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# Vehicular Vocalizing to Start Your Day

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## INTRODUCTION

**S**INGERS SPEND A LIFETIME TRAINING THEIR singing voice, often not considering that it is the same vocal instrument used in speech and song. They understand the necessity to train the singing voice, but consideration for healthy speaking patterns also should be a part of a complete vocal training regimen. Singers with high voice usage (often called vocal dose), such as teachers or choral directors, should be particularly aware of how they use their speaking voice, since it can contribute to vocal health concerns. Warming up the singing voice as preparation for a rehearsal or performance is considered routine training; those whose profession depends on speaking, such as teachers, should also warm up the voice to maintain an overall healthy mechanism for speaking and singing.

Outlined in this article is a four-tiered system that provides guidelines to prepare the speaking voice at the beginning of the day. The goal is to condition healthy voice production and reduce potential for voice fatigue. The exercises outlined could be used as daily maintenance before speaking or for anyone experiencing heavy vocal demands. The mechanics of the voice involve respiration, phonation, articulation, and resonance systems for the production of sound. The vocal exercises outlined coordinate these systems and include 1) stretching, 2) breathing, 3) semi-occluded vocal tract exercises (SOVT), and 4) resonant voice exercises. The order of the four tiers could be arranged to suit the singer's individual needs but are presented to include each important component of warm ups. Because singers recognize the necessity of training the voice, the idea of integrating a daily routine will be familiar. Commuter time provides an opportunity to vocalize, with some obvious safety considerations outlined. It must be noted that if one has a complaint of hoarseness, pain, voice fatigue, or other related vocal health concerns, an examination by a qualified laryngologist or otolaryngologist voice specialist is necessary.<sup>1</sup> The general guideline is to seek medical evaluation after two weeks of voice concerns. This article is not intended as a substitute for medical advice or voice treatment.

## PRINCIPLES OF PHONATION

The goal in achieving a “healthy” speaking voice is to produce a voice that carries a message effectively, without discomfort or fatigue, and to avoid excessive stresses to the vocal fold tissues that may lead to swelling and pathol-

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ogy. Well aligned posture, efficient breathing, and good vocal hygiene set the stage for effective voicing. Good “vocal posture” is also necessary; it involves balancing the degree of vocal fold closure with airflow and maximizing the way the vocal tract feeds energy back to the vocal folds to facilitate easy and efficient voicing.

To create voicing, we bring our vocal folds together during exhalation and they are set into vibration. This vibration converts aerodynamic energy into acoustic energy. If our vocal folds are too spread apart, there will be very little impact on the vocal folds as they vibrate, but they will do a poor job of creating acoustic energy. This creates a breathy voice quality that is limited in loudness. If the vocal folds are pressed tightly together, they will create a lot of acoustic energy, but at the cost of high impact on the vocal fold tissues. This creates a bright, “brassy” quality which carries well, but may be harmful in large doses. For healthy voicing, we want to achieve a vocal fold posture that maximizes acoustic output, while minimizing vocal fold impact stresses, that is, an *efficient* voice. Berry et al. investigated this cost-output ratio in an in-vitro study and found that the most efficient voice was produced with the vocal folds barely touching or slightly separated.<sup>2</sup> This is consistent with resonant voice, a technique that is frequently used in voice therapy. Laryngoscopy of trained vocalists producing pressed, breathy, and resonant voice qualities found that resonant voice was consistently produced with a barely ab/adducted vocal fold posture.<sup>3</sup>

The shape of our vocal tract (the area from the glottis/vocal folds to the lips) can also affect how well our vocal folds vibrate and the acoustic energy they create. As sound waves travel through the vocal tract, some of this energy feeds back to the vocal folds and may either help or hinder vibration. When increased acoustic pressures occur above the vocal folds during the opening phase of vibration, and decreased acoustic pressures occur during the closing phase, these changes in pressure help to “push” and “pull” the vocal folds and facilitate sustained vibration with lower subglottal pressure.<sup>4</sup> This is known as vocal tract inertance. When the opposite occurs, it is known as compliance, and it can disrupt vocal fold vibration. You likely have experienced this as voice breaks or instability, such as occurs when singing through the *passaggio*. Inertance also impacts acoustic output. Vocal tract posture determines whether there is inertance or compliance, and how much, at a wide

range of frequencies, and either boosts or dampens the harmonics produced by the vocal folds at those frequencies. To facilitate sustained vocal fold vibration and amplify our acoustic output, we want to achieve a lot of inertance at a wide range of frequencies.

## HARNESSING THE ENERGY OF THE VOCAL TRACT

How can we achieve a healthy (barely ab/adducted) vocal fold posture and a high degree of vocal tract inertance during voicing? Exercises known as semi-occlusions of the vocal tract (SOVT), such as straw phonation, can help to achieve both of these goals. Studies using computational models to simulate voicing have demonstrated that narrowing and lengthening the vocal tract (e.g., putting a straw between the lips) paired with narrowing the epilarynx leads to inertance gains across a wide range of frequencies.<sup>5</sup> This boosts the acoustic energy produced by the vocal folds across a wide range of frequencies, including a band of frequencies around 2500–3500 Hz, known as the singer’s (or speaker’s) formant cluster.<sup>6</sup> This formant cluster is associated with the sudden expansion from a narrow epilarynx tube to a wide pharynx, and creates a ringing quality in the voice that allows it to carry without amplification. Semi-occlusion also facilitates healthy adduction of the vocal folds. SOVT exercises create increased intraoral pressure due to the narrowing of the lips (or other articulators). This increased pressure in the vocal tract helps to “spread” the vocal folds and prevent hyperadduction, avoiding a pressed voice quality.<sup>7</sup>

Research with human subjects using SOVT exercises has had mixed results, but evidence demonstrates that even brief use of SOVT may improve several aspects of voicing, including acoustic output,<sup>8</sup> vocal tract posture,<sup>9</sup> and perceptual voice quality.<sup>10</sup> The variability of research findings may be partially attributed to the fact that there are many types of SOVT exercises, and they are not one-size-fits-all. SOVT exercises are an important feature of most voice therapy approaches.<sup>11</sup> Even for healthy voices, spending a few minutes doing voice exercises to reset good vocal posture can be a helpful way to prepare for, and recover from, your speaking day. The following sections will describe some specific exercises you may use, and strategies for incorporating them into your busy schedule.

## GUIDELINES FOR VEHICULAR VOCALIZING

Vehicular Vocalizing is not meant to be just a clever title. Time efficiency is a constant goal in our busy lives, and the car can be a useful place to prepare the voice for the day in order to maintain an overall healthy mechanism for speaking and singing. Whether driving a long or a short commute to work, carpooling, or running errands, using the time to vocalize can be productive. The car is certainly not a proper place for daily singing practice needing a high level of vocal efficiency and training.

Posture is often one of the first considerations of voice production. In the car, begin with postural awareness by sitting tall and lengthening the spine. (Of course, this is after you have buckled up, put your cell phone away, and carefully pulled out of the driveway or parking spot.) Shoulders should be relaxed (even in bad traffic), and hands should be on the steering wheel at 9:00 and 3:00 o'clock. Not only is this hand position advocated by safety experts, the lateral elevation of arms facilitates an expanded rib posture allowing for good inhalation. In the seated position it can be easier to feel the abdominal wall release on inhalation; use the lower seat belt to help with this sensation. Other car considerations include remaining in a narrow vocal range, not too high or low, and at a moderate dynamic level; not too loud—remember there is a lot of ambient noise in a car. Extremes of either require concentration and physical energy not suited to vocalizing while operating a motor vehicle. Plus, remember road rage can contribute to pressed phonation, so stay calm. Experientially, 10–12 minutes of warming up the voice are recommended; however, a shorter or longer time frame could be suitable.

### TIER ONE: ARTICULATORY STRETCHES AND EXERCISES

Due to the muscular interconnections between the jaw, tongue, palate, and larynx, it is understandable that tensions can be inadvertently created. For voice athletes, it is important to acquire independence within the articulatory system. The following exercises encourage flexibility and mobility between the jaw, tongue, and larynx, with the intent of optimal voice production. Stretches can be done with and without voicing.

#### Jaw Unvoiced Stretches

1. Begin by gently wiggling the jaw in multiple directions, back and forth in a circular motion both directions, and then as if you are chewing.
2. Slowly extend to a broader range of motion by gradually opening the jaw. The jaw should remain flexible and never locked or rigid. You can add lip movement to the stretch as well.
3. Place a thumb on the masseter muscle and massage while slowly opening your jaw (one hand at a time while driving). The masseter muscle can be found by placing a thumb just below the middle of the cheekbone and clenching the jaw until you feel the bulge of the insertion point of the muscle. This area might be tender.

#### Tongue Unvoiced Stretches

1. Gently and slowly stick the tongue straight out, directing it toward the floor. Stretch the tongue as if rolling it off a mounted water hose reel. Repeat several times.
2. Place the tongue below the inside of the bottom teeth and gently and slowly roll the middle of the tongue forward out of the mouth. Repeat several times.
3. Move the tongue in a 360-degree circular motion slowly around the outside of the teeth in both directions ten times. Remember to release any tension at the base of the tongue while doing this exercise.

#### Jaw and Tongue Voiced Exercises

1. Using the dental consonants /l,d,n,t/, speak the syllables /la,la,la,la,da,da,da,da,na,na,na,na,ta,ta,ta,ta/. Careful awareness should be made to use only the tip of the tongue for this gesture. Jaw should remain stationary but not rigid. The tongue should be “liquid,” not tense. Next sing a 5-note scale 1-2-3-4-5-4-3-2-1 while singing each syllable (one at a time or rotating through l,d,n,t) with the same principles described above. Start in a comfortable range and ascend a few half steps then descend a few half steps staying in a moderate range.
2. Using consonants /j/ (sounds like y), /k/, /g/, speak the syllables /ja,ja,ja,ja,ka,ka,ka,ka,ga,ga,ga,ga/ bringing careful awareness that the tongue remains released of tension. The tongue gesture should be in



tongue). If you became aware of some tension in your articulators during the previous exercises, try a trill and see if it helps you release that tension.

Check that your posture is still upright and relaxed. Relax your shoulders, neck, and face. Using your preferred SOVT, do a few repetitions of the following exercises:

1. Pitch glides or sirens. Glide your voice up the scale and back down with ease. Do not worry about pitch breaks, which may move or become exaggerated during some SOVTs. Allow your voice to move easily through your range.
2. Accents. Create pulses of sound from your belly. Vary the pitch and speed of the accents.
3. Singing. Sing the melody of a simple song through the straw or other semi-occlusion. Use accents to support changes in pitch and loudness.
4. Speech. Recite a few favorite lines of poetry or read out the street signs along your commute. Note that you will not be articulating speech, but rather producing just the rhythm and melody of speech. Use lots of expression in your voice.

As you complete these exercises, notice how your voice feels. Do you feel tension in your throat or shoulders that you need to release? Does your voice feel easy?

#### TIER FOUR: RESONANCE EXERCISES

The term resonance can mean many things. It has a perceptual meaning in terms of voice, referring to a fullness or robustness of sound. It also has a meaning in physics, referring to reinforcement of vibration or specifically sound through reflection of waves (recall vocal tract inertance). It also has sensations associated with it for the speaker; a resonant voice should feel easy to produce and create a sensation of buzzing or vibration in the front of the face.

During the SOVT exercises from the previous section, you were likely creating strong resonances between your vocal tract and vocal folds because of vocal tract inertance. These resonances allow you to produce a lot of sound without a lot of effort or impact. Unfortunately, we can't spend our days semi-occluding, so resonant speech exercises are in order to help bring what you have learned into your daily communication.

1. On a comfortable pitch, say "hmmmm." Does your voice feel effortless? Do you feel vibration in the front of your face? Where do you feel the vibration? Play with humming and move your pitch around until you feel an easy voice that creates a lot of buzzing.
2. Try adding different vowels to your hum. Does your voice remain effortless throughout? Do you still feel vibration? /mɑm/ /mim/ /moʊm/ /mum/ /meɪm/ /maɪm/
3. With your resonant voice, say a few words and phrases that are full of nasal sounds. "Mom." "Man." "Moon." "Many men." "Maybe Monday." "Mary made me mad." "Marvelous lemon muffins." Say some phrases you might use at work or home and try to maintain your resonant voice.
4. Hum while gliding on scale degrees 1-3-1, moving directly into a group of words or sentence on the same breath and resonant voice (e.g., hum 1-3-1-1-2-3-4-5) or (hum 1-3-1 -a,b,c,d,e,f,g) or (hum 1-3-1-hi how are you).

#### CONCLUSION

Thoughtful preparation of the speaking voice can help ready your instrument for daily demands and may prevent vocal fatigue. Outlined in this article is a four-tier system to prepare the speaking voice using a systematic approach familiar to singers. It is important to reiterate that any voice concerns lasting longer than two weeks should be evaluated by an appropriate medical voice team. Vocal health considerations are necessary for any voice athlete and should include education about the speaking voice, since the same mechanism is used for both tasks.

#### NOTES

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