May-2013

Voice as a Parameter of Emotional and Physical Health

Ahmed Abdelal

Bridgewater State University, ahmed.abdelal@bridgew.edu

Recommended Citation


This item is available as part of Virtual Commons, the open-access institutional repository of Bridgewater State University, Bridgewater, Massachusetts.
Voice as a Parameter of Emotional and Physical Health

Ahmed M. Abdelal

This article provides basic information about voice and laryngeal health to fellow educators and professionals who want to be able to make a difference in their lives. If I were to design a course that can be used to help people understand the effects of voice on the body, I’d start with this article, which provides insights into the role of voice in communication and health.

As we move about our daily lives there are many things that we take for granted. Voice is one of them. Voice is an extremely intimate part of our personalities, as it is intricately tied to our nervous systems, especially the circuits responsible for motor execution and emotional processing. For this reason, voice analysis has been widely used in medical and criminal investigations.

Criminal investigators sometimes conduct a voice stress test to help them determine a suspect’s credibility. Speech language pathologists (SLPs) and ear, nose and throat doctors (ENTs) conduct voice testing to determine if someone has laryngeal pathology. Most recently, voice analysis has been used as a quick and highly accurate tool for diagnosing Parkinson’s disease.

In the experimental phase of testing included in the VFs auditory-based technology that has been used by SLPs for decades to design a new test for PD. Normally vibrating VFs tend to make very tiny involuntary tremors in pitch and loudness. When the tremor involves pitch we call it shimmer. When it involves loudness we call it shiver. These tremors are so tiny that neither speakers nor listeners can detect them. When jitter and shimmer values exceed the norms, that could mean PD, a disease characterized by involuntary tremors that eventually affect the entire body. Because the VFs are extremely sensitive, PD shows up in them long before it shows up in the extremities and the rest of the body. Soon a person will be able to call a phone number, speak for 30 seconds and know if he/she has early symptoms of PD.

Smoking and Other Things From Which You Should Protect Your Voice

Voice-fold tissue is extremely delicate and susceptible to damage. The VFs can be harmed by a variety of allergens (e.g., pollen), noxious gases (as those found in paint products and some household cleaners), and environmental contaminants. The Vocal Folds Serve Life Preservation and Speech Functions

The VFs are positioned within the larynx. Each VF ranges from 0.5 to 0.94 of an inch (depending on age and gender), and is encased within a thin, rubbery, flexible and shiny cover called the mucosa lamina propria. Because the VFs are attached to the top of the airway, all the air you breathe in and out must pass between them. These two little muscles guard the air we take in and out to ensure that nothing other than air gets into the airway. They enable us to sneeze, cough, push, or hold our breath whenever we need to.

In addition to these life-preserving functions, the VFs enable us to communicate and add shades of meaning and emotion to our voices. Originating from the same location in the larynx, inside the Adam’s apple, the VFs gradually diverge as they course posteriorly, and each connects into a little pyramidal cartilage (arytenoid) in back of the larynx. A paired muscle attached to the bases of the arytenoids rotates them inward to bring the VFs in contact with each other. Two other muscles based on the arytenoids move tightly together to compress the VFs against each other. With the VFs now sealed, air pressure builds up beneath them and forces the rubbery edges of the mucosa open, causing the vibration we know as voice.

Voice as a Vehicle for Conveying Emotions and Attitudes

A major component of speech is the manner in which utterances are expressed. Normally, speakers depend on intonation/medley of speech to add shades of meaning to their utterances. Intonation is achieved by continuously varying levels of pitch, loudness and muscular tension. This is achieved through constant modification of vocal-fold tension and length. Sometimes intonation is the only tool used for conveying a message. Children just a few weeks old, for example, learn to use intonation as a means of communication. Mothers soon learn what type of pitch accompanying their newborns’ crying/vocalization conveys pleasure, comfort or hunger. In conversation, the meaning of utterances may depend on pitch, loudness, and other aspects of voice quality.

In the presence of a cyst, the VFs are altered in the presence of a cyst, increase vocal-fold size/weight, thus decreasing the vibration rate. Vocal-fold edges become uneven and fail to valve the air efficiently. The escaping air compromises air pressure below the VFs (which reduces loudness) and adds noise to vocal-fold vibration, thus producing hoarseness and reducing loudness further.

A 30-second Voice-Based Test to Diagnose Parkinson’s Disease (PD)

Voice quality reveals important information about vocal-fold health, and can alert us to more serious health problems. In July 2012, Dr. Max Little and colleagues at MIT adapted voice-based technology that has been used by SLPs for decades to design a new test for PD. Normally vibrating VFs tend to make very tiny involuntary tremors in pitch and loudness. When the tremor involves pitch we call it jitter. If you suspect you are a loud speaker, get a hearing evaluation. Hearing loss can cause people to raise their voices.

Avoid tobacco smoke, especially the first-hand kind.

Space out speaking engagements to avoid putting excessive stress on the VFs, and to allow them to rest.

Drink water throughout the day (especially when talking) to ensure adequate vocal-fold hydration and function.

Avoid caffeine prior to speaking engagements. Caffeine elevates anxiety and dehydrates the VFs.

If you experience hoarseness or a purgry voice while eating, consult an SLP. This could indicate a swallowing disorder.

If you feel your voice has become less pleasant in tone, seek a voice evaluation.

When it involves loudness we call it shiver. These tremors are so tiny that neither speakers nor listeners can detect them. When jitter and shimmer values exceed the norms, that could mean PD, a disease characterized by involuntary tremors that eventually affect the entire body. Because the VFs are extremely sensitive, PD shows up in them long before it shows up in the extremities and the rest of the body. Soon a person will be able to call a phone number, speak for 30 seconds and know if he/she has early symptoms of PD.

Smoking and Other Things From Which You Should Protect Your Voice

Voice-fold tissue is extremely delicate and susceptible to damage. The VFs can be harmed by a variety of allergens (e.g., pollen), noxious gases (as those found in paint products and some household cleaners), and environmental contaminants. The Vocal Folds Serve Life Preservation and Speech Functions

The VFs are positioned within the larynx. Each VF ranges from 0.5 to 0.94 of an inch (depending on age and gender), and is encased within a thin, rubbery, flexible and shiny cover called the mucosa lamina propria. Because the VFs are attached to the top of the airway, all the air you breathe in and out must pass between them. These two little muscles guard the air we take in and out to ensure that nothing other than air gets into the airway. They enable us to sneeze, cough, push, or hold our breath whenever we need to. In addition to these life-preserving functions, the VFs enable us to communicate and add shades of meaning and emotion to our voices.

Originating from the same location in the larynx, inside the Adam’s apple, the VFs gradually diverge as they course posteriorly, and each connects into a little pyramidal cartilage (arytenoid) in back of the larynx. A paired muscle attached to the bases of the arytenoids rotates them inward to bring the VFs in contact with each other. Two other muscles based on the arytenoids move tightly together to compress the VFs against each other. With the VFs now sealed, air pressure builds up beneath them and forces the rubbery edges of the mucosa open, causing the vibration we know as voice.

Voice as a Vehicle for Conveying Emotions and Attitudes

A major component of speech is the manner in which utterances are expressed. Normally, speakers depend on intonation/medley of speech to add shades of meaning to their utterances. Intonation is achieved by continuously varying levels of pitch, loudness and muscular tension. This is achieved through constant modification of vocal-fold tension and length. Sometimes intonation is the only tool used for conveying a message. Children just a few weeks old, for example, learn to use intonation as a means of communication. Mothers soon learn what type of pitch accompanying their newborns’ crying/vocalization conveys pleasure, comfort or hunger. In conversation, the meaning of utterances may depend on pitch, loudness, and other aspects of voice quality.

In the presence of a cyst, the VFs are altered in the presence of a cyst, increase vocal-fold size/weight, thus decreasing the vibration rate. Vocal-fold edges become uneven and fail to valve the air efficiently. The escaping air compromises air pressure below the VFs (which reduces loudness) and adds noise to vocal-fold vibration, thus producing hoarseness and reducing loudness further.

A 30-second Voice-Based Test to Diagnose Parkinson’s Disease (PD)

Voice quality reveals important information about vocal-fold health, and can alert us to more serious health problems. In July 2012, Dr. Max Little and colleagues at MIT adapted voice-based technology that has been used by SLPs for decades to design a new test for PD. Normally vibrating VFs tend to make very tiny involuntary tremors in pitch and loudness. When the tremor involves pitch we call it jitter. If you suspect you are a loud speaker, get a hearing evaluation. Hearing loss can cause people to raise their voices.

Avoid tobacco smoke, especially the first-hand kind.

Space out speaking engagements to avoid putting excessive stress on the VFs, and to allow them to rest.

Drink water throughout the day (especially when talking) to ensure adequate vocal-fold hydration and function.

Avoid caffeine prior to speaking engagements. Caffeine elevates anxiety and dehydrates the VFs.

If you experience hoarseness or a purgry voice while eating, consult an SLP. This could indicate a swallowing disorder.

If you feel your voice has become less pleasant in tone, seek a voice evaluation.
Voice as a Parameter of Emotional and Physical Health

Ahmed M. Abdelal

This article provides basic information about voice and laryngeal health to fellow educators and professional users with the hope that it can make a difference in their lives. I tackle voice from a multi-dimensional approach integrating research and clinical practice. What follows is based on extensive research that I have reviewed over the years, on coursework that I have taught in related areas (including anatomy and physiology of speech, language and hearing; phonetics, linguistics, and neurological bases of speech, language and hearing) and on my own experience as a licensed speech-language pathologist who has diagnosed and treated patients with voice disorders for more than 14 years.

As we move about our daily lives there are many things that we take for granted. Voice is one of them. Voice is an extremely intimate part of our personalities, as it is intricately tied to our emotions and psychological states. People often recognize the sound of someone's voice before they recognize the face. In fact, people may have difficulty in remembering a name but remember the voice. Voice is one of the main vehicles through which we communicate. Mothers soon learn what it means to risk their lives to bring into the world a new life. Speaking is a universal human behavior. When we move about our daily lives there are many things that we take for granted. Voice is one of them. Voice is an extremely intimate part of our personalities, as it is intricately tied to our emotions and psychological states. People often recognize the sound of someone's voice before they recognize the face. In fact, people may have difficulty in remembering a name but remember the voice. Voice is one of the main vehicles through which we communicate. Mothers soon learn what it means to risk their lives to bring into the world a new life. Speaking is a universal human behavior.

Voice as a Vehicle for Conveying Emotions and Attitudes

A major component of speech is the manner in which utterances are expressed. Normally, speakers depend on intonation/melody of speech to add shades of meaning to their utterances. Intonation is achieved by continuously varying levels of pitch, loudness and muscular tension. This is achieved through constant modification of vocal-fold structure and function. Normal VFs have shiny, moist mucosa with even, smooth edges. Whether pitch is high or low depends on vocal-fold vibration rate per second. The greater the vibration rate, the higher the pitch, and vice versa. On average, for example, a woman's VFs complete 215 vibrations per second, while a man's complete around 125. This explains why a woman's pitch is much higher than a man's. These rates, however, are altered in the presence of a cyst, tumor, inflammation, or any mass that increases vocal-fold weight. A lesion could also compromise loudness and interfere with the pure tones the VFs typically produce. Let's take the case of laryngitis, for example, which is an infection of the VFs and surrounding laryngeal tissue. Like any type of infection, laryngitis triggers swelling as an immune response, which increases vocal-fold size/weight, thus decreasing the vibration rate. Vocal-fold edges become uneven and fail to vibrate the air efficiently. The escaping air compromises air pressure below the VFs (which reduces loudness) and adds noise to vocal-fold vibration, thus producing hoarseness and reducing loudness further.

A 30-second Voice-Based Test to Diagnose Parkinson’s Disease (PD)

Voice quality reveals important information about vocal-fold health, and can alert us to more serious health problems. In July 2012, Dr. Max Little and colleagues at MIT adapted voice-based technology that has been used by SLPs for decades to design a new test for PD. Normally vibrating VFs tend to make very tiny involuntary tremors in pitch and loudness. When the tremor involves pitch we call it jitter.

Tips on How to Protect Your Voice

- Avoid speaking in noisy situations. This causes you to raise your voice.
- If you suspect you are a loud speaker, get a hearing evaluation. Hearing loss can cause people to raise their voices.
- Avoid tobacco smoke, especially the first-hand kind.
- Space out speaking engagements to avoid putting excessive stress on the VFs, and to allow them to rest.
- Drink water throughout the day (especially when talking) to ensure adequate vocal-fold hydration and function.
- Avoid caffeine prior to speaking engagements. Caffeine elevates anxiety and dehydrates the VFs.
- If you experience hoarseness or a gumplike voice while eating, contact an SPL. This could indicate a swallowing disorder.
- If you feel your voice has become less pleasant in tone, seek a voice evaluation.
The experimental phase of testing included ten thousand people and Parkinson’s Disease detection rate reached 98.6% accuracy.