

Clinical Voice Pathology

Theory and Management

Fifth Edition

Joseph C. Stemple, PhD, CCC-SLP, ASHAF
Nelson Roy, PhD, CCC-SLP, ASHAF
Bernice K. Klaben, PhD, CCC-SLP, BRS-S



Contents

<i>Preface</i>	<i>xiii</i>
1 Voice: A Historical Perspective	1
Ancient History	2
The Renaissance	5
The 17th to 19th Centuries	5
The Laryngeal Mirror	6
Further Advancements	7
Voice Therapy	8
Clinical Voice Pathology	9
References	11
2 Anatomy and Physiology	13
Anatomy	13
The Laryngeal Valve	15
Respiration for Phonation	16
Vocal Tract Resonance	18
Structural Support for the Larynx	18
Hyoid Bone	18
Laryngeal Cartilages	19
Muscles	24
Muscles for Respiration: Inspiration and Exhalation	24
Laryngeal Muscles	27
True Folds, Ventricular (False) Folds, and Ventricle	34
Vocal Fold Microstructure	35
Epithelium	36
Basement Membrane Zone	36
Lamina Propria	37
Vocal Muscle	40
Blood Supply and Secretions	40
Neurologic Supply	41
Central Nervous System Control	41
Peripheral Innervation	42
Laryngeal Reflexes	44
Developmental Changes	44

Geriatric Vocal Folds	46
DNA Microarray Gene Expression Analysis	47
Physiology of Phonation	48
Theories of Vibration	48
Fundamental Frequency Control	50
Intensity Control	50
Phonation Modes and Voice Quality Control	51
Summary	51
References	52
3 Some Etiologic Correlates	57
Etiologies of Vocal Misuse	57
Phonotrauma	58
Inappropriate Vocal Components	59
Medically Related Etiologies	62
Direct Surgery	63
Indirect Surgery	63
Chronic Illnesses and Disorders	64
Primary Disorder Etiologies	67
Personality-Related Etiologies	68
Environmental Stress	69
Identity Conflict	69
Summary	70
References	70
4 Pathologies of the Laryngeal Mechanism	73
Prevalence of Voice Disorders	74
Pathology Classifications	75
Structural Pathologies of the Vocal Fold	76
Congenital and Maturational Changes Affecting Voice	86
Inflammatory Conditions of the Larynx	88
Trauma or Injury of the Larynx	89
Systemic Conditions Affecting Voice	90
Allergies	93
Nonlaryngeal Aerodigestive Disorders Affecting Voice	93
Psychiatric and Psychological Disorders Affecting Voice	95
Neurologic Disorders Affecting Voice	100
Movement Disorders Affecting the Larynx	106
Central Neurologic Disorders Affecting Voice	109
Other Disorders of Voice Use	111
Summary	114
References	114

5	The Diagnostic Voice Evaluation	121
	The Management Team	122
	Patient Profile	123
	Referral Sources	123
	Medical Evaluation	124
	Voice Pathology Evaluation	126
	Diagnostic Voice Evaluation	127
	Referral	127
	Reason for the Referral	127
	History of the Problem	129
	Oral-Peripheral Examination	131
	Auditory-Perceptual Voice Assessment	132
	Patient Self-Analysis of the Voice Disorder	135
	Impressions	136
	Prognosis	136
	Recommendations	137
	Additional Considerations	137
	Summary	137
	References	138
	Appendix 5–A. Sample Report	140
	Appendix 5–B. Consensus Auditory-Perceptual Evaluation of Voice (CAPE-V)	143
	Appendix 5–C. The Rainbow Passage	145
	Appendix 5–D. Vocal Component Checklist	146
	Appendix 5–E. Voice Handicap Index (VHI)	147
6	Instrumental Measurement of Voice	149
	Introduction to Instrumentation in Voice Assessment	149
	Clinical Utility	150
	Basics of Technical Instruments	153
	Microphones and Recording Environment	153
	Digital Signal Processing	154
	Acoustic Measurements	155
	Pitch Detection Algorithm	156
	Fundamental Frequency	157
	Intensity	158
	Voice Range Profile, Phonetogram, and Physiologic Frequency	159
	Range of Phonation	
	Perturbation Measures	159
	Signal (or Harmonic)-to-Noise Ratios	161
	Spectral Analysis	161

Cepstral Spectral Index of Dysphonia (CSID)	164
Aerodynamic Measures	164
Calibration	166
Pressure, Flow, Resistance, and Ohm's Law	166
Airflow Equipment	167
Flow Measurement	168
Subglottal Air Pressure Measurement	168
Phonation Threshold Pressure	169
Laryngeal Resistance	171
Inverse Filter	171
Laryngeal Imaging	172
Endoscopy	174
Stroboscopy	176
High-Speed Digital Imaging	178
Kymography	180
Criteria for Laryngeal Imaging	182
Endoscopic Imaging Techniques	183
Recording Protocol	184
Visual Perceptual Judgments	184
Electroglottography (EGG)	187
Laryngeal Electromyography (LEMG)	187
Normative Information	188
Electrical Safety	188
Hygienic Safety	191
The Clinical Voice Laboratory	191
Glossary	192
Acoustics	192
Aerodynamics	193
Imaging	194
References	195
Appendix 6–A. Joint Statement: ASHA and AAO-HNS	201
Appendix 6–B. Vocal Tract Visualization and Imaging: Position Statement	202

7	Survey of Voice Management	203
	Voice Therapy Orientations	203
	Hygienic Voice Therapy	203
	Symptomatic Voice Therapy	205
	Psychogenic Voice Therapy	207
	Physiologic Voice Therapy	208
	Eclectic Voice Therapy	209
	Case Study 1	209

Hygienic Voice Therapy	213
Treatment Strategies for Vocally Traumatic Behavior	213
Vocal Hygiene Therapy Approaches	213
Case Study 2: The Homemaker	214
Case Study 3: The Noisy Job Environment	216
Case Study 4: The Public Speaker	217
Case Study 5: Phonotrauma in Children	218
Case Study 6: Can We Always Expect Success?	222
Hydration	223
Confidential Voice	224
Symptomatic Voice Therapy	224
Therapy Approaches for Respiration	225
Therapy Approaches for Phonation	227
Therapy Approaches for Resonance	230
Therapy Approaches for Pitch	235
Therapy Approaches for Gender Reassignment Voice Change	238
Therapy Approaches for Loudness Modification	239
Therapy Approaches for Rate Modification	240
Treatment Approaches for Laryngeal Area Muscle Tension	241
Psychogenic Voice Therapy	243
Functional Aphonia/Dysphonia	244
Functional Falsetto	249
Vocal Cord Dysfunction (VCD)	252
Physiologic Voice Therapy	253
Case Study 11: Laryngeal Muscle Imbalance	254
Case Study 12: The Postsurgical Patient	255
Case Study 13: Presbyphonia	255
Vocal Function Exercises	256
Resonant Voice Therapy	260
Accent Method of Voice Therapy	264
Lee Silverman Voice Treatment	267
Team Management of Specific Laryngeal Pathologies	268
Vocal Fold Cover Lesions	268
Laryngopharyngeal Reflux and Gastroesophageal Reflux Disease	269
Unilateral Vocal Fold Paralysis	271
Case Study 14: Unilateral Vocal Fold Paralysis	276
Spasmodic Dysphonia	277
Successful Voice Therapy	282
References	283
Appendix 7–A. Phrases and Sentences Graduated in Length	292
Paragraph Readings	299
Poetry Readings	304

8 The Professional Voice	311
Overview	311
The Professional Voice User	312
History	312
The “At-Risk” Status	315
Professional Roles	316
The Otolaryngologist	317
The Voice Pathologist	317
The Producer	319
The Agent or Manager	319
Clinical Pathways	320
Otolaryngology-Voice Pathology-Voice Pedagogy	320
Voice Pedagogy-Otolaryngologist-Voice Pathology	320
Voice Pedagogy-Voice Pathology-Otolaryngology	322
Otolaryngology-Voice Pedagogy	322
Voice Pathologist-Voice Pedagogy	322
Vocal Types and Vocal Range	322
Categories of Singers	324
Vocal Registers	324
Common Etiologic Factors	325
Personality Factors	325
Phonotrauma	326
Drugs	328
Hydration	328
Common Pathologies	329
Acute and Chronic Noninfectious Laryngitis	329
Vocal Nodules	330
Contact Ulcers and Granulomas	332
Gastroesophageal Reflux Disease/Laryngopharyngeal Reflux	332
Voice Fatigue	333
Vocal Fold Hemorrhage and Vascular Pathologies	334
Clinical Assessment of the Vocal Performer	336
Supportive Training and Techniques	337
Alexander Technique	338
The Linklater Method	339
The Feldenkrais Method	339
The Lessac System	340
Estill Voice Training	341
Summary	341
Glossary of Terms Used in Singing	341
References	342

9	Rehabilitation of the Laryngectomized Patient	349
	Overview	349
	Incidence of Laryngeal Cancer	349
	Etiology	350
	Symptoms of Laryngeal Cancer	351
	Medical Evaluation	352
	Staging and Tumor-Node-Metastasis Classification	353
	Lymph Node Distribution	357
	Treatment Options	359
	Conservation	359
	Combined Treatments	360
	Radiation Therapy	360
	Surgery	362
	Concurrent Chemoradiotherapy	363
	Methods of Reconstruction	366
	Needs for Follow-Up Treatment	367
	Multidisciplinary Rehabilitation Team	368
	Special Concerns of the Laryngectomized Patient	372
	Communication	372
	Physical Concerns	373
	Psychosocial Concerns	381
	Speech Rehabilitation	382
	Artificial Larynges	383
	Esophageal Speech	390
	Surgical Prosthetics	395
	Role of the Speech-Language Pathologist and Surgical Prosthetics	399
	Patient Evaluation	399
	Patient Fitting	401
	Independent Care	404
	Maximizing Communication	406
	Hands-Free Speaking Valve	407
	Summary	408
	Helpful Websites on Head and Neck Cancers	409
	References	411
	<i>Index</i>	419

Preface

This fifth edition of *Clinical Voice Pathology: Theory and Management* marks the 30-year anniversary of this text. As this preface is written, the memories of 1984 are in the forefront of our minds. It was an exciting time for the profession—the beginning of a new age of voice pathology. Desktop computers were new and provided clinicians the opportunity to instrumentally assess voice production. Laryngeal videostroboscopy was introduced as a voice care tool, and the importance of preserving the vocal fold cover was realized. To understand the influence and growth of technology in the field, one need only observe the differences between the Apple IIE computer that was used to prepare the first edition of this text and the iMac being used today for the fifth edition. We have seen remarkable changes in these 30 years.

This edition also introduces the end of one era and the beginning of another. The past 3 editions have included the wonderful contributions of our friend and colleague Dr Leslie Glaze. Her scientific knowledge, masterful writing, and attention to detail have all added to the quality and fabric of this text. Leslie is now enjoying retirement, but her influence upon this text will live through this and future editions of *Clinical Voice Pathology: Theory and Management*.

We are excited to introduce Dr Nelson Roy as a new coauthor for this fifth edition. Dr Roy's research and clinical contributions to the field of voice pathology are nationally and internationally recognized. He is a master clini-

cian and scientist who will continue the tradition of "clinical scientist as author." We are pleased to have Nelson on board and know that his contributions will enhance the quality of the learning experience for our students and professionals alike.

The advances in our field in the past 30 years have been extraordinary. However, when one studies the history of our specialty, it is remarkable how much of our past remains in terms of assessment and treatment. As an example, with all the available technology to aid in voice evaluation, we would submit that the skilled patient interview remains the most important part of the voice assessment. In the same vein, many of the therapy techniques that we currently use have their foundations in skills that were practiced centuries ago to enhance singing and speaking voices. The advances in our knowledge have significantly enhanced the diagnostic process and have helped confirm whether our chosen treatments are truly effective.

The authors of this text have been privileged to serve those with voice disorders for many years. While we have had the opportunity to work in clinical voice centers, side-by-side with our laryngology partners, we fully understand that voice therapy is needed and provided in practically every setting in which speech-language pathologists work. This text is designed to help prepare all clinicians, not only those who specialize in the area of voice, to

evaluate and treat voice disorders. This unique and eclectic population of patients encompasses all ages across the life span and represents etiologies arising from medical, environmental, social, psychological, and occupational threats to vocal health. Our patients may be typical voice users, occupational voice users, elite vocal performers, individuals with head and neck cancer, and others who suffer with upper airway symptoms. Each patient provides us with a unique diagnostic dilemma: How do we best return the voice to optimal condition?

This text is organized to systematically build the knowledge base and clinical skills necessary to successfully answer this question. We seek to organize, explain, and illustrate the comprehensive hierarchy of knowledge necessary to manage the many types of voice disorders. **Chapter 1** begins with an entertaining history of voice disorders from ancient foundations to the present. This information clarifies the role of speech-language pathologists in the care of voice-disordered patients and introduces the interdisciplinary background that has permeated our history of successful voice therapy.

A progressive development of essential clinical knowledge areas begins with **Chapter 2**, the anatomy and physiology of voice production. Understanding the structure and function of the laryngeal mechanism is an essential basis for evaluating phonatory function, examining the larynx and vocal folds, recognizing the impact of abnormal changes or adaptations on voice production, and sharing information with our physician partners in care. This fifth edition updates the descriptions of the 3 subsystems of voice production—respiration, phonation, and resonance—and expands the discussion of vocal fold

histology and DNA microarray gene expression analysis.

Chapter 3 provides a thorough update on the common etiologies of voice disorders including behavioral, medical, and personality related. Common factors associated with the cause and maintenance of voice disorders are discussed to understand best options for treatment planning.

Chapter 4 presents the pathologies of the laryngeal mechanism, organized according to the *Classification Manual for Voice Disorders-I* developed by Special Interest Division 3 (Voice and Voice Disorders) of the American Speech-Language-Hearing Association (2006). The pathologies are presented in 8 major groups: (1) structural pathologies; (2) inflammatory conditions; (3) trauma or injury; (4) systemic conditions affecting voice; (5) aerodigestive conditions affecting voice; (6) psychiatric or psychological disorders affecting voice; (7) neurologic voice disorders; and (8) other disorders of voice. Many of the pathologies are illustrated with color plates.

Chapters 5 and 6 discuss the objectives and procedures of a systematic diagnostic voice evaluation. Chapter 5 introduces traditional evaluation techniques, including the patient interview, audioperceptual judgments, patient self-assessment, determining the cause(s) and maintaining factor(s) of the voice disorder, and educating the patient about these findings to establish a collaborative management plan based on these clinical data. Chapter 6 provides a state-of-the-art overview of the instrumental measures that comprise a comprehensive voice assessment, including the scientific principles that underlie their development, application, and interpretation. In addition to standard measures of acoustics, aerodynamics,

electromyography, and stroboscopy, this edition explains the utility of high-speed digital imaging and videokymography tools. The appendix includes instrumental measurement norms and a helpful glossary of terms.

Knowledge of anatomy and physiology, pathologies, etiologies, and the diagnostic process have prepared the reader for **Chapter 7** that explores an array of voice therapy approaches following the orientations of hygienic, symptomatic, psychogenic, physiologic, and eclectic treatments. Using patient cases to illustrate major insights about voice treatment that we have each gathered from our 30-plus years of clinical experience, we orient the reader to the theories, selection criteria, and clinical methods for specific voice management principles. This treatment framework is appropriate for common, yet diverse voice complaints due to a variety of laryngeal pathologies and vocal dysfunctions. Finally, we highlight the current clinical evidence that either supports or refutes popular treatments used in voice therapy.

Because of the exceptional concerns of voice performers, **Chapter 8** introduces the factors that influence clinical management approaches for this artistic population, such as personalities, temperament, performance routines and schedule, and other special considerations needed for their care and treatment. The chapter defines the roles of the expanded interdisciplinary team and identifies the affiliate organizations that represent and support voice performers. In addition to traditional voice therapy considerations, the chapter discusses nontraditional alternative treatments that are popular with this population.

Chapter 9, Rehabilitation of the Laryngectomized Patient, serves as a

stand-alone manual on the management of this special patient population. This chapter reflects the current “best practice” in voice rehabilitation or restoration in head and neck cancer patients. By outlining the complementary roles of the interdisciplinary treatment team, we understand the multiple management goals: cure the disease; select optimal communication methods; ensure safe swallowing; and address any associated physical, social, and emotional changes that affect each patient. The chapter also contains photographs of the latest communication and airway management devices currently on the market.

Over the past four decades, our chosen specialty of clinical voice pathology has expanded greatly within the field of communication disorders. Nonetheless, this fifth edition of our text retains its original purpose: to provide students and clinicians with a strong foundation of basic voice science infused with a deep clinical understanding of the best methods for assessing and treating voice disorders. We hope that you, the reader, will find this text clear, informative, and a worthwhile addition to your professional library.

As always, text development requires a team. We are indebted to Angie Singh, Valerie Johns, Milgem Rabanera, and McKenna Bailey for encouraging and supporting this fifth edition. In addition, we wish to thank our students and colleagues who have suggested ways to improve the text with each new writing. Finally, it is our patients who have taught us so much about what is important in the care of their voices and to them we are greatly indebted.

Joseph C. Stemple,
Nelson Roy, and
Bernice K. Klaben



Survey of Voice Management

The extensive diagnostic voice evaluation has provided the voice pathologist with answers to what has caused the voice disorder and a description of the current vocal symptoms. The answers to the etiologic questions include primary causes as well as secondary etiologic factors. In addition, an understanding of the present vocal physiology and the relationship of respiration, phonation, and resonance has been established. A systematic management approach must now be initiated with the purpose of modifying or eliminating the etiologic factors and improving voice by rebalancing the three sub-systems of voice production. This chapter is designed to survey the basic philosophies of voice treatment and to introduce the reader to some specific voice therapy techniques. In addition, the evidence that supports the use of the various techniques will be examined. Although the information contained in this chapter is by no means an exhaustive presentation of all voice therapy approaches, the survey is a useful point of departure for the study of voice management.

VOICE THERAPY ORIENTATIONS

As stated in Chapter 1, the management of voice disorders by “speech correctionists” began in the 1930s. Since that time, a rich and interesting history of voice therapy approaches has evolved, leading to several philosophical orientations of therapy. These orientations include hygienic, symptomatic, psychogenic, physiologic, and eclectic voice therapies.¹

Hygienic Voice Therapy

Hygienic voice therapy often is the first step in many voice therapy programs. As discussed in Chapter 3, many etiologic factors contribute to the development of voice disorders. Poor vocal hygiene may be a major developmental factor. Some examples of behaviors that constitute poor vocal hygiene include shouting, talking loudly over noise, screaming,

vocal noises, coughing, throat clearing, and poor hydration. When the inappropriate hygienic behaviors are identified, appropriate treatments can be devised for modifying or eliminating those behaviors. Once modified, voice production has the opportunity to improve or return to normal.

When poor vocal hygiene behaviors are modified, vocal symptoms may improve without direct manipulation of the voice subsystems (respiration, phonation, resonance). A common example is the reduction of the abusive behavior of shouting in children who have nodules. By eliminating the shouting behavior, the nodules are given an opportunity to resolve, and the voice may improve. If the compensations in the voice subsystems that resulted from the presence of the nodules have not habituated, improvement may result without the need for direct modification of the voice components, such as inappropriate pitch, breathiness, glottal attacks, and so on.

Hygienic voice therapy presumes that many voice disorders have a direct behavioral cause. This therapy strives to instill healthy vocal behaviors in the patient's habitual speech patterns. Good vocal hygiene also focuses on maintaining the health of the vocal fold cover through adequate internal hydration and diet. Once identified, poor vocal hygiene habits can be modified or eliminated leading to improved voice production.

Research Evidence and Vocal Hygiene

Thomas and Stemple² presented a comprehensive review of the research evidence supporting the use of the major voice therapy orientations. Despite the fact that hygienic methods have been a mainstay of voice therapy from the

earliest days to the present, few studies have systematically investigated the efficacy of vocal hygiene therapy alone as a means of managing functional voice disorders. More common in the literature have been studies using vocal hygiene training as a control against which other more *direct* therapy methods are measured. In their review, Thomas and Stemple examined the evidence supporting vocal hygiene in several categories including:

- individual vocal hygiene training³⁻⁹
- group vocal hygiene training¹⁰⁻¹⁵
- specific vocal hygiene targets
 - Hydration^{12,16-20}
 - Silent cough²¹⁻²³
 - Voice rest/modified voice rest^{21,24-31}

The major conclusions drawn from this review raised questions regarding the sufficiency of a vocal hygiene training as a stand-alone therapy. Results from many of the reviewed studies point to a superiority of direct treatments over hygiene approaches for treating voice disorders and call into question the degree of change possible with vocal hygiene when used alone.^{5,6,9}

Studies examining the potential for *group-based* hygiene training for altering vocal behaviors have raised questions regarding the effectiveness of this form of treatment. Studies have demonstrated changes in *knowledge level* following training; however, such changes have not translated into changes in *behavior*.¹⁰⁻¹⁵ As a result, the benefit of group hygiene training for preventing and managing voice disorders has not yet been clearly demonstrated.²

An exception to the above statement involves research related to hydration. Several well-controlled studies have identified reductions in phona-

tion threshold pressure¹⁷⁻¹⁹ as well as improvement in vocal endurance³² following hydration conditions. Unfortunately, only one study has demonstrated the benefit of hydration in subjects with diagnosed voice disorders.²⁰ Nonetheless, hydration studies provide evidence to suggest that increased hydration may yield reduced phonatory effort along with enhanced vocal endurance, important considerations for the treatment of voice disorders.

A review of the above studies suggests that vocal hygiene training lacks adequate scientific evidence to support its use as a *primary* mode of voice treatment, but it should be considered as part of a larger, more comprehensive voice therapy program.

Symptomatic Voice Therapy

The focus of symptomatic voice therapy is on the modification of the deviant vocal symptoms or perceptual voice components that were identified during the diagnostic voice evaluation. Aberrant symptoms include a pitch that is too high or low, voice that is too soft or loud, breathy phonation, or the use of hard glottal attacks or glottal fry among others. Daniel Boone²⁴ was the first voice pathologist to organize previous literature and introduce this symptomatic therapy orientation to our profession. Symptomatic voice therapy is based on the premise that most voice disorders are caused by the functional misuse of the voice components including respiration, phonation, resonance, pitch, loudness, and rate. When identified through the diagnostic process, the misuses are eliminated or reduced through various voice therapy facilitating techniques. Boone^{24(p11)} stated:

In the voice clinician's attempt to aid the patient in finding and using his best voice production, it is necessary to probe continually within the patient's repertoire to find that one voice that sounds "good" and which he is able to produce with relatively little effort. A voice therapy facilitating technique is that technique which, when used by a particular patient, enables him easily to produce a good voice. Once discovered, the facilitating technique and resulting phonation become the symptomatic focus of therapy . . . This use of a facilitating technique to produce a good phonation is the core of what we do in symptomatic voice therapy for the reduction of hyperfunctional voice disorders.

Boone's original facilitating techniques included:

- altering of tongue position
- change of loudness
- chewing exercises
- digital manipulation
- ear training
- elimination of abuses
- elimination of hard glottal attack
- establishment of new pitch
- explanation of the problem
- feedback
- hierarchy analysis
- negative practice
- open-mouth exercises
- pitch inflections
- pushing approach
- relaxation
- respiration training
- target voice models
- voice rest
- yawn-sigh approach

As you read through this chapter, many of these approaches are described in detail, as they continue to be well

utilized in the treatment of voice disorders. To summarize symptomatic voice therapy, we conclude that:

- The voice pathologist evaluates the presence of deviant voice components.
- The voice pathologist constantly probes for the “best” voice in the presence of the disorder.
- When the best voice is found, facilitating techniques are used to stabilize the improved voice production.

Symptomatic voice therapy assumes voice improvement through direct symptom modification.

Research Evidence and Symptomatic Voice Therapy

Many efficacy studies related to symptomatic treatment have failed to isolate a specific facilitating method for investigation. The studies have, rather, examined comprehensive symptomatic programs composed of a variety of facilitating methods. For the purpose of examining the evidence supporting this method of treatment, a therapy method was considered “symptomatic” if it aligned closely with one of the traditional facilitating methods listed above, or if it focused on the modification of an isolated vocal symptom for correction of voice.² Individual facilitating methods of pushing,^{33,34} humming,³⁵ chewing,^{36–38} yawn-sigh,^{39–42} feedback (EMG,^{43–46} acoustic and aerodynamic,^{47,48} stroboscopy^{49,50}), change of loudness,^{51–53} inhalation phonation,^{40,54,55} digital manipulation,^{40,55} relaxation,^{43,56,57} establishment of a new pitch,^{40,58} amplification,^{53,59} and comprehensive symptomatic programs with multiple methods employed^{60–63} were reviewed.

The review of symptomatic therapies revealed concerns related to efficacy research within this therapy orientation. The majority of studies cited above demonstrated a lack of rigor in their research design. As a result, many of the facilitating methods within the symptomatic model have been supported by limited evidence. Although the studies provide early evidence for the use of a method, firm efficacy conclusions cannot be derived from these studies. Second, few of the above studies examined the efficacy of *specific* symptomatic techniques. Authors reported on the efficacy of *comprehensive* voice therapy protocols, but examinations of specific components of those protocols were few. Finally, the literature search demonstrated that no published evidence exists for many of the traditional symptomatic methods proposed by Boone and others.

At present, only one symptomatic method has been examined through multiple group studies. Promising lines of research have emerged suggesting the benefit of various forms of biofeedback for relaxing the laryngeal musculature. Systems offering feedback on laryngeal function, acoustic/aerodynamic output, and muscle effort appear efficacious. Recent advances in instrumentation perhaps will allow for the future development of even more sophisticated biofeedback methods.

The paucity of research evidence in support of symptomatic voice therapy does not mean that the approaches used in this method are not effective. The methods have been used successfully for many years. However, to *prove* the efficacy of these approaches, research in this area must advance on 2 fronts. First, the theoretical foundations of symptomatic methods must be examined. As

sophisticated instrumentation was not available when symptomatic therapy emerged, the physiologic underpinnings of many symptomatic methods have not been demonstrated. Researchers should employ the advanced instrumentation now available in the field to examine the physiology behind these conventional methods. Second, the symptomatic methods must be examined more fully for their clinical efficacy. Future studies must advance beyond previous work by isolating specific facilitating methods for examination and employing more rigorous group research designs.

Psychogenic Voice Therapy

Psychogenic voice therapy is based on the assumption of underlying emotional or psychosocial behavioral causes for the voice disturbance. The relationship of emotions to voice production has been well documented in the literature starting as early as the mid-1800s to the present.⁶⁴⁻⁶⁶ West, Kennedy, and Carr⁶⁷ and Van Riper⁶⁸ discussed the need for emotional retraining in voice therapy, whereas Murphy⁶⁹ and Brodnitz⁷⁰ presented excellent information related to the psychodynamics of voice production. In her comprehensive discussion of voice therapy and children, Moya Andrews⁷¹ presented a compelling argument for examining the psychodynamics of a child's speaking environment when treating voice disorders in this population.

Aronson^{72(p131)} first articulated his description of a psychogenic voice disorder when he stated that:

A psychogenic voice disorder is broadly synonymous with a functional one but

has the advantage of stating positively, based on the explanation of its causes, that the voice disorder is a manifestation of one or more types of psychological disequilibrium, such as anxiety, depression, conversion reaction, or personality disorder, which interfere with normal volitional control over phonation.

Aronson,⁷³ Case,⁷⁴ and Colton and Casper⁷⁵ further discussed the need for determining the emotional dynamics of the voice disturbance from the interactive perspectives of emotions as a cause for voice disorders and voice disorders as the cause of emotional disequilibrium.

In other words, psychogenic voice therapy focuses on identification and modification of the emotional and psychosocial disturbances associated with the onset and maintenance of the voice problem. When the psychogenic causes are resolved, the voice disorder dissipates. Voice pathologists must develop and possess superior interviewing and counseling skills, as well as the skill to know when the emotional or psychosocial problem is in need of more intensive evaluation and therapy by other professionals.

Research Evidence to Support Psychogenic Voice Therapy

Although it is well understood that emotions, personality, and psychological disorientation may play a vital role in the development and maintenance of voice disorders, there have been no studies designed to determine the efficacy of counseling, either by a speech-language pathologist or other health care providers, in resolving voice disorders. Further research is needed in