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A Resource for Interprofessional Providers

Presbyphonia: The Aging Voice

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Presbyphonia, also known as presbylarynx or aging voice, refers to the age-related alterations in the upper aerodigestive tract that result in changes to a person's voice. While presbyphonia itself is not pathologic, it can influence a person's ability to communicate and have social, work-related, and psychological effects. If the changes progress to the point where they impair an individual's ability to communicate effectively, then presbyphonia can significantly affect a person's quality of life.

Voice Production

Three anatomical components work together to produce the voice. The first one is the lungs and muscles of inspiration and expiration. Together, they present a steady stream of air to the larynx.

The second component is the larynx itself. As air passes through the larynx, the vocal folds vibrate, creating sound that propagates through the upper airway.

Finally, the voice is filtered by the upper airway – the supraglottal vocal tract, which includes the throat, mouth, and nose. These air chambers shape the sound into words or song.

Age-Related Changes in Voice Production

The lungs, larynx, and supraglottal vocal tract all change with age in the following ways.

Lung

With increased age, voice production changes because there is a decreased force (FEV1), and rate of contraction of the respiratory muscles, along with a stiffening of the thorax and loss of elasticity of lung tissue. These changes diminish the upward flow of air from the lungs through the larynx, reducing the power of the voice.

Larynx

The laryngeal cartilages calcify, the muscles of the larynx atrophy, and the soft tissue stiffens. These changes serve to

reduce vocal fold elasticity, resulting in a weaker, breathier, and rougher sounding voice.

It can be difficult to hear the aging voice in noisy environments, such as restaurants or social gatherings. In addition, many individuals report significant vocal fatigue. Laryngeal changes also influence the pitch of the voice. Pitch generally increases for men and decreases for women. The pitch change can lead to misgendering when communication is not face-to-face.

Supraglottic Vocal Tract

With age, the facial and pharyngeal muscles atrophy and lose elasticity. Dental changes such as tooth loss can also affect speech production. Dry mouth leads to discomfort, dysphonia, and dysphagia.

All of these factors - changes in the lungs, larynx, and supraglottic vocal tract - lead to the classic senescent voice changes. These are listed in Table 1.

Diagnosis

The diagnosis of presbyphonia is one of exclusion. Other pathologies can produce similar voice changes. Therefore, videostroboscopic examination is critical to establishing the diagnosis. Common laryngeal disorders in older adults can include vocal fold paralysis, laryngeal cancer, and neurologic conditions including Parkinsonism and stroke.

Weak	Rough
Breathy	Voice Fatigue
Pitch changes	Aspiration while speaking

TIPS ABOUT DEALING WITH PRESBYPHONIA

- **ENT referral:** When adults report voice changes longer than 4-6 weeks, consider ENT referral for laryngoscopy.
- **Voice therapy:** Behavioral therapy with a specialized speech and language pathologist is first-line therapy and might improve voice quality.
- **Surgery:** The laryngologist might recommend surgery to improve vocal fold closure if conservative treatment does not satisfactorily improve quality of life.

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When adults have persistent voice changes (greater than 4-6 weeks), they should be referred to an otolaryngologist for laryngoscopy and videostroboscopy (examining the vibratory pattern of the vocal folds during phonation with a strobe light).

The classic videostroboscopic appearance shows thin/atrophic vocal folds with poor closure and decreased vibration. Normal vocal fold mobility without lesions expected. Hyperfunction and edema are sometimes present. (Figure 2).

Treatment

Voice therapy and surgery are the mainstays of treatment. Treatment decisions are based on the impact the person's voice has on quality of life. In general, voice therapy is the first line treatment.

Voice Therapy

Speech-language pathologists teach patients about voice production and vocal health. Patients are then taught voice production techniques to strengthen the voice. Most patients participate in 4-8 therapy sessions.

Surgery

For patients requiring additional treatment after voice therapy, there are several surgical options. The goal of surgery is to augment the vocal folds or move them closer to the center of the larynx to reduce the gap, improve vocal fold closure, and strengthen the voice.

Injection laryngoplasty involves placing a biomaterial near the vocal folds. Injections can be performed under general anesthesia in the operating room or as a convenient office-based procedure. Injections are considered temporary.

Another more definitive approach, bilateral medialization thyroplasty, is an open surgical procedure performed under local anesthesia with mild sedation. The larynx is accessed via the neck and a small window is created in the laryngeal cartilage overlying the vocal cords. Material is implanted deep to the laryngeal cartilage to medialize the vocal cords.

Which Treatment is Best?

There are benefits and potential risks to each of the treatment options. Treatment should be tailored to best suit the patient's needs.



Figure 1, left, shows the larynx of a young adult. Note the closely apposed vocal cords.



Figure 2, right, shows the larynx of an older adult. Note that the vocal cords are not tightly apposed, leaving a glottic gap.

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