTD, hyperfunctional dysphonia, vocal fatigue, teachers, functional dysphonia	SOVT, RVT, flow/stretch-and-flow, VFE, manual therapy, vocal amplification, CBT/biofeedback	VHI, VTD/VFI, GRBAS or CAPE-V, MPT, CPP, DSI, phonation threshold pressure
Neurogenic voice disorder	4 (19.0)	Parkinson-related dysarthria; post-stroke or traumatic brain injury dysphonia with dysphagia	LSVT LOUD, EMST, laryngopharyngeal NMES	VHI, sound-pressure level, communication effectiveness, GRBAS, cough and swallowing measures

Primary clinical group	Studies, n (%)	Common diagnoses or settings	Most frequently evaluated interventions	Frequently reported outcomes
Presbyphonia	1 (4.8)	Age-related vocal fold bowing and reduced respiratory reserve	VFE with inspiratory or expiratory muscle strength training	CPP, subglottal pressure, self-assessment, vocal fold bowing
Mixed functional and benign organic dysphonia	1 (4.8)	Functional dysphonia, vocal fold nodules, and age-related atrophy in singers and nonsingers	SOVT	Jitter, shimmer, expiratory pressure, VHI-10, formant measures

MTD, muscle tension dysphonia; SOVT, semi-occluded vocal tract exercises; RVT, resonant voice therapy; VFE, vocal function exercises; CBT, cognitive behavioral therapy; NMES, neuromuscular electrical stimulation; VHI, Voice Handicap Index; VTD, Vocal Tract Discomfort scale; VFI, Vocal Fatigue Index; MPT, maximum phonation time; CPP, cepstral peak prominence; DSI, Dysphonia Severity Index.

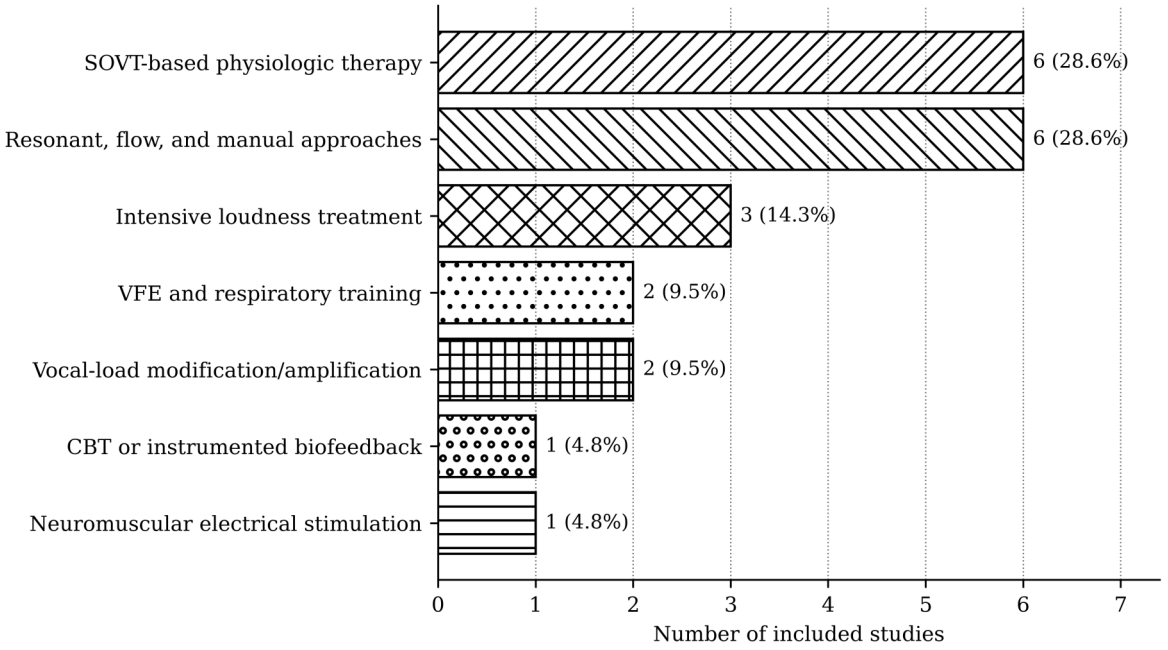


Figure 1. Distribution of the included studies by principal intervention class (n = 21).

The literature was concentrated in two broad treatment families: SOVT-based physiologic therapy and resonant/flow/manual approaches. This concentration reflects the predominance of functional and behavioral dysphonia in the study population. Disease-specific intensive loudness treatment formed a smaller but methodologically strong body of evidence in Parkinson disease.

Table 3. Physiological principles, methods, and clinical indications of common voice therapy techniques

Technique	Therapeutic principle	Typical method	Main indications	Clinical limitations or precautions
Vocal hygiene and	Reduces dehydration,	Education, hydration, pacing,	Occupational dysphonia;	Education alone often produces limited

Technique	Therapeutic principle	Typical method	Main indications	Clinical limitations or precautions
load modification	phonotraumatic behavior, and excessive occupational vocal dose; amplification lowers required vocal intensity.	avoidance of habitual shouting or throat clearing, microphone or portable amplifier when appropriate.	recurrent vocal fatigue; adjunct to any direct therapy.	change. It does not correct glottal insufficiency, hyperfunction, or impaired motor calibration.
Semi-occluded vocal tract exercises	Increases supraglottic inertance and source-filter interaction, allowing efficient vibration with lower phonation threshold pressure and less collision.	Straw phonation, tube phonation in air or water, lip or tongue trill, humming, voiced fricatives; progression from sustained sound to speech.	Behavioral dysphonia, MTD, vocal fatigue, benign lesions after medical assessment, presbyphonia, professional voice users.	The resistance must be appropriate. Excessive depth or effort may increase pressure and discomfort; transfer to connected speech requires explicit practice.
Resonant voice therapy	Promotes forward oral vibration and adequate vocal fold contact with minimal impact stress.	Nasal continuants and easy resonant productions progressed to words, phrases, and conversational speech.	Primary hyperfunction, occupational dysphonia, MTD, patients who can identify oral vibratory sensations.	Less suitable as a sole approach when a large fixed glottal gap or severe respiratory weakness is the dominant problem.
Vocal function exercises	Systematic conditioning of respiratory-laryngeal coordination, adduction, flexibility, and endurance.	Warm-up on sustained vowel, pitch glides, and sustained notes at selected pitches, usually with daily home practice.	MTD, presbyphonia, vocal deconditioning, selected patients with mild glottal insufficiency.	Technique and dosage must be monitored; excessive effort or inappropriate pitch can reinforce strain.
Flow phonation / stretch-and-flow	Reduces excessive laryngeal resistance by establishing continuous airflow before and during phonation.	Airflow awareness, tissue or hand feedback, cup bubbles, gargling, gentle airflow-to-voice transitions, connected speech.	Primary MTD, pressed phonation, high phonatory effort, supraglottic compression.	May be insufficient alone for profound paresis or a large structural glottal gap.
Manual circumlaryngeal therapy	Reduces extrinsic laryngeal muscle tension and lowers an elevated or restricted laryngeal posture.	Palpation, massage, reposturing, and manual reduction of suprahyoid and thyrohyoid tension, often combined with phonation.	MTD with pain, palpable tension, elevated larynx, or poor response to exercise alone.	Requires trained hands and a clear diagnosis; tenderness, vascular disease, recent surgery, or unstable cervical conditions warrant caution.

Technique	Therapeutic principle	Typical method	Main indications	Clinical limitations or precautions
LSVT LOUD	Increases respiratory-laryngeal motor amplitude and recalibrates the patient's perception of vocal effort.	Four high-intensity sessions weekly for 4 weeks, sustained /a/, pitch glides, functional phrases, speech hierarchy, and daily practice.	Hypophonia and hypokinetic dysarthria in Parkinson disease; selected neurogenic disorders with adequate cognition and stamina.	High treatment burden; vocal strain may occur. It should not be applied without laryngeal assessment when pain or structural disease is suspected.
Respiratory muscle strength training	Improves inspiratory or expiratory pressure generation and control available for phonation and cough.	Threshold loading with IMST or EMST, usually combined with direct voice exercises.	Presbyphonia with respiratory limitation; Parkinson disease with weak cough; selected patients with reduced respiratory reserve.	Respiratory gains do not guarantee efficient glottal closure. Cardiopulmonary screening and individualized load are required.
CBT and biofeedback	Modifies maladaptive beliefs, anxiety, muscular recruitment, or self-monitoring through explicit external feedback.	CBT integrated into voice therapy; visual acoustic display; surface electromyography; real-time performance feedback.	Functional dysphonia with psychological distress; poor awareness of effort; persistent maladaptive tension.	Biofeedback is an adjunct, not a substitute for diagnosis. Benefits may not generalize when feedback is removed.
Laryngopharyngeal NMES	Provides peripheral sensory-motor stimulation to weak laryngopharyngeal musculature while active tasks are practiced.	Surface electrodes combined with phonation or swallowing exercises under a defined protocol.	Selected neurogenic dysphonia accompanied by dysphagia after stroke or traumatic brain injury.	Evidence is based on small samples; electrode placement and dose are not standardized. Medical contraindications must be excluded.

SOVT, semi-occluded vocal tract; MTD, muscle tension dysphonia; IMST, inspiratory muscle strength training; EMST, expiratory muscle strength training; CBT, cognitive behavioral therapy; NMES, neuromuscular electrical stimulation.

Table 4. Representative clinical evidence for commonly used voice therapy interventions

Study	Design and population	Intervention/comparator	Main findings	Clinical interpretation
Roy et al., 2003 [2]	RCT; 64 teachers with voice disorders	Voice amplification, RVT, or	Amplification and RVT reduced VHI and self-rated severity; respiratory training did	Reducing vocal load and improving efficient resonance are more useful than nonspecific

Study	Design and population	Intervention/comparator	Main findings	Clinical interpretation
		respiratory muscle training; 6 weeks	not show comparable benefit.	respiratory training in occupational dysphonia.
Duong and Kenny, 2009 [13]	Single-blind RCT; 40 Vietnamese female teachers with MTD	Full VFE protocol versus partial exercise protocol; 4 weeks	The full protocol improved perturbation, HNR, perceptual ratings, and tonal pitch movement more consistently.	VFE can be adapted to tonal-language demands; speech transfer should include language-specific prosody.
Kapsner-Smith et al., 2015 [3]	RCT; 20 adults with dysphonia and/or vocal fatigue	Flow-resistant tube therapy versus VFE with delayed-treatment controls	Both active treatments improved VHI versus no treatment; tube therapy was noninferior to VFE for handicap reduction.	Different SOVT protocols may achieve similar functional benefit when correctly taught and practiced.
Watts et al., 2015 [4]	RCT; primary MTD	Stretch-and-flow plus vocal hygiene versus vocal hygiene alone; 6 weeks	The active group showed large reductions in VHI and improvements in MPT and CPP compared with control.	Airflow-oriented therapy is a well-supported first-line option for primary hyperfunctional voice production.
Meerschman et al., 2019 [10]	Blocked randomized sham-controlled trial; 35 patients with dysphonia	Lip trill, water-resistance therapy, straw phonation, or sham; 3 weeks	Lip trill and straw phonation improved DSI; straw phonation reduced perceptual grade/roughness; lip trill and water resistance reduced VHI.	No single SOVT exercise improved every domain; the selected task can be matched to the patient's principal complaint.
Guzman et al., 2020 [18]	RCT; 34 adults with behavioral dysphonia	Eight-session physiologic SOVT program plus hygiene versus hygiene alone	VHI, VoiSS, VTDS, resonant voice perception, subglottal pressure, and phonation threshold pressure improved in the active group.	Patient-reported effort and aerodynamic efficiency may be more responsive than conventional perturbation measures.
Antonetti et al., 2023 [19]	Randomized blinded trial; 18 adults with mild behavioral dysphonia	SOVT therapeutic program versus VFE; 4 weeks with 1-month follow-up	Both groups reduced VFI and VHI-30 and maintained improvement at follow-up; no clear between-group superiority.	Technique choice may be guided by patient preference, ease of performance, and transfer rather than an assumed hierarchy.
Ramig et al., 2018 [7]	RCT; 64 participants with Parkinson disease	LSVT LOUD versus intensive articulation	LSVT LOUD produced greater gains in speech sound-pressure level at 1 and 7 months than	For Parkinson-related hypophonia, treatment intensity and a voice-amplitude target have

Study	Design and population	Intervention/comparator	Main findings	Clinical interpretation
		treatment versus no treatment	both comparison groups.	disease-specific support.
Sackley et al., 2024 [12]	Pragmatic multicentre RCT; 388 participants with Parkinson disease	LSVT LOUD versus usual NHS speech-language therapy versus no therapy	At 3 months, VHI was 8.0 points lower than no therapy and 9.6 points lower than usual therapy; vocal strain was more frequent with LSVT.	Large-scale evidence confirms benefit, but treatment burden and transient strain require skilled supervision.
Ko et al., 2016 [16]	Controlled pilot; 18 post-stroke or traumatic brain injury patients with dysphonia and dysphagia	Laryngopharyngeal NMES plus conventional swallowing therapy versus swallowing therapy alone	GRBAS total score and sound-pressure level improved more at 2 weeks in the NMES group; the between-group difference was not maintained at 4 weeks.	NMES may accelerate short-term phonatory change, but durability and optimal dosing remain uncertain.
Desjardins et al., 2022 [8]	Prospective randomized trial; 12 completers with presbyphonia	VFE alone, VFE plus IMST, or VFE plus EMST	The IMST group improved connected-speech CPP, self-assessment, and subglottal pressure control; VFE alone improved bowing and selected voice measures.	Respiratory training is most useful when a measured respiratory deficit contributes to presbyphonia.
Khoddami et al., 2023 [17]	Double-blind parallel RCT; 30 female teachers with MTD	Vocal facilitating techniques, manual circumlaryngeal therapy, or combined therapy	All groups improved VTD and DSI; combined treatment produced the largest improvement.	Patients with both inefficient phonation and palpable extrinsic tension may benefit from a combined approach.

RCT, randomized controlled trial; VHI, Voice Handicap Index; RVT, resonant voice therapy; VFE, vocal function exercises; MTD, muscle tension dysphonia; HNR, harmonics-to-noise ratio; MPT, maximum phonation time; CPP, cepstral peak prominence; DSI, Dysphonia Severity Index; VoiSS, Voice Symptom Scale; VTDS, Vocal Tract Discomfort Scale; VFI, Vocal Fatigue Index; NHS, National Health Service; IMST, inspiratory muscle strength training; EMST, expiratory muscle strength training.

IV. DISCUSSION

4.1. What the evidence supports most clearly

The most consistent evidence concerns functional and behavioral dysphonia. SOVT, RVT, and flow-based treatment repeatedly improved the patient's perception of handicap or effort, and often improved MPT, CPP, DSI, or perceptual severity [2-6,10,13-15,17-20]. These approaches share a practical goal: they make phonation easier without asking the patient to "push" for closure. The route differs. SOVT modifies vocal tract impedance; RVT emphasizes efficient contact and oral vibration; flow phonation

reduces excessive laryngeal resistance; manual therapy reduces extrinsic tension. In primary MTD, these methods should be viewed as related tools rather than competing brands.

A notable pattern is the difference between patient-reported and acoustic outcomes. VHI, VFI, VTD, and perceived ease often changed when jitter and shimmer did not [3,10,18,19]. This is clinically plausible. Perturbation measures derived from sustained vowels are sensitive to recording and signal conditions and may not reflect effort, endurance, or communicative participation. Cepstral measures and connected-speech tasks are generally better suited to dysphonic voices, but they also do not replace the patient's report. A credible outcome set should therefore include at least one perceptual rating, one patient-reported measure, and one objective measure obtained under standardized conditions [24,25].

4.2. Matching the technique to the disorder

Treatment selection should follow the dominant impairment. A patient with pressed MTD and continuous supraglottic constriction is a logical candidate for flow phonation, RVT, SOVT, or manual therapy. A patient with presbyphonia and poor respiratory reserve may require VFE plus targeted inspiratory training rather than simple diaphragmatic breathing [8]. A teacher whose larynx is relatively normal but whose vocal dose is excessive may obtain more benefit from amplification and work-place modification than from adding another drill [1,2,11].

Neurogenic dysphonia requires a different framework. LSVT LOUD has the strongest disease-specific evidence in Parkinson disease, including a large pragmatic trial with benefit sustained over 12 months [7,12]. Its effect should not be generalized to every weak voice. The protocol depends on intensive practice, sufficient cognition, and the ability to tolerate repeated high-effort phonation. In PD COMM, vocal strain was common enough to reinforce the need for trained supervision [12]. Laryngopharyngeal NMES is more preliminary. The small controlled study by Ko et al. found an early phonatory benefit in patients with concomitant dysphagia, but the advantage was not sustained after stimulation ceased [16]. It should remain an adjunct for selected patients rather than a routine substitute for active therapy.

4.3. Indications are not diagnoses alone

A diagnostic label does not determine the exercise. "Vocal nodules," for example, may coexist with severe MTD, inefficient breath use, or an occupational load that makes recovery impossible. Conversely, a large fixed glottal gap from paralysis is unlikely to close through resonant voice work alone. Laryngoscopy or videostroboscopy should precede therapy when symptoms persist, when the voice is painful, or when neurological or structural disease is suspected. The therapist then identifies a modifiable physiological target and documents whether the chosen exercise changes that target.

The same principle applies to treatment dose. Eight sessions of a structured SOVT program and 16 intensive LSVT sessions are not equivalent exposures. Home practice, feedback, adherence, and transfer to spontaneous speech are part of the treatment, not ancillary details. Studies that report only pre-post vowels without functional speech outcomes may overestimate clinical transfer.

4.4. Gaps in the literature

The geographical distribution of the evidence is a concern. Most studies were conducted in a small number of academic centres, often with women, teachers, or highly selected patients. African populations were not represented in this corpus, and relatively few trials addressed tonal languages, multilingual patients, or settings with limited access to specialized

voice therapy. Duong and Kenny's study is important because it showed that an exercise protocol can require language-specific adaptation rather than direct importation [13].

Sample size was another limitation. Several studies enrolled fewer than 30 participants, and many compared active techniques without an untreated or attention-matched control. The heterogeneity of outcome measures prevents a meaningful pooled estimate. Future trials should use transparent treatment manuals, report adherence and adverse effects, include connected speech and participation outcomes, and define the laryngeal phenotype of the sample. Long-term follow-up is particularly important because early improvement may reflect therapist cueing rather than stable motor learning.

V. CONCLUSIONS

Common voice therapy techniques are supported by a growing but uneven clinical literature. For functional and behavioral dysphonia, SOVT, resonant voice therapy, flow or stretch-and-flow treatment, VFE, and manual circumlaryngeal therapy can improve vocal handicap, effort, perceptual quality, and selected physiologic measures. LSVT LOUD has robust disease-specific evidence for Parkinson-related hypophonia. Vocal hygiene and load reduction remain necessary, particularly for occupational voice users, but they are rarely sufficient as sole treatment. Respiratory training, CBT, biofeedback, and NMES are best used when the corresponding respiratory, psychological, sensory-motor, or neuromuscular deficit is demonstrable.

The central clinical task is not to choose the most fashionable exercise. It is to identify the mechanism that is limiting phonation, select a technique that directly addresses that mechanism, and verify change with multidimensional outcomes. That approach is both more defensible and more likely to produce durable functional benefit.

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