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The Science of Vocal Fold Vibration and Benefits of Sustained Vowel Exercises

Before diving into the details, here's the key takeaway: When you sustain a vowel like "AHHH," you're training the coordination between your breathing muscles and vocal folds, improving your voice's efficiency and endurance for both speaking and singing.

Understanding Your Vocal Folds

The human voice begins with two remarkable structures in your throat called vocal folds (also known as vocal cords). Unlike what many people imagine, vocal folds aren't actually string-like "cords" but rather folds of tissue that protrude into your airway[1].

Structure and Location

Your vocal folds are located in your larynx (voice box), which sits at the top of your windpipe (trachea)[2]. Each vocal fold consists of multiple layers:

- An outer covering of mucous membrane
- A middle layer of flexible, gel-like tissue (superficial lamina propria) that allows the outer layer to move freely
- A deeper vocal ligament
- An innermost muscle layer (vocalis muscle)[1][3]

This layered structure is crucial for healthy voice production. When viewed from above using an endoscope, the vocal folds appear V-shaped, but in cross-section, they're actually triangular or wedge-shaped[4][3].

How Your Voice Works: The Vibration Process

When you speak or sing, three systems work together:

1. **Your breathing system** provides the power (air pressure)
2. **Your vocal folds** create the sound source (vibration)
3. **Your throat, mouth, and nose** shape the sound into recognizable speech

Here's how the vibration process happens:

Step 1: Preparation

First, your vocal folds are brought together (adducted) by your laryngeal muscles[5]. This closes the airway partially or completely, depending on the sound you're making.

Step 2: Pressure Builds

As you exhale, air pressure builds up beneath your closed vocal folds[4]. This is called subglottic pressure.

Step 3: The Vibration Cycle Begins

When the air pressure becomes strong enough, it forces the bottom edges of your vocal folds to open first[4][6]. The air then continues upward, gradually opening more of the vocal folds until it reaches the top edges.

Step 4: The Bernoulli Effect

As air rushes through the opening, something fascinating happens: the speed of the airflow creates a drop in pressure between the vocal folds (this is called the Bernoulli effect)[4][7]. This suction-like effect, combined with the elasticity of the vocal folds, pulls them back together, starting with the bottom edges.

Step 5: Repeat

This opening and closing cycle repeats rapidly-anywhere from 100 to over 1000 times per second, depending on the pitch you're producing[8]. Each cycle releases a small puff of air, creating the sound waves we perceive as voice[3].

This wave-like motion that travels from the bottom to the top of the vocal folds is called the "mucosal wave"[6]. It's this sophisticated rippling motion that creates healthy, efficient sound.

The Importance of Sustained Vowel Exercises

Now that we understand how vocal folds work, let's explore why sustained vowel exercises (like saying "AHHH" for as long as possible) are so beneficial:

1. Strengthens Breath Control

When you sustain a vowel, your vocal folds provide resistance to the airflow from your lungs[9]. This resistance forces your breathing muscles to work more efficiently to maintain steady pressure beneath your vocal folds[10]. Over time, this strengthens the coordination between your breathing muscles and your voice.

2. Improves Vocal Efficiency

Sustained phonation exercises train your vocal folds to vibrate with optimal efficiency-using just the right amount of muscle effort and air pressure to create sound[10][9]. This reduces strain and helps prevent vocal fatigue.

3. Enhances Coordination of Voice Systems

These exercises improve the relationship between airflow, vocal fold vibration, and how you shape the sound in your throat and mouth[9]. This overall coordination is essential for healthy voice production.

4. Increases Vocal Endurance

Research shows that regular practice of sustained vowel exercises increases maximum phonation time-how long you can sustain a sound on one breath[10]. This improved stamina transfers to everyday speaking and singing.

5. Provides Measurable Progress

The length of time you can sustain a vowel is a valuable measurement that speech therapists use to track improvement in voice function[10]. It's a practical way to see your progress over time.

Conclusion

Your vocal folds are remarkable structures that vibrate in precise patterns to create your unique voice. Sustained vowel exercises like saying "AHHH" for as long as possible are valuable tools for strengthening the coordination between your breathing and your voice.

By understanding the science behind vocal fold vibration, you can better appreciate why these exercises are so effective for improving voice quality, endurance, and overall vocal health.

Sustained vowels in LSVT LOUD are performed at maximum, healthy loudness. This strengthens the vocal fold closure (adduction), improves respiratory drive, and recalibrates the patient's sense of what "normal" loudness feels and sounds like. This recalibration is crucial because people with Parkinson's often don't realize their voices are too soft. These exercises offer a scientifically-grounded approach to vocal training.

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1. https://www.kenhub.com/en/library/anatomy/vocal-cords
2. https://emedicine.medscape.com/article/1948995-overview
3. https://www.youtube.com/watch?v=mQryxnJC0Eo
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