

Task-Specific Singing Dystonia: Vocal Instability That Technique Cannot Fix

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Summary: Objectives. Singer's dystonia is a rare variation of focal laryngeal dystonia presenting only during specific tasks in the singing voice. It is underdiagnosed since it is commonly attributed to technique problems including increased muscle tension, register transition, or wobble. Singer's dystonia differs from technique-related issues in that it is task- and/or pitch-specific, reproducible and occurs independently from the previously mentioned technical issues. This case series compares and contrasts profiles of four patients with singer's dystonia to increase our knowledge of this disorder.

Methods. This retrospective case series includes a detailed case history, results of singing evaluations from individual voice teachers, review of singing voice samples by a singing voice specialist, evaluation by a laryngologist with endoscopy and laryngeal electromyography (LEMG), and spectral analysis of the voice samples by a speech-language pathologist.

Results. Results demonstrate the similarities and unique differences of individuals with singer's dystonia. Response to treatment and singing status varied from nearly complete relief of symptoms with botulinum toxin injections to minor relief of symptoms and discontinuation of singing.

Conclusions. The following are the conclusions from this case series: (1) singer's dystonia exists as a separate entity from technique issues, (2) singer's dystonia is consistent with other focal task-specific dystonias found in musicians, (3) correctly diagnosing singer's dystonia allows singer's access to medical treatment of dystonia and an opportunity to modify their singing repertoire to continue singing with the voice they have, and (4) diagnosis of singer's dystonia requires careful sequential multidisciplinary evaluation to isolate the instability and confirm dystonia by LEMG and spectral voice analysis.

Key Words: Voice dystonia–Singers–Spasmodic dysphonia–LEMG–Musician's dystonia–Focal task-specific dystonia.

INTRODUCTION

Singer's dystonia is a rare neurologic disorder that is initially confined solely to the singing voice and combines aspects of the focal task-specific dystonia (FTSD) found in instrumentalists with many of the vocal abnormalities that are the characteristics of laryngeal spasmodic dysphonia.^{1,2} Dystonia is a movement disorder causing involuntary contractions of a specific muscle or muscle groups. Dystonia is believed to be a disorder originating in the central nervous system. The specifics regarding the cause of dystonia are not known. Typically, focal laryngeal dystonia presents as spasmodic dysphonia. Spasmodic dysphonia disrupts the voice during speech. There are two types of spasmodic dysphonia; the most prevalent type is adductor spasmodic dysphonia, whereas the less prominent type is abductor spasmodic dysphonia. It is possible for a patient to have both types and this is termed "mixed." In adductor spasmodic dysphonia, the muscles of adduction involuntarily spasm and close the vocal folds inhibiting voicing and causing a strained-strangled

feeling. In abductor spasmodic dysphonia, the muscles of abduction involuntarily spasm opening the vocal folds and stop voicing. Spasmodic dysphonia is task dependent because it only occurs on speech and occurs during specific actions when voicing (either producing a voiced sound or moving from voiceless to voiced phonemes). Spasmodic dysphonia is typically not present when laughing, singing, or speaking in an atypical manner.

Singer's dystonia is different from spasmodic dysphonia because it initially occurs only in the singing voice during specific singing tasks or when singing specific pitches. However, it also has some similarities to spasmodic dysphonia as dystonia in the speaking voice developed in some singers over time.¹ Singer's dystonia is similar in several aspects to musician's dystonia in that more than one site can become affected as time progresses and a familial incidence of movement disorders can be present, as seen in some of our singers.²

Differentiating singer's dystonia from poor singing technique requires careful evaluation on the part of the voice teacher, laryngologist, speech-language pathologist, and singing voice specialist. Technical issues such as excessive tongue and laryngeal tension, difficulty in negotiating a passagio or singing register shift, and wobble, characterized by wide amplitude variation in vibrato, must be carefully evaluated in each singer. These technical problems may arise from the singer desperately trying to control the instability in their singing voice and can be isolated and corrected by training with the voice teacher and singing voice specialist. The critical difference in task-specific singing dystonia is that it is independent of problems related to register shifts or vibrato. The dystonic

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breaks are reproducible at specific pitches that are unrelated to the passaggio, or occur while performing specific tasks, such as singing voiceless consonants. Singer's dystonia is resistant to correction by vocal exercises and unrelated to vocal fatigue.

The diagnosis of laryngeal dystonia is not based on any single test, but rather a composite impression based on the perceptual, acoustic, laryngoscopic, and electromyographic evaluation of the speaking voice.³⁻⁷ Laryngeal electromyography (LEMG) and spectral analysis of the singing samples coupled with the visualization of the larynx and perceptual evaluation of the voice can support the diagnosis of dystonia in the singing voice.

A correct diagnosis of singer's dystonia has many benefits. The diagnosis of singer's dystonia can alert the clinician to assess other aspects of the patient's general and neurologic health. Precautions and warning signs can be discussed with the patient to prevent the disorder from causing other voice problems and for early detection of changes suggestive of more generalized neurologic disorders. A correct diagnosis can relieve singer's guilt at not being able to accomplish specific singing tasks, which free them to be able to move forward and work with the voice that they have. Voice teachers, singing voice specialists, speech-language pathologists, and laryngologists have a role in determining the correct diagnosis and helping the singer configure a therapeutic program, which may allow them to continue singing.

There has been one prior case series of singer's dystonia in the peer-reviewed literature. Chitkara et al¹ published a series of five cases in 2006. This case series introduced the previously undescribed disorder of singer's dystonia and detailed four patients with adductor type disorder and one patient with abductor type disorder. For each patient, the article presents their age at onset, sex, type of dystonia, the affected singing characteristics including range, vibrato, stability, and the chosen method(s) of treatment. Additionally, they noted whether dystonia developed in their speaking voice at a later time. Absent from the case presentation is a detailed characterization of the dystonia, a discussion of the role of LEMG and spectral analysis of the singing voice in the diagnosis of the singer's dystonia and the role of the singing voice specialist both in the diagnosis and in the treatment of the disorder. This case series expands on the findings of the previously published work.

METHOD

Methods used for data collection and presentation were approved by the institution's institutional review board and included information from the patient's medical record, stroboscopy, acoustic recording, and LEMG. Quiet rooms typically used for the assessment of voice clients in the hospital clinic were the setting for the recordings. Four patients seen between 2006 and 2010 are described.

Case history

A detailed case history inclusive of gender, age of onset and duration of singing problem, affected singing characteristics, level of voice training, profession, and response to instruction by the patient's voice teacher was completed by the treating

laryngologist. Additionally, all general medical problems, reflux symptoms, and medications were examined in detail to assure that they were well controlled.

Perceptual evaluation of speaking and singing voice

The evaluation of the singing and speaking voice combined perceptions gleaned by interaction with the singer during several visits and the recordings taken at the time of the stroboscopic evaluation, which were recorded on the Digital Rhino-Laryngeal Stroboscopic System Model 9100B (Kay Elemetrics Corp., Lincoln Park, NJ). Quiet rooms typically used for the assessment of voice clients in the hospital clinic were the setting for the recordings, and the recordings were reviewed in the same setting without specialized equipment. The connected speech of each singer was evaluated during segments of spontaneous connected speech or with the "Rainbow Passage." Additionally, the vocal tasks for abductor and adductor spasmodic dysphonia were tested including counting and phrases loaded with voiced vowels and voiceless consonants. The singing voice was evaluated for audible disruptions of pitch and vibrato that were task- and/or pitch-specific and reproducible and independent of the register shift of the singer's voice. The perceptual evaluation was accomplished by the Voice Team of the Evelyn Trammell Institute for Voice and Swallowing, which includes a singing voice specialist, an otolaryngologist, and a speech-language pathologist. Perceptual evaluation was made both collectively and independently during the treatment of these singers over several visits. There was concordance with the results of the perceptual evaluation from the voice team on all singers. As this was a retrospective series of patients seen over a 4-year time span, no set protocol was used.

Endoscopy and stroboscopy

Stroboscopy was conducted using a Digital Rhino-Laryngeal Stroboscopic System Model 9100B. Two evaluations were performed. A Video Naso-PharyngoStrobo-Laryngoscopy (Kay-Pentax Corp., Lincoln Park, NJ; model VNL-11 70K) was used to evaluate the singing voice by examining the singer's vocal range and particularly in the area of instability. An examination with a 70° rigid endoscope (Kay Elemetrics; model 9106) was additionally performed to assure that no structural lesions were present that might go undetected on a fiberoptic examination. Singing voice instability was confirmed by spasms in the singing voice on fiberoptic laryngovideostroboscopy when taking the singer through the area of vocal difficulty on both ascending and descending scales. The spasms were distinguished by their task and pitch specificity and reproducibility. The spasms were seen as sudden involuntary muscular contractions of varying severity, ranging from very slight to quite large. The spasms were always clearly audible as a disruption of pitch and vibrato. The laryngeal evaluation was remarkable for lack of laryngeal or tongue base tension in the passaggio or other areas of the vocal range. Any technical errors that were observed were corrected either by the patient's voice teacher or the singing voice specialist and reevaluated before committing to the diagnosis of dystonia.

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