

# Spasmodic Dysphonia

**S**pasmodic dysphonia (SD) is a neurologic disorder that is characterized by uncontrolled contractions of laryngeal muscles, manifesting as a “strained-strangled” or sometimes breathy voice. SD is categorized as a laryngeal (focal) “dystonia.” In contrast to generalized dystonias (movement disorders), focal dystonias are localized but may be exacerbated while performing a specific task. Examples of other focal dystonias include:

- Writer’s cramp (occurs only while writing)
- Blepharospasm (eyelid twitching; increases with speaking)
- Oral mandibular dystonia (jaw-opening spasms during speech, but not chewing)
- Torticollis (turning the head and stiffening of the neck)

There are two manifestations of SD. Adductor type of spasmodic dysphonia (ADSD) accounts for most patients, and is characterized by a tight closure of the larynx at the wrong time forcing the voice to stop. Abductor spasmodic dysphonia (ABSD) often manifests with a breathy voice where spasms open the larynx at the wrong time rather than closing it. There can also be mixed forms including features of both ADSD and ABSD.

## What causes spasmodic dysphonia?

We do not know how SD develops. It was originally described by Traube in 1871 as a form of “nervous hoarseness,” and later referred to as “laryngeal stuttering.” It is currently believed to be due to a dysfunction in the basal ganglia of the brain. Altered levels of neurotransmitters have been detected in autopsies of patients with other dystonias. There is also the theory that there is a central disinhibition of laryngeal responses to sensory input in patients with ADSD. Since SD is usually confined to the larynx, problems with swallowing or other movements may suggest another neurologic diagnosis.

## How is spasmodic dysphonia diagnosed?

SD is relatively rare, presents in adulthood and affects two times as many females as males. Patients may first notice symptoms during a period of increased stress, following an upper respiratory infection, or during a speech performance. The voice usually sounds “strained-strangled,” similar to the sound of someone being “choked.” It doesn’t hurt to talk, and it is usually worse when speaking loudly or in times of stress. Singing, crying, laughing and whispering often sound normal.

The larynx appears anatomically normal on examination by the otolaryngologist, but there may be subtle findings. Laryngeal electromyography (EMG) generally has a normal pattern of muscle activation with an occasional intrusion of spasmodic bursts, but there may also be prolonged spasms at a voice break. Since the laryngeal and EMG findings are not consistent among all patients, SD is a diagnosis by the otolaryngologist based on the clinical findings.

## Problems that may make the diagnosis more difficult

- If patients also have a constant voice strain and strangle, then they may have a superposed muscle tension dysphonia.
- If patients report they have intervals when they are completely symptom-free, then they may have a psychogenic dysphonia.
- Patients may also develop compensatory speech patterns to improve their ability to communicate: whispering (less effort and greater control), speaking on inhalation (overcomes hyperadduction in ADSD, and produces voice more easily in ABSD).
- Vocal tremor, which may be related to benign essential tremor, is also focal and task-specific and may be confused with SD. However, when producing a prolonged vowel, tremor produces a regularity of the glottal stops or frequency and amplitude variation.

## The role of botulinum toxin injection

Botulinum toxin is produced by the bacteria *Clostridium botulinum*. While it is a dangerous toxin in the natural environment, it has been shown to be safe and effective in treating SD when injected into the larynx by a trained professional. The medical use of botulinum toxin was introduced by Scott (1980) for the treatment of strabismus (eye muscle imbalance), was later used for blepharospasm (eye muscle spasm, Scott 1985) and is now widely used for facial wrinkles and some forms of headache. Most patients receive notable improvement as measured by the Voice Related Quality of Life index after receiving this injection for SD.

During a botulinum toxin injection for SD there is a small amount of discomfort. Many clinicians use EMG to confirm appropriate needle placement. A small-gauge needle is used to confirm placement in the target muscle and to inject the botulinum toxin.

Effects may be noticed as early as six to 12 hours, but usually by one to two days and may continue for up to seven days due to diffusion of the toxin. Some patients may have

difficulty swallowing liquids during this time (three to five days), and breathy speech may last from seven to 20 days. Most patients enjoy up to a two to three month period of improved speech without breathiness or difficulty swallowing. Since symptoms return due to new motor unit sprouting and reinnervation, injections are generally required every two to four months.

## Surgery

- The most promising surgical option involves section of the adductor branches of the recurrent laryngeal nerve (RLN) and reinnervation with the ansa cervicalis nerve, showing very good potential for sustained benefit.
- Surgery of the RLN includes section and avulsion (cutting the nerve and scraping the ends), but reinnervation occurs on the avulsed side and/or SD still affects the non-operated side. This operation is irreversible, and may leave patients with either dyspnea (difficulty breathing) or with a breathy voice.
- Selective thyroplasty (vocal implant), partial thyroarytenoid myectomy (removing vocal cord muscle) and anterior commissure retrusion, all report variable success.

## Other treatment options

- Voice therapy alone may be effective for patients mild forms of SD, and may prolong the duration of effectiveness for those treated with botulinum toxin.
- Medical therapy is usually discouraging but may have some benefit for related voice disorders. Propranolol (beta-blocker) “blunts” the effects of voice tremor. Anti-cholinergics may benefit severe dystonia. Muscle relaxants have limited effect in a few patients. Central nervous system depressants such as diazepam reduce stress and its manifestations.
- Other treatments proposed for SD include hypnosis, acupuncture and electrical stimulation of the recurrent laryngeal nerve, none of which show definitive help.
- Support groups are important in patients with SD since people with a speech motor disorder may tend to have a compromised self-image and defer social engagements due to their difficulty with communication.

## Related Information

- National Spasmodic Dysphonia Association, [www.dysphonia.org](http://www.dysphonia.org), 1-800-795-NSDA