Vocal Function Exercises: The Bread and Butter of Voice Therapy

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Introduction

Many SLPs use Vocal Function Exercises (VFEs) (Stemple et al., 1994) as a foundation of the voice therapy process. This resource will provide you with information regarding the history and objectives of VFEs and who is a candidate for this therapy program. We will also cover how to perform VFEs and teach them to your patients, how to modify the program when necessary for a specific patient, and how VFEs fit into a comprehensive therapy plan. Finally, we will also discuss cultural considerations to take into account when administering this therapy approach. At the end of the resource, you will find a hand-out that you can use as a simplified framework for your patients when administering this program.

History and Objectives of VFEs

In the 1950s, Bertram Briess originally discussed the direct relationship between the condition of the laryngeal musculature and the quality of the voice. He developed a therapy program that was designed to lessen the tension of the hyper-functioning muscles and improve laryngeal stamina (Briess, 1959). These were later developed into Vocal Function Exercises (VFEs) by Joseph Stemple (Stemple et al., 1994). Stemple describes VFEs as a “series of systematic voice manipulations designed to strengthen and coordinate the laryngeal musculature and to improve the efficiency of the relationship among airflow, vocal fold vibration, and supraglottic treatment of phonation”(Stemple et al., 1994, p. 271). The program was designed to combine tenets of exercise physiology (Saxon & Schneider, 1997) with qualitative aspects of the voice (i.e., frontal focus/placement, pharyngeal widening, ease of voice onset) (Stemple et al., 1994).

Brief Overview of Vocal Function Exercises

According to Roy et al. (2001), VFEs are a set of 4 foundational exercises: 1) a warm-up, 2) stretch, 3) contract, and 4) power exercises. All exercises are to be completed 2 times each, 2 times per day, and should be done using a soft but engaged voice. The onset of each exercise should be easy without breathiness. It is also important to emphasize an inverted megaphone shape of the mouth to accomplish a forward-focused tone without tension or excessive strain for all productions. An inverted megaphone posture involves cueing the patient to maintain “tightly rounded lips created a narrow and elongated labial aperture” while also expanding the pharynx (Croake et al., 2017, p.245). The specific sound for each exercise should emphasize an open pharyngeal posture. Patients should be cued to rely on the interaction between abdominal contraction and breath support to avoid tension at the larynx.

The instructions for the warm-up consist of “Sustain the vowel /i/ for as long as possible” (Roy et al., 2001, p. 295). This exercise should be completed on the musical note F (above middle C for female-identifying patients, below middle C for male-identifying patients). The tone for this exercise should have “extreme forward focus, almost but not quite nasal” (Roy et al., 2001, p. 295). The goal of this exercise is to sustain the vowel for as long as the patient is able to sustain the phoneme /s/.

The stretching exercise involves “glide upwards from your lowest to your highest note” (Roy et al., 2001, p. 295). This exercise has been performed on various sounds, including the word ‘knoll’, ‘whoop’, or a lip or tongue trill. Again, the focus for this exercise is on forward placement using an open pharynx and sympathetic vibration on the lips. Patients may benefit from cues to “feel the buzz on your lips” for this exercise. For the contracting exercise, patients are instructed to “glide downwards from your lowest note to your highest note” on the word ‘knoll’, ‘boom’, or a tongue or lip trill (Roy et al., 2001, p. 295). For both exercises 2 and 3 (stretch and contract), the goal is to avoid voice breaks during the pitch glide (Roy et al., 2001).

Finally, for the low impact power adductory exercises, patients are instructed to “sustain the musical notes (C-D-E-F-G) for as long as possible on the word ‘knoll’ minus the ‘kn’” (Roy et al., 2001, p. 295). The objective of this exercise is to sustain the sound for the same duration as the patient was able to for Exercise 1.

How to incorporate VFEs into an overall voice therapy plan?

In the same way that different voice clinicians have different styles and manners of crafting a rehabilitation plan, all voice patients are also unique and will require an eclectic therapy approach. VFEs are often a great starting point for therapy as they allow the client to understand a new method of voice production that is different and perhaps more effective than their current functioning. However, a limitation of VFEs is that they are used to train a patient to produce a more optimal tone in the context of a single sound, but it may be difficult to generalize this new pattern to more functional contexts. As such, it may be useful to pair VFEs with other voice therapy frameworks that emphasize using the target production in the context of words, phrases, and most importantly, conversation. Examples of more integrative or functional approaches include Resonant Voice Therapy techniques (Verdolini et al., 1998), Conversation Training Therapy (Gartner-Schmidt et al., 2016), or Flow Phonation (McCullough et al., 2012).

Who is a candidate for VFEs?

Prior to selecting VFEs as a treatment approach, it should be noted that this program requires considerable independent practice, which in turn demands self-efficacy for adherence to consistent and daily practice. Van Leer & Connor (2010) stated that “adherence to behavioral voice therapy is a process that… requires motivation, commitment, learning, self-regulation, and a good relationship with the therapist” (p. 468). A particular patient’s willingness to adhere to an intensive voice program should be addressed when determining candidacy. Patient-reported outcome measures (PROMs) such as the Voice Handicap Index-10, Voice-Related Quality of Life, and Voice Symptom Scale are a viable method to “track…effectiveness of treatments” (Branski et al., 2010). You may consider administering one or more of these instruments prior to initiation of therapy to assess candidacy, mid-way through the therapy sessions to assess efficacy and effectiveness of the selected approach, and on conclusion of the therapy process to ensure that your patient has met their own personal goals for voice therapy and undergone an improvement of quality of life.

A limitation of using PROMs is that these standardized measures do not address a patient's personal goals. Refer to Valeria Gary's October 2020 resource in the Collective for information on using Goal Attainment Scaling (GAS) to aid your patient in creating functional goals that reflect the behaviors most important to them (Kiresuk and Sherman, 1968). GAS can be used in collaboration with motivational interviewing to establish functional goals for therapy that are individualized for each patient.

VFEs can be used for many patients, as long as they are adapted to the specific voice complaints that your patient is presenting with. Traditionally, patients are grouped into those with hyperfunction (too much muscle activity) or hypofunction (too little muscle activity) and cues can be modified based on the presenting problem. For example, it may be more beneficial to emphasize the adductory power aspect of VFEs for a patient with hypofunction (e.g., vocal cord atrophy, paresis/paralysis). Conversely, it may be more beneficial to emphasize coordinating breath with voice to produce a smooth vocal quality without strain for patients who use hyperfunctional voice patterns (e.g., muscle tension dysphonia). A recent systematic review found that VFEs resulted in improved outcomes in individuals with both normal and disordered voices, presbylaryngeus, and professional voice users (Angadi et al, 2019). As such, we can use VFEs with a wide range of patients with dysphonia.

How do you explain VFEs to your patients?

Stemple originally discussed VFEs as physical therapy for the voice. He has previously stated "what is made of multiple cartilages, muscles, and connective tissue and is a jointed system which may become injured, weakened, or imbalanced in its function? Your knees!" For rehabilitation of injuries to the knee, systematic exercise is recommended to restore previous levels of function. Similarly, the larynx is also a complex system of cartilages, muscles, connective tissue, joints, etc. and following an injury, requires systematic exercises to restrengthen and coordinate the laryngeal musculature (Stemple, 2011). Stemple describes that you can admit that the program seems silly at first, but comparing it to a workout program, physical therapy or weightlifting will help the patient to understand the objective.

Modifications to VFEs

*Note: The suggestions made in this section are based on the author's own clinical experience and judgment. While VFEs were designed to be completed in a structured, systematic manner, this author has found that in many instances, additional modifications based on patient characteristics may be warranted to ensure efficacy and effectiveness of the approach.

While VFEs are a structured, exercise-based protocol, often we need to adjust the instructions based on the patient in front of us. When making modifications, always have your instructions align as closely to the original tenets of VFEs outlined above.

- Pitch-matching: Many patients struggle with matching pitch to the Stemple-recommended C-D-E-F-G for the power exercise or the warm-up on F. For these patients, you may recommend that they perform the warm-up at a modal pitch, i.e., slightly above one's speaking pitch. For the power exercises, these may be modified to a comfortable low, medium, and high note. Radhakrishnan & Scheidt (2012) used these cues in a single study design for a 77-year-old patient and found similar results as the original Stemple et al. (1994) study.

- Excess strain or tightness: The original VFE sounds were designed to use a semi-occluded vocal tract (SOVT) posture, in order to lengthen the larynx and subsequently cause the vocal folds to vibrate with less effort. If the patient is unable to produce the VFE sounds with forward focus and reduced strain, you may attempt other semi-occluded sounds/postures, e.g., straw phonation or cup bubbles, kazoo, lip/tongue trills in order to assess whether the patient is more stimulable for a relaxed, soft sound. Roy et al. (2001) used other SOVT sounds in a study examining VFEs in teachers with dysphonia and found similar results as the Stemple et al. (1994) study.

- Hypofunction: VFEs were originally designed to be conducted using a soft and gentle sound. However, with patients who have vocal cord paralysis, vocal cord bowing, or other voice disorders where reduced adduction is the issue, you may try cueing your patient to perform these exercises with an emphasis on the adductory power aspect of VFEs, e.g., with a loud and strong voice; continuing to use a soft glottal onset as instructed, but greater power throughout the duration of the tone. Reducing hyperfunction is not always the goal of voice therapy with patients who are presenting with hypofunctional voice patterns; in fact, some hyperfunction may be indicated in these populations to improve glottic contact or closure. For more information on how to implement VFEs in hypofunctional populations, reference Carly Schiff's September 2020 presentation "Management of Vocal Fold Paralysis/Paresis for the Speech-Language Pathologist".

Cultural Considerations

Vocal function exercises have primarily been studied in English and within western, English-speaking, first world cultures (American, English, Australian). However, we know from the voice literature that while physiology of phonation is the same across languages, features such as acceptable volume, fundamental frequency (pitch), or vocal fatigue in bilingual speakers may differ across various cultures and languages and this may affect the administration of these exercises.

For example, Lee & Sidtis (2017) found that bilingual Mandarin-English and Korean-English speakers were more likely to use a higher F0 (pitch) and a greater volume in their non-English language. As such, clinicians administering VFEs in a language other than English should familiarize themselves with the pitch/volume norms in the language they are working in and adapt VFEs to that specific language and culture background. For instance, a Korean speaker may require a higher pitch to be used for the warm-up and power exercises than an English speaker. This can be determined by measuring modal pitch prior to administering the exercises and cueing the patient to phonate approximately an octave above that.

Another consideration is bilingual speakers who exhibit vocal fatigue when transitioning from L1 to L2, which is a known phenomenon (Järvinen et al., 2016). If a patient were to present for voice therapy due to vocal fatigue in their L2, it would likely be indicated to conduct VFEs in their L2. However, if the clinician is not proficient in the patient's L2, again, they should familiarize themselves with pitch/volume norms in that language and modify VFEs so that the pitch and volume the exercises are performed on are functional for the language of interest.

Finally, a financial consideration to make for patients from uninsured or lower socioeconomic backgrounds is the number of sessions required for a patient to restore previous levels of function using VFEs. The research of Gorman et al 2008, Sauder et al., 2010, and Mau et al., 2010 taken together have found that anywhere between 6-12 sessions are necessary for this approach. When the speech/hearing therapy code (CPT 92507) is billed for these sessions, the total cost may amount to almost $1,000 out of pocket, which does not account for the initial voice evaluation +/- a videostroboscopy. This expense may not be feasible for many patients from uninsured backgrounds. A clinician administering this approach can again modify the treatment plan to minimize the number of sessions required, i.e., providing audio recordings of the exercises during treatment sessions or written hand-outs (such as the one below) that the patient may refer to and which may minimize the number of return sessions that will be required. Additionally, many university clinics are free, and uninsured or under-insured clients may be referred to them for treatment.

The current evidence base for VFEs unfortunately does not reflect the culturally and linguistically diverse clientele we see in a voice clinic, and this is a limitation of this approach that must be acknowledged. However, we can certainly utilize our clinical judgment and knowledge of the anatomy, physiology, and acoustic features of voicing to adapt these exercises to the specific client we are working with.

Appendix

Joseph Stemple has made several further training materials on this topic if you would like additional information on how to conduct these exercises. These resources include:

- DVD available on the Plural Publishing website with treatment demonstrations
- Medbridge course with more information about the genesis of VFEs
- Latest edition of Stemple's textbook, Vocal Function Exercises, originally published in September 2006

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Vocal Function Exercises:

Vocal Function Exercises (VFEs) are like physical therapy for your voice. VFEs are a series of systematic voice exercises designed to strengthen and balance the laryngeal musculature, improve the closure of the vocal cords, and coordinate the subsystems of voice production.

Tips for Success

- Complete these exercises 2 times each, twice daily, for 6 weeks.
- All exercises are produced as softly as possible, but the voice is engaged, not breathy.
- It is very important that the placement of the tone is forward (constricted, sympathetically vibrating lips) and the pharynx is open (i.e., inverted megaphone shape).
- Think about coordinating your breath with your voice for each exercise.
- Notes are matched to a pitch pipe, keyboard, tape recording, or piano.

Steps

1. **Warm-Up Exercise:** Sustain the sound “eee” as long as possible on the musical note “F”. Use extreme forward focus (almost but not quite nasal).
    - Women on musical note (F) above middle C
    - Men on musical note (F) below middle C
2. **Stretching Exercise:** Glide smoothly from your lowest note to your highest note on the word “knoll”. (You may also use a tongue or lip trill or the word ‘whoop’)
    - Emphasis on forward placement, open pharynx, sympathetic vibration on lips
    - Goal: No voice breaks during upward pitch glide
3. **Contracting Exercise:** Glide from a comfortable high note to your lowest note on the word “knoll”. (You may also use tongue or lip trill or the word ‘boom’)
    - Focus on half-yawn in the throat – pharynx open. Slow, systematic, without growl at the bottom. No muscling of the tone allowed.
    - Goal: No voice breaks during downward pitch glide
4. **Power Exercise:** Sustain the musical notes C-D-E-F-G for as long as possible on the word “old” without the /d/.
    - Middle C for women, octave below middle C for men

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