CANADIAN VOICE CARE FOUNDATION

VOICE Talk

Dedicated to serving the needs of professional and occupational voice users in Canada.

Volume 7, Issue 1, Fall 2002

FROM THE DIRECTOR'S DESK

Every body will likely be in full swing with courses, classes, vocal activities and performances. I hope this issue of Voice Talk will support and enlighten you in your vocal activities and endeavours.

Between the last Voice Talk and this issue, you have a complete overview of Body Therapy Techniques.

After the G8 Summit in June, Calgary remained a busy city, staging concerts and festivals. One of the highlights this year was the Calgary International Organ Festival and its associated Speaker Series. Two speakers of particular note were Dr. Mitchel Gaynor and Dr. Samuel Wong. Both spoke on very similar topics, the healing power of music.

Dr. Mitchell Gaynor, Director of Medical Oncology and Integrative Medicine at the Stang-Cornell Cancer Prevention Center, discussed the effects of music and breathing on the cellular and sub-cellular level. He described this through his observations of treating cancer patients whose immunoglobin levels were significantly increased after listening to certain forms of music. Of particular interest was his use of Tibetan drums and crystal bowls to produce sound therapy to complement his patient's regular treatments to induce a relaxed and calming state. Dr. Gaynor expressed that the "voice is nothing more than audible breath. Your voice is one of the most powerful healing tools that I know of, the human voice. That is why...chanting (and) why singing is so powerful. It's able to get you breathing deeply again."

Dr. Samuel Wong, Ophthalmologist and Music Director of the Hong Kong Philharmonic Orchestra and the Honolulu Symphony Orchestra, discussed at length the effects of music on clinical results. Of particular note was his explanation and observations around stroke patients where by using the singing voice enables the patient's level of communication to strengthen more quickly, thus boosting confidence to continue all rehabilitation.

The presentations and discussions were very inspiring and reaffirmed our beliefs and observations. For more information and a transcript of the lectures, please visit the Royal Bank Calgary International Organ Festival web-site: http://www.triumphent.com/rbcSymposium/

Donna Kay, a friend and assistant of mine, stepped in for me in September to give two presentations at the Prairie Music Week in Winnipeg. She did an excellent job in both workshops. The conference coordinator, Lee Ann Peluk, reported about much positive feedback from the attendants. In October I gave a presentation and workshop at the Alberta Music Conference which took place at the Telus Convention Centre in Calgary. It was followed a week later by the Vocal Fitness seminar I held with Donna Kay at the Rozsa Centre on the campus of the University of Calgary. It ran on two Saturdays and continued the seminars I have been conducting in early spring and fall since 1996 through the University's Continuing Education Program.

Despite financial difficulties we intend to proceed with our preparations for the 5th International Voice Care Symposium, likely to take place in Toronto or Banff, Alberta. Your Input will help us to decide on the location. Please give us your thoughts and feedback by Dec 22, 2002. Send us your suggestions by mail, fax or e-mail. All as noted on the last page.

INSIDE...

Sona-Speech

Even without a large budget, you can still afford the best speech therapy software available.

FEATURES:

- **Powerful, user-friendly, affordable speech/voice therapy software.**
- **Real-time visual feedback displays to help achieve therapy goals more efficiently.**
- **Seven separate modules for assessment and treatment applied to a broad range of communication disorders.**
- **Games and graphic rewards to motivate children in therapy.**
- **Quantitative measurements to track client progress.**

Sona-Speech is a powerful, new, low-cost therapy product from Kay Elemetrics. With the same sophisticated software as Kay's acclaimed Visi-Pitch III, Sona-Speech offers tremendous versatility with seven separate modules (and two optional programs) for assessment and treatment of a broad spectrum of communication disorders at a tremendous bargain. Because Sona-Speech relies on standard sound cards for data acquisition and playback, rather than the robust hardware of the Visi-Pitch III, it is ideally suited to the budget-minded clinician.

APPLICATIONS:

- **Visual Feedback in Therapy**
- **Articulation Training**
- **Voice Disorders**
- **Fluency**
- **Motor Speech Disorders (Dysarthria)**
- **Accent Reduction**

The broad applicability of Sona-Speech extends across a variety of disorders including voice, articulation, fluency, and motor speech (dysarthria). Games are included to help motivate and reward children in therapy. Sona-Speech can also be used for English as a Second Language (ESL) and accent reduction.

For more information about Sona-Speech, contact Kay Elemetrics or a local representative.

KAY
World Leaders in Speech, Voice, and Swallowing Instrumentation

Kay Elemetrics Corp.

2 Bridgewater Lane ❖ Lincoln Park, NJ 07035-1488 USA
Tel: 1-800-289-5297 (USA and Canada) ❖ (973) 628-6200 ❖ Fax: (973) 628-6363
E-mail: sales@kayelemetrics.com ❖ Web: www.kayelemetrics.com

Many Methods for Improved Vocal Results:

A review of several commonly used structured voice therapy programs

Douglas Roth, M.M., M.A, CF-SLP
Katherine Verdolini, Ph.D., CCC-SLP

Department of Communication Science and Disorders
School of Health and Rehabilitation Sciences
University of Pittsburgh

University of Pittsburgh Voice Center
Department of Otolaryngology Head and Heck Surgery
University of Pittsburgh

The speech language pathologist who routinely engages in voice therapy encounters a diversity of patients, who present with a variety of different and often concomitant voice problems.

These include functional problems in the actual use of the voice, organic conditions such as nodules, polyps, or cysts, and neurological processes such as superior or recurrent laryngeal nerve paresis and paralysis.

In addition several diseases of the nervous system such as Parkinson disease and Amyotrophic Lateral Sclerosis also may have an affect on voice.

The clinical picture often is complicated by the fact that a patient may have a combination of conditions operating simultaneously. Not uncommonly, a patient with a vocal cyst (for example) also may present with muscle tension dysphonia. In such cases, it is often difficult to determine if the vocal functioning lead to the pathology or vice versa.

The voice therapist is responsible for determining the best course of therapy, based on his or her findings together with those from the physician. Although some patients with organic pathologies require some type of surgical intervention for an optimal result, voice therapy often helps a patient achieve a voice that is acceptable to him or her, and even reduces lesions and alters neuromuscular status in some cases.

Although a survey of voice pathologies is not within the scope of this article, a thorough understanding of them is crucial for the therapist to select the best method of therapy for each patient.

A plethora of traditional, non-structured techniques and strategies exist.

In those approaches, the therapist employs a variety of convergent tools to provide the most effective and rapid therapy for each individual. However, a number of structured therapy programs has been developed recently, by skilled therapists, based on clinical experience and research. This article reviews some of the major therapy programs that have been developed for a variety of voice conditions.

THERAPY FOR HYPER- AND HYPOADDUCTED CONDITIONS

Lessac-Madsen Resonant Voice Therapy

Lessac-Madsen Resonant Voice Therapy (LMRVT) was developed by Verdolini (Verdolini, 2000) based on the work of Arthur Lessac and Mark Madsen. LMRVT is appropriate for patients with hyperadducted and hypoadducted vocal folds, associated with functional or organic conditions such as phonotraumatic lesions, pareses and paralyses.

In this therapy program, the patient's attention is directed to: (1) anterior oral vibrations, and (2) "easy" voice production. The sensation of oral vibrations during easy vocalization-or "resonant voice"—indicates that the patient is producing voice using a barely touching (or barely separated) vocal fold posture, thus minimizing vocal fold impact stress while maximizing vocal output (Berry, Verdolini, Montequin, Hess, Chan, & Titze, 2001; Peterson, Verdolini-Marston, Barkmeier, & Hoffman, 1994; Verdolini, Druker, Palmer, & Samawi, 1998; Verdolini, 2000).

The therapy program also incorporates recent research in motor learning indicating that individuals learn better by attending to the effects of a motor activity (e.g. oral vibrations) rather than to the mechanics of the activity itself (e.g. vocal production) (Wulf & Prinz, 2001).

LMRVT is designed for 45-minute weekly sessions for approximately 8 weeks. The patient completes twice daily home exercises.

The initial therapy session consists of discussing vocal hygiene including hydration, laryngopharyngeal reflux, and patently vocally traumatic behaviors such as out-and-out screaming.

The clinician develops a home hygiene program tailored to the individual's needs. All subsequent therapy and

home practice sessions begin with stretching exercises designed to minimize head and neck tension and promote a sense of equilibrium before beginning vocal exercises. Then, each session proceeds with resonant voice "core exercises," which include the "Basic Training Gesture" (BTG). The BTG involves sustaining /m/ while attending to easy, anterior oral vibrations.

Then, a variety of biomechanical explorations follow, on sustained /m/ and words, which strengthen the patient's awareness and control over these vibrations through self discovery. In later sessions, the core exercises are expanded to include increasingly complex communication material.

Next, bridging exercises which help to extend "resonant voice" to speech include (1) a resonant voice Chant Exercise, which shapes extreme resonant voice on a single pitch during nonsense syllables gradually into spoken phrases with natural inflection (e.g. mee mee mee mee mee mee -> mee mee pee pee mee mee -> meet me Peter meet me), and (2) a "Vocal Communicator" exercise, which links resonant voice to meaning early in the training process. In this exercise, the patient uses the sound /mmmhmm/ or /hmmmm/ as a listener, to indicate communicative content.

Applied outside the clinic, the exercise helps the patient to apply resonant voice to actual communication early in training, and to get "in the zone" with resonant voice prior to his conversational turn.

Subsequent exercises involve resonant voice "Minis," or pull-outs from non-resonant voice. In these exercises, the patient employs a self-identified strategy to switch from a non-target (e.g. tight) vocal production to an easy resonant voice production.

In the therapy room, the patient is asked to purposely begin using his or her "old" voice and on cue employ the strategy to switch to a resonant vocal production. At about the same time, a resonant voice Messa di Voce is used to train the patient in safe ways to produce loud voice, borrowing from the old Italian school of singing.

In this exercise, the patient learns how to increase loudness by abducting the vocal folds, rather than adducting them as is more spontaneous.

Other transfer exercises are introduced relatively early in the training process, and are continued throughout the process.

These exercises are designed to help the patient meet the specific environmental and vocal demands of his or her daily life.

Conversations progress from quiet voice without background noise to speaking on the telephone, speaking loudly, speaking with background noise, conversing in emotionally charged situations, and maintaining resonant voice while the clinician mimics the patient's old vocal pattern.

By the conclusion of therapy, the patient should be able to maintain resonant voice, or return to resonant voice online.

Some efficacy data have been reported for a preliminary version of LMRVT.

In one study, 13 adult females with nodules or polyps were prospectively and randomly assigned to either resonant voice therapy (+ hygiene; RVT), the more traditional "confidential voice therapy" (+ hygiene; CVT), or a vocal hygiene program alone, for two weeks (Verdolini-Marston, Burke, Lessac, Glaze, & Caldwell, 1995). At one-week post-therapy follow-up, auditory-perceptual, effort, and visual-perceptual measures indicated equal gains in RVT and CVT groups, which were greater than those found with the hygiene-only group.

The success of RVT or CVT was strongly determined by whether patients reported actually using the therapy technique outside the clinic, or not. An important finding was that all patients who had received RVT reported using the voicing method outside the clinic, to some extent. In contrast, all patients who had received CVT-except one-reported not using the trained technique outside the clinic. These results match some clinical observations suggesting that a larger-N study might reveal a superior benefit of RVT compared to CVT, particularly for individuals who need strong voice for their work or social functioning.

Vocal Function Exercises

The Vocal Function Exercise (VFE) program is a structured approach to voice therapy, developed by Stemple and colleagues (Stemple, 1993; Stemple, Lee, D'Amico, & Pickup, 1994; Sabol, Lee, & Stemple, 1995, Stemple, 2000). Similar to LMRVT, the VFE program is appropriate for individuals with hyper- and hypoadducted voice problems. Also, the VFE may benefit healthy voices in singing training (Sabol et al., 1995).

As for LMRVT, the target physiology which the VFE train, is a barely separated or barely touching vocal fold posture.

This posture not only produces relatively maximized output, for relatively minimized impact stress; the posture also tends to maximize vocal efficiency defined as output intensity divided by aerodynamic input (pressure x flow; Schutte, 1981).

The VFE program is designed for weekly therapy sessions

and regular home practice twice daily (morning and evening) over a 4-week period. In-clinic and home exercises are identical, taking between 15-20 minutes for each complete set (Stemple et al., 1994; Stemple, 2000).

The critical instructions for all exercises are: (a) produce voice as quietly as possible, with extreme "forward focus" (which may be nasal in some cases); (b) repeat each exercise twice, before progressing to the next one.

The four base exercises in the VFE program are:

(1) a warm-up exercise: sustain /i/ on F4 (349 Hz) for women, girls, and boys, and F3 (175 Hz) for men;

(2) vocal fold lengtheners: pitch glides on /o/ from the lowest to highest note possible;

(3) vocal fold shorteners: pitch glides on /o/ from the highest to lowest note possible; and

(4) power exercises, sustaining the musical pitches C4, D4, E4, F4, and G4 (for women, girls, and boys) or C5, D5, E5, F5, G5 (for men) for as long as possible. Pitches may be altered to suit individual patients.

Progress is monitored with records of durations (warm-up and power exercises), and smooth pitch glides (lengtheners and shorteners). Interestingly, the physiology which the duration exercises target, in particular, is identical to the biomechanical target for resonant voice as described by Verdolini (Berry et al., 2001; Peterson et al., 1994; Verdolini et al., 1998; Verdolini, 2000): a barely adducted, or barely separated vocal fold posture.

One positive element that the VFE program introduces, that is not systematically represented in LMRVT, is pitch exercises, especially high-pitch, low-intensity (quiet) exercises.

Research in joints, cartilages, and ligaments has indicated that low-magnitude tensile strain (tissue elongation) assists in the reduction of inflammation (Agarwal, 2001; Grottkau et al, 2002; Long, Gassner, & Agarwal, 2001; Reno, Grazianetti, Stella, Magliacani, Pezzuto, & Cannas, 2002).

A hypothesis, supported by some anecdotal observations (Verdolini, 1996), is that low-intensity exercise may assist in the reversal of phonotrauma in the larynx. The research suggests that high-frequency, quiet vocal exercises as found with the VFE may play a special role in this process.

Caution, on the other side of the argument, is that impact stress generally increases in the vocal folds as frequency increases, within register (Jiang & Titze, 1994). Thus, the importance of quiet phonation for the VFE, especially where high pitches are concerned, cannot be overemphasized. Additionally, vocal fold stretching and shortening should benefit cartilage mobility.

The VFE program may include bridging exercises to speech, if needed. However, such exercises are not a core part of the program.

Accent Method

The Accent Method originally was developed by Svend Smith in Denmark as a treatment for stuttering and voice disorders. Smith believed that the three most important considerations in speech production are: (1) speech is a dynamic process, (2) intonation and stress are tantamount in speech, and (3) control of the expiratory flow of air is crucial as the driving force of speech production (Kotby, 1995). These considerations formed the basis for the Accent Method of voice therapy, for a large range of conditions.

One of the distinguishing characteristics of the Accent Method is the use of body movements during the exercises. Such movements reflect Smith's belief that vocal production is a dynamic process.

Moreover, the movements are typically rhythmic. Although neither Smith nor his protégées discuss the issue explicitly, a strong case can be made that a rhythmic emphasis in training should benefit motor learning. This speculation is based on the findings that relative timing may be the key component of motor programs for classes of skilled behaviors (e.g. Keele et al., 1990; Raibert, 1977; Hollerbach, 1978)

Another feature of the Accent Method, the emphasis on breath control and abdominal breathing, is argued to be linked to the aerodynamic, myoelastic theory of vocal fold vibration, in particular the Bernoulli Effect.

Specifically, Kotby (1995) suggests that increased airflow which may occur with abdominal breathing works to "suck" the vocal folds together, thus compensating for glottal incompetence in cases of mass lesions or hypoadduction. At best, these arguments are oversimplified. Titze (1994) provides extensive discussion of the relation of aerodynamics to vocal fold oscillation, addressing such issues.

In the present article, the point is that although breathing mechanics certainly influence vocal fold oscillation (Iwarsson, 2002; Iwarsson & Sundberg, 1998; Iwarsson, Thomasson, & Sundberg, 1998), the Bernoulli effect is an inadequate and even misleading explanation of the connection.

A typical course of therapy using the Accent Method ranges from about 12-25 sessions (e.g. Kotby, 1995). Unlike

many other voice therapy programs, little if any time is spent describing the patient's voice problem or how the therapy program is intended to correct the vocal faults (Kotby, 1995).

Chronologically, the program begins with training abdominal breathing first in the supine position with tactile self-monitoring. Breathing training continues in the sitting and finally standing positions with fading use of tactile feedback.

Mutual monitoring also is used in which the patient monitors the clinician's abdominal movements with the back of her hand and the clinician similarly monitors the patient's abdominal movements. Relaxation exercises have not traditionally been included in the Accent Method, but Thyme-Frokjaer and Frokjaer-Jensen (2001) recently included these as a part of the program in those cases where the Accent Method exercises alone have not reduced the patient's tension.

Such work includes a variety of neck, shoulder and chewing exercises. Following the relaxation exercises, a series of voiceless and voiced fricatives are introduced. These sounds are first produced with a steady release of air with the main point of airflow constriction at the place of articulation. The patient is then instructed to accent the last portion of the fricative with an abdominal pulse of air.

Exercises then proceed to simple sighs using a breathy low-pitched voice quality, with simultaneous rather than aspirate onset. Interestingly, the combination of anterior vocal tract constriction as promoted by the fricative exercises, liberal use of airflow, and simultaneous onset all point to the same laryngeal configuration as targeted in LMRVT and VFE programs: the barely adducted or barely abducted vocal fold posture.

As such, the difference across these three programs does not lie with the biomechanical goals, but rather with the approach to training and learning.

Once the basic exercises are mastered, therapy progresses to a series of rhythmic speech exercises, which are often accompanied by a drumbeat to inculcate a strong rhythmic pulse. The potential rationale for this approach was discussed in a previous paragraph.

The first of the rhythmic speech exercises is called the Largo. This exercise utilizes the tempo of the patient's natural respiratory rate, to produce a single unaccented vowel on the offbeat followed by a single longer accented vowel on the downbeat of the next musical measure.

As for all subsequent rhythmic exercises, the clinician and patient alternate productions in a turn-taking manner, as the patient imitates the clinician's model.

The patient and clinician use body and arms movements during the productions; forward movements occur slowly during inhalation, and backward movements occur rapidly during phonation in synchrony with the accentuation of the vowel.

As the patient progresses through the Largo exercises the voice should begin to take on a less breathy and more resonant tone. The two succeeding tempos, Andante and Allegro, progressively introduce faster rhythms requiring a more rapid inhalation and increased coordination of respiration and phonation.

Transfer to conversational speech is first approached by using the various rhythmic patterns with individual words and phrases, and stressing accented syllables.

The next steps toward generalization involve text reading of short and long passages and finally practice with spontaneous speech.

A study by Kotby, El-Sady, Bassiouny, Abou-Rass, and Hegazi (1991) looked at the effectiveness of the Accent Method in 28 individuals with functional (non-organic) voice disorders, vocal nodules and vocal fold paralysis. Their results showed a decrease in patient's vocal complaints, and an improvement in auditory perceptual assessment of voice quality by experienced clinicians using the GRABAS scale.

The authors also report a reduction in the size of vocal nodules upon visual assessment using videostroboscopy.

Manual Circumlaryngeal Massage

This technique was first described by Aronson (1990) and has been further refined by Roy and colleagues (Roy & Leeper, 1993; Roy, Bless, Heisey, & Ford, 1997). The technique primarily has been investigated for individuals with functional voice disorders such as muscle tension dysphonia in the absence of organic pathology (Roy & Leeper, 1993; Roy et al., 1997).

However, the technique also may be beneficial for individuals with a hyperfunctional contribution to a condition involving organic lesions. In the published reports, patients typically have experienced improvements in voice within 1-3 extended treatment sessions, without significant recurrence of symptoms at long-term follow-up (Roy et al., 1997).

The initial treatment session begins by reviewing the results of the otolaryngologic evaluation stressing the absence of any pathology.

Then the effects of emotions and muscle tension on the

patient's voice are discussed. Emphasis is placed on the notion that the patient is not "at fault" for the condition, but that stress may play a role in a variety of medical conditions. Discussion is followed by a description of the therapy approach and how it functions to improve the patient's voice problem.

After such discussion, the manual circumlaryngeal technique itself is initiated. Throughout the procedures, the patient is instructed to hum lightly or prolong vowels while attending to any changes in voice quality or pitch. Roy & Leeper (1993) described the treatment protocol based on the description of Aronson (1990) as follows:

(1) Encircle the hyoid bone with the thumb and middle finger in an anterior to posterior direction. Once the end of the major horns of the hyoid are reached, the clinician continues the small circular motions over the tips of the hyoid.
(2) These circular motions are then repeated in the hypothyroid space beginning in the thyroid notch and working posteriorly.
(3) These circular motions are then repeated at the posterior borders of the thyroid cartilage which are located medial to the sternocleidomastoid.
(4) The thumb and middle finger are then placed on the superior borders of the thyroid cartilage, which is gently lowered and occasionally moved laterally. Any reduction in tension should be marked by a clearer voice quality and a reduction in tenderness.

Once the patient is able to consistently obtain an easier vocal production on vowels, this is gradually shaped to words, phrases, automatic speech, sentences and conversation in the usual manner.

At the end of treatment, the results are discussed with the patient as well as any life stresses that may have contributed to the voice problem indicating a possible psychological referral.

THERAPY FOR SPEECH AND VOICE PROBLEMS DUE TO PARKINSON DISEASE

Lee Silverman Voice Treatment

The Lee Silverman Voice Treatment was developed by Ramig and colleagues (Ramig, Pawlas, & Countryman, 1995) to help patients with Parkinson disease improve their speech and voice production.

Although this program is intended primarily for this population, the program also has been used for patients with other neurological conditions such as ataxia, multiple sclerosis, stroke, and cerebral palsy (Ramig, 2000). The treatment program is very specifically designed for sixteen, 50-minute high-effort therapy session to be completed in four weeks.

Five critical concepts form the foundation of the Lee Silverman Voice Treatment (LSVT).

(1) The treatment places primary focus on the production of loud voice. Because patients with Parkinson disease have reduced loudness, this emphasis leads to rapid improvement in intelligibility. In addition, when combined with increased effort, an emphasis on loud voice has been found to improve articulation as well (Dromey, Ramig, & Johnson, 1995). Finally, a singular focus on loud voice minimizes the number of concepts that the patient has to process and remember. This simplification can be critical for motor learning in general, in particularly for individuals who may have some cognitive difficulties.
(2) Therapy and home practice sessions are intended to be high effort.

This increased effort helps the patient achieve normal adduction of the vocal folds. Patients are frequently asked to attend to the level of effort they are using throughout a session.

(3) The treatment program is intended to be intensive to promote frequent practice and thus rapid improvement in voice and speech.
(4) "Calibration" in LSVT involves frequent references to the prescribed strong output level, encouraging the patient to recognize this level as well as the attendant effort as "normal." This emphasis is related to the observation that individuals with Parkinson disease classically underscale the magnitudes of sensory events compared to cohorts, including effort and voice output (Brooks, 1986; Muller and Stelmach, 1991; Grill, Demirchi, McShane, and Hallet, personal communication, October, 1994, as cited in Ramig, Pawlas, & Countryman, 1995, p.15). Thus, much of retraining should focus on recalibration of sensory perceptions, to address these fundamental issues. In brief, patients need to experience a greater than normal amount of effort in order to produce voice at a normal volume level. Calibration occurs when this level of effort becomes habituated and no longer feels greater than normal.
(5) Throughout the treatment program, the clinician and patient engage in regular measurement of the patient's performance.

Each therapy and home practice session begins with three daily variables:

(1) Maximum Duration of Sustained Vowel Phonation, involving 10 to 12 repetitions of maximally prolonged, loud /a/ (maximum 90 dB at one foot); the objective is to increase glottal competence, improve coordination between phonatory and respiratory systems, and increase overall loudness;
(2) Pitch Range exercises, involving sustaining the maximal high and maximal low pitch for 2-3 second, 10 times each;

(3) Maximum Functional Speech Loudness Drill, emphasizing the generalization of increased loudness and effort levels to speech.

This Drill uses 10 personally-identified, frequently used phrases, which the patient considers relevant to his lifestyle.

The patient then produces each of the phrases 3-5 times each in a loud voice (maximum 90 dB at one foot). Eventually these phrases serve as a baseline for the patient during daily life and function to help to cue him during spontaneous speech.

Finally, during each therapy session, generalization to spontaneous speech is further trained with Hierarchical Speech Loudness Drills. During these exercises the patient is expected to engage the same level of effort and loudness that was used during the Maximum Functional Speech Loudness Drill.

The level of complexity is increased through the four weeks of therapy from single words or phrases to sentences, paragraph reading and finally conversation.

SUMMARY AND CONCLUSIONS

This article has reviewed several structured voice therapy programs. Three structured therapy programs have been developed for hyper and hypoadduction unrelated to any systematic neurologic disease.

All of these programs have the same biomechanical goal of a barely adducted or barely abducted vocal fold posture. What differs is the approach to learning. A fourth program, circumlaryngeal massage, also probably targets similar biomechanics, which are "ideal," using yet another approach.

The point is that method, not biomechanics, distinguish the programs.

Thus, the selection of a therapy program depends on a match between the patient's learning style and program.

Selection is also based on the clinician's facility with a given program and he may choose to rotate among the programs to keep from becoming stagnant within any given structure.

Another highly structured voice therapy program reviewed is distinctive for Parkinson disease and possibly other neurological conditions.

Although additional tools often are used in conjunction with some of these therapy programs, these can form the basis of a sound and effective therapy program in the hands of a skilled therapist.

However, it is important to stress that the majority of therapeutic benefit with most of these programs does not take place in the therapy room, but rather during the patients individual practice time, as the newly learned behaviors need to become habituated.

Therefore, the therapist needs to feel confident that the patient will be able to successfully engage in the practice exercises between therapy sessions. The ultimate goal of voice therapy is for the patient to become independent with his voice production and also to have the tools necessary to serve as his own voice therapist when necessary after discharge.

This review is by no means comprehensive or exhaustive and the therapist interested in voice is encouraged to explore many of the references and comprehensive texts on the subject of voice therapy.

References

Agarwal, S. (2001). Low magnitude of tensile strain inhibits IL-1 beta-dependent induction of pro-inflammatory cytokines and induces synthesis of IL-10 in human periodontal ligament cells in vitro. Journal of Dental Research, 80(5), 1416-1420.

Aronson, A.E. (1990). Clinical Voice Disorders: An Interdisciplinary Approach. (3rd ed.). New York: Thieme Stratton.

Berry, D., Verdolini, K., Montequin, D., Hess, M., Chan, R, & Titze, IR. (2001). New indications of an optimal glottal half-width in vocal production. Journal of Speech, Language and Hearing Research, 44, 29-37.

Dromey, C., Ramig, L.O., & Johnson, A.B. (1995). Phonatory and Articulatory Changes Associaged With Increased Vocal Intensity in Parkinson Disease: A Case Study. Journal of Speech, Language and Hearing Research, 38, 751-764.

Grottkau, B.E., Noordin, S., Shortkroff, S., Schaffer, J.L., Thornhill, T.S., & Spector, M. (2002). Effect of mechanical perturbation on the release of PGE(2) by macrophages in vitro. Journal of biomedical materials research, 59(2), 299-293.

Hollerbach, J.M. (1978). A study of human motor control through analysis and synthesis of handwriting. Unpublished doctoral dissertation, Massachusetts Institute of Technology, Cambridge.

Iwarsson, J. (2001). Effects of inhalatory abdominal wall movement on vertical laryngeal position during phonation. Journal of Voice, 15(3), 184-394.

Iwarsson, J, Thomasson, M., & Sundberg, J. (1998). Effects of lung volume on the glottal voice source. Journal of Voice, 12(4), 424-433.

Iwarsson, J., & Sundberg, J. (1998). Effects of lung volume on vertical larynx position during phonation. Journal of Voice, 12(2), 159-165.

Jiang, J.J., & Titze, I.R. (1994). Measurement of vocal fold intraglottal stress and impact stress. Journal of Voice, 8, 132-144.

Keele, S.W., Cohen, A., & Ivry, R. (1990). Motor programs: Concepts and issues. In M. Jeannerod (Ed.), Attention and performance XIII (pp. 77-110). Hillsdale, NJ: Erlbaum.

Kotby, M.N. (1995). The Accent Method of Voice Therapy. San Diego, California: Singular Publishing Group, Inc.

Kotby, M., El-Sady, S., Basiouny, S., Abou-Rass, Y., & Hegazi, M. (1991). Efficacy of the accent method of voice therapy. Journal of Voice, 5, 316-320.

Long, P., Gassne,r R., Agarwal, S. (2001). Tumor necrosis factor alpha-dependent proinflammatory gene induction is inhibited by cyclic tensile strain in articular chondroctes in vitro. Arthritis & Rheumatism;

Care and Research, 44(10), 2311-2319.

Peterson, K.L., Verdolini-Marston, K., Barkmeie,r J.M., & Hoffman, H,T. (1994). Comparison of aerodynamic and electroglottographic parameters in evaluating clinically relevant voicing patterns. The Annals of otology, rhinology, and laryngology, 103, 335-346.

Raibert, M.H. (1977). Motor control and learning by the state-space model (Tech. Rep. No. AI-TR-439). Cambridge: Massachusetts Institute of Technology, Artificial Intelligence Laboratory.

Ramig, L. (2000). Lee Silverman Voice Treatment (LSVT; CM) for Individuals With Neurological Disorders: Parkinson Disease. In Stemple (Ed.), Voice Therapy: Clinical studies (2nd ed.) (pp. 76-84). San Diego: Singular Publishing Group, Inc.

Ramig, L.O., Pawlas, A.A., Countryman, S. (1995). The Lee Silverman Voice Treatment: A practical guide for treating the voice and speech disorders in Parkinson disease. National Center for Voice and Speech.

Reno, F., Grazianett,i P., Stella, M., Magliacan,i G., Pezzuto, C., & Cannas, M. (2002). Release and activation of matrix metalloproteinase-9 during in vitro mechanical compression in hypertrophic scars. Archives of dermatology, 138(4), 475-478.

Roy, N., & Leeper, H.A. (1993). Effects of the manual laryngeal musculoskeletal tension reduction technique as a treatment for functional voice disorders: Perceptual and acoustic measures. Journal of Voice, 7, 242-249.

Roy, N., Bless, D.M., Heisey, D., & Ford, C.N. (1997). Manual circumlaryngeal therapy for functional dysphonia: An evaluation of short- and long-term treatment outcomes. Journal of Voice, 11, 321-331.

Sabol, J.W., Lee, L., & Stemple, J.C. (1995). The value of vocal function exercises in the practice regimen of singers. Journal of Voice, 9, 27-36.

Schutte, H.K. (1981). A clinical method for estimating laryngeal airway resistance during vowel production. Journal of Speech and Hearing Disorders, 46, 138-146.

Stemple, J.C. (2000). Case Study: Vocal Function Exercises. In Stemple (Ed.), Voice Therapy: Clinical studies (2nd ed.) (pp. 34-46), San Diego: Singular Publishing Group, Inc.

Stemple, J.C., Lee, L., D'Amico, B., & Pickup, B. (1994). Efficacy of vocal function exercises as a method of improving voice production. Journal of Voice, 8, 271-278.

Thyme-Frokjaer, K., & Frokjaer-Jensen, B. (2001). The Accent Method. Bicester, Oxon: Speechmark Publishing, Ltd.

Verdolini-Marston, K. Burke, M.K., Lessac, A., Glaze, L. & Caldwell, E. (1995). A preliminary study on two methods of treatment for laryngeal nodules. Journal of Voice, 9, 74-85.

Verdolini, K. Options for acute and chronic management of dysphonia secondary to edema. Invited paper presented at the Ninth Annual Pacific Voice Conference, San Francisco, CA.

Verdolini, K. (2000). Case study: Resonant Voice Therapy. In Stemple (Ed.), Voice Therapy: Clinical studies (2nd ed.) (pp. 46-62; 82-96), San Diego: Singular Publishing Group, Inc.

Verdolini, K., Druker, D.G., Palme, P.M., & Samawi., H. (1998). Laryngeal adduction in resonant voice. Journal of Voice, 12, 315-327.

Wulf, G., &Prinz, W. (2001). Direction attention to movement effects enhances learning: a review. Psychonomic bulletin & review, 8(4), 648-660.

Vocal Fitness

TIPS TO MAINTAIN VOCAL HEALTH

To Avoid:

1. *Ignore early warning signals such as hoarseness, fatigue or laryngeal discomfort.*
2. *Throat clearing or coughing.*
3. *Forceful/loud talking or whispering.*
4. *Poor posture.*
5. *Competing with loud noise.*
6. *Excessive exposure to dry environments, especially air conditioning.*
7. *Drinking excessive amounts of caffeine and/or alcohol which are drying.*
8. *Exposure to irritants including smoke, fumes, dust and other allergenic substances.*
9. *Dehydrating medications including antihistamines.*
10. *Highly acidic or spicy foods especially late at night.*

To Do:

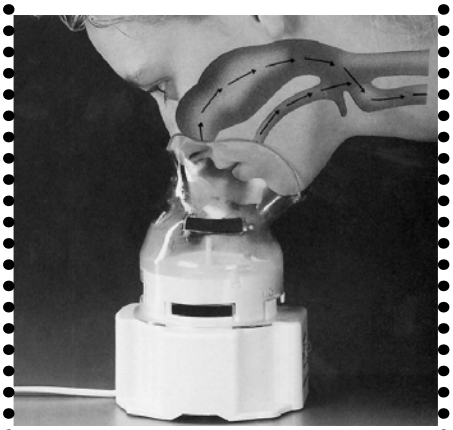
1. *Learn how your voice works & how to protect it from injury.*
2. *"Sip" water throughout the day.*
3. *Increase humidity at home & at work.*
4. *Take vocal breaks, particularly when the voice is sore or tired.*
5. *Learn proper breathing techiques for speaking & singing.*
6. *Do vocal warm-up & cool down exercises.*
7. *Cover your mouth in cold or dry harsh environments.*
8. *Reduce physical tension in neck/shoulder/jaw & facial muscles.*
9. *Use non-vocal strategies to get attention.*
10. *Learn to use amplification systems properly and employ them whenever possible.*

Courtesy of:

THE PROFESSIONAL VOICE CENTRE
Toronto, Canada
(416) 922-0070

Calendar of Events

Steam Inhaler



This personal steam inhaler is small, light and effective and can be ordered through the Canadian Voice Care Foundation (CVCF) for $68.00 plus shipping.

Name: _____

Address: _____

_____

City/Province: _____

Postal Code: _____

Tel: _____

Please make your cheques payable to:

Canadian Voice Care Foundation
2828 Toronto Crescent N.W.
Calgary, Alberta T2N 3W2

For more information call
1-888-284-9590

International Association for Jazz Education 30th International Conference

January 8-11, 2003

Toronto, Ontario

Phone: (785) 776-8744
Email: info@iaje.org

Lisa Popeil's Total Singer Workshop

January 3-5, 2003
Studio City, California

February 15-17, 2003
Orlando, Florida

Phone: (818) 906 - 7229
Email:totalsingerworkshop@popeil.com

Council of Academic Programs in Communication Sciences and Disorders (CAPCSD)

April 9-12, 2003

Albuquerque, New Mexico

CAPCSD (952) 920-0966
www.capcsd.org

Medicine in the Vocal Arts, Spoleto Symposium

May 23-26, 2003

Double Tree Hotel
Charleston, South Carolina

Medical University of
South Carolina
Phone: (843) 792-7162
Email: halstead@musc.edu

The Voice Foundation 32nd Annual Symposium: Care of the Professional Voice

June 4 - June 8th, 2003

Philadelphia, Pennsylvania

Phone: (215) 735-7999
Email: voicefound@onrampcom.com

Summer Vocology Institute 2003

June 8 - August 6, 2003 (tentative)

Denver, Colorado

www.ncvs.org/vocinstitute

Festival 500 The Phenomenon of Singing International Symposium IV

June 26-29, 2003

St. John's, Newfoundland

www.festival500.com
Email: information@festival500.com

3rd World Voice Congress

June 29-July 3, 2003

Antalya, Turkey

Phone: +90 532 790 4790
Email: dursung@superonline.com

The European Voice Teachers Association's EUROVOX Conference

August 8-11, 2003

Oslo, Norway

Email:Barbro.Marklund@nmh.no

Canadian Voice Care Foundation
2828 Toronto Cres. NW
Calgary, AB T2N 3W2
Tel: (403) 284-9590
Fax: (403) 289-4988
Toll Free: 1-888-284-9590
E-mail: cvcf@shaw.ca

Director: Katherine Ardo
Administrative Assistant: Kim Wallace
Membership & Subscriptions: $30/year

Advertising rates: Available upon request

"The CVCF is a national, non-profit organization dedicated to promoting good vocal health in Canada through education and communication between relevant disciplines."

It's Up To You

Waiting for **YOUR INPUT** where to hold the 5th International Symposium, *Care of the Occupational and Professional Voice*: **BANFF** or **TORONTO**. Please e-mail (cvcf@shaw.ca) or call RSVP by December 22, 2002.

PLEASE RENEW YOUR MEMBERSHIP NOW!

Associate Membership Application Form

Yearly membership in CVCF includes the Voice Talk newsletter, access to program information, the international directory and referrals worldwide, access to an extensive reference library of voice books, video-tapes, audio-tapes and software programs as well as many other benefits.

Please check one: ____ Renewing Member ____ New Member

Name: _____

Address: _____

Postal Code: _____

Telephone: (day) _____ (eve) _____

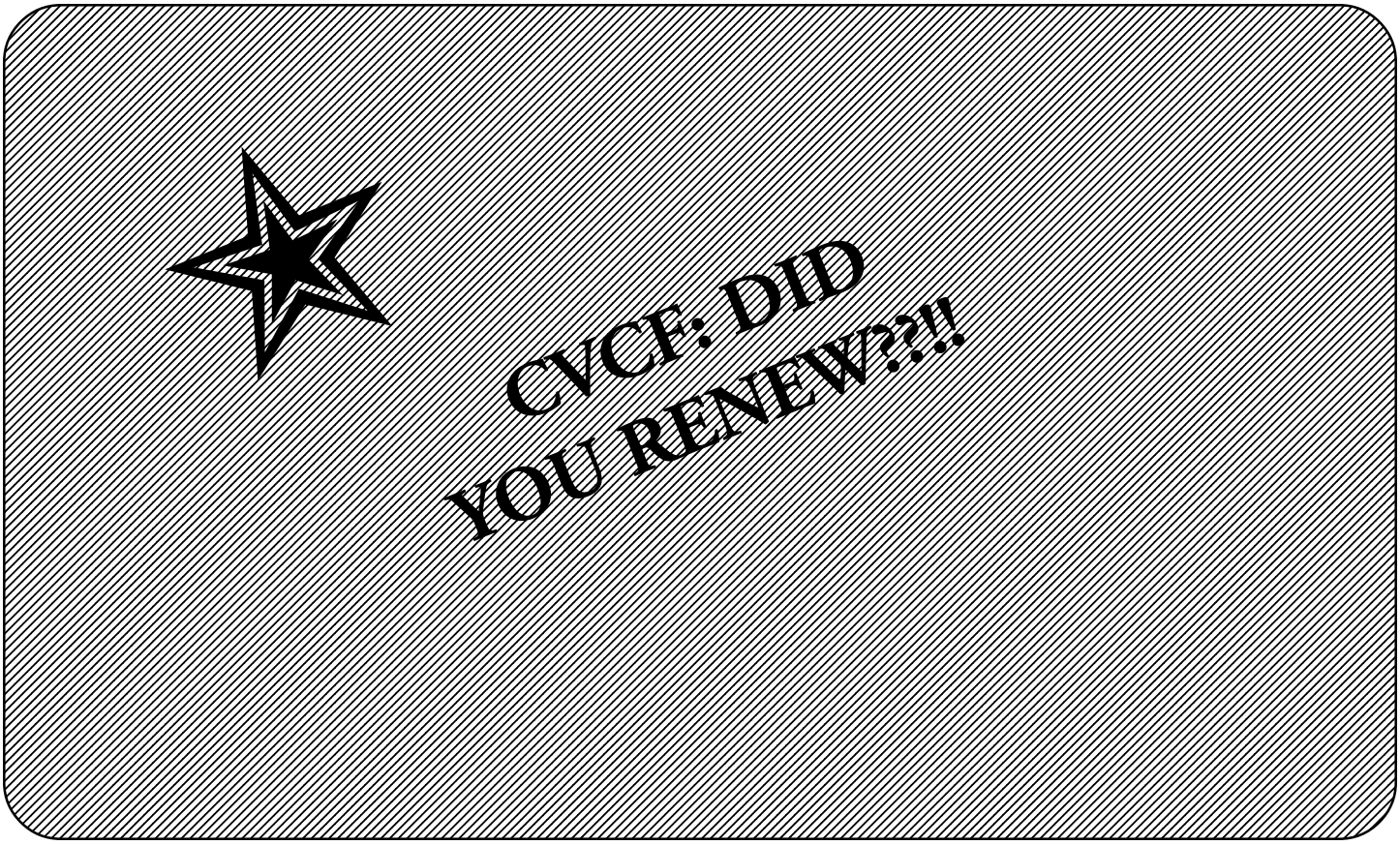
Fax: _____ **E-mail:** _____

Individual	$30.00	
Institution (Hospitals, Universities, etc.)	$50.00	
Corporate	$70.00	$ _____
My tax deductible donation to assist the CVCF		$ _____
TOTAL ENCLOSED		$ _____

Please send cheque or money order payable to the Canadian Voice Care Foundation.
Payment can also be made by Visa.

Card Holder: _____ Visa No: _____

Expiry Date: _____ Authorizing Signature: _____



"Voice Talk is Sponsored and Printed by Unicom Graphics Limited of Calgary, Alberta."

CANADIAN VOICE CARE FOUNDATION

2828 Toronto Crescent N.W.
Calgary, AB T2N 3W2
Tel: (403) 284-9590
Fax: (403) 289-4988
E-mail: cvcf@shaw.ca

CANADA POST / POSTE CANADA
Postage paid / Port payé
Publication Mail / Nombre
40014577