

# A Comparison of Initial and Subsequent Follow-Up Stroboscopic Examinations in Singers

\*Calvin Myint, †Jaime Eaglin Moore, \*Amanda Hu, \*Aaron J. Jaworek, and \*Robert T. Sataloff, \*Philadelphia, Pennsylvania, and †Richmond, Virginia

**Summary: Objectives.** Previous studies have identified abnormal findings in up to 86.1% of singers on initial screening stroboscopic examination (SVL) examinations. No studies have compared the prevalence of abnormalities in singers on their subsequent follow-up SVL. Our study evaluates the frequency of these findings in both the initial and subsequent examinations.

**Methods.** Retrospective charts and SVL reports were reviewed on students from an opera conservatory from 1993 to 2014. All students had initial screening SVL, but only students who later returned with acute voice complaints were included in the study ( $n = 51$ , 137 follow-up visits). Normal SVL was defined as an examination without structural or functional abnormalities and reflux finding score  $\leq 7$ . Data were analyzed using the chi-square test.

**Results.** For initial examinations, 90.2% (including reflux) and 88.2% (excluding reflux) were abnormal. In follow-up examinations, 94.9% (including reflux) and 94.2% (excluding reflux) had abnormal findings, which included muscle tension dysphonia (40.1%), vocal fold (VF) masses (unilateral 48.9%, bilateral 30.7%), vascular abnormalities (unilateral 27.0%, bilateral 5.8%), sulcus (unilateral 17.5%, bilateral 5.1%), VF hypomobility (unilateral 36.3%, bilateral 5.9%), phase (30.6%) and amplitude (44.8%) asymmetries, and glottic insufficiency (49.3%). Follow-up examinations revealed a significant increase in laryngopharyngeal reflux ( $\chi^2 = 7.043$ ;  $P < 0.05$ ).

**Conclusions.** We found a higher prevalence of abnormal findings compared with previous studies, which we attributed to a more inclusive definition of abnormal pathologies, improvements in SVL technology, and possibly increased experience with SVL interpretation. This high prevalence of abnormal findings in asymptomatic singers further supports the importance of baseline examinations.

**Key Words:** Voice abnormalities in singers—Voice pathology in asymptomatic singers—Dysphonia—Stroboscopy—Stroboscopic examination.

## INTRODUCTION

Stroboscopic examination (SVL) is an invaluable tool for the evaluation of voice disorders.<sup>1–3</sup> The use of stroboscopic light dates back to 1878, and now, it is used widely by laryngologists to perform a detailed examination of the vocal fold (VF) movement and pathology.<sup>1,2</sup> SVL is a clinically useful procedure that can influence the diagnosis and treatment of patients. In studies by Sataloff et al, SVL modified the diagnoses in 47% of patients and confirmed uncertain diagnoses in many of the patients studied.<sup>1,2</sup>

However, when performing SVL, it is important to consider the degree to which abnormal findings contribute to a complaint of acute dysphonia. Previous studies of healthy singers demonstrated that, although there was a high prevalence of laryngeal abnormalities, many of these findings did not affect the singers' vocal performance.<sup>3–5</sup> In a study by Elias et al,<sup>3</sup> 58% of asymptomatic opera students ( $n = 65$ ) had abnormal laryngeal findings including six clinical pathologies: reflux laryngitis, nodule, cyst, varicosity, VF asymmetry, and VF weakness.

Lundy et al<sup>4</sup> studied 65 asymptomatic singing students, 57 with sufficient data to review, and reported the following incidences of abnormal findings: 5 (8.8%) with benign vocal lesions, 35 (61.4%) with posterior erythema, 17 (29.8%) with edema, and 20 (38.5%) with incomplete glottic closure. Sataloff et al<sup>5</sup> also reported abnormal SVL findings in 86.1% of asymptomatic singing teachers. Reulbach et al<sup>6</sup> studied occult laryngeal findings in asymptomatic adults (not singers) older than 40 years, and only 12% had normal laryngeal examinations.

Baseline examinations in professional voice users may provide a clinically important reference point when acute symptoms occur. Although previous studies documented abnormal findings in asymptomatic singers, they did not investigate the presence of these or other abnormalities on follow-up examination when acute symptoms occurred. Our study explored the differences in the prevalence of abnormal laryngeal findings in advanced singing students comparing their initial, routine evaluation and subsequent SVL examinations when acute dysphonia was present.

## MATERIALS AND METHODS

A retrospective chart review was approved by the institutional review board at Drexel University College of Medicine. Our subjects were from an elite opera conservatory at which promising young singers are selected to attend the school on full scholarship. All new opera students from this vocal academy have a screening SVL performed at our voice center at the beginning of their freshman year. These students are referred back to our practice if they develop acute vocal complaints.

Demographic data and SVL reports were reviewed on all students from 1993 to 2014. Reports of the initial screening

Accepted for publication June 19, 2015.

Conflict of interest: None.

This project was presented at The Voice Foundation's 43rd Annual Symposium: Care of the Professional Voice Meetings in Philadelphia, PA, May 28–June 1, 2014.

From the \*Department of Otolaryngology–Head and Neck Surgery, Drexel University College of Medicine, Philadelphia, Pennsylvania; and the †Department of Otolaryngology–Head and Neck Surgery, Virginia Commonwealth University, Richmond, Virginia.

Address correspondence and reprint requests to Amanda Hu, Department of Otolaryngology–Head and Neck Surgery, Drexel University College of Medicine, 219 N. Broad Street, 10th Floor, Philadelphia, PA 19102. E-mail: [amanda.cm.hu@gmail.com](mailto:amanda.cm.hu@gmail.com)

Journal of Voice, Vol. 30, No. 4, pp. 472–477

0892-1997/\$36.00

© 2016 The Voice Foundation

<http://dx.doi.org/10.1016/j.jvoice.2015.06.013>

SVL examinations and of any follow-up examinations that were conducted for acute vocal complaints were reviewed. Freshman students from this cohort received baseline examinations during the study period; however, only 51 of them had follow-up visits to our office for voice complaints. Therefore, students with baseline examinations but no follow-up visits were excluded.

All SVL examinations were performed with the students in seated position, with or without the administration of oral topical anesthetic. The laryngeal observations were made using a KayPENTAX digital stroboscopy system (Montvale, NJ). The PENTAX distal-chip flexible nasolaryngoscope with continuous light and stroboscopic light is used routinely, as well as the Kay-70° rigid laryngoscope with stroboscopic light. Before the distal-chip laryngoscope was available, examinations were performed using an Olympus ENF-L3 flexible nasolaryngoscope (Center Valley, PA). The patient was asked to perform speech and nonspeech tasks to detect laryngeal abnormalities. Repetitive phonatory tasks (RPTs) and glissando singing maneuvers were used to detect neuromuscular abnormalities.<sup>5,7</sup> Stroboscopic light at different intensities and frequencies during phonation of /i/ was used to assess glottic competence, masses, structural lesions, vibratory patterns, and mucosal wave.<sup>5,7</sup> The SVL examinations were performed by laryngologists and laryngology fellows, and examinations performed by a laryngology fellow were contemporaneously reviewed by the senior author (R.T.S.).

Our study defined a normal SVL as having a reflux finding score (RFS) of  $\leq 7$  and an examination without structural or functional abnormalities. An RFS  $> 7$  is suggestive of laryngopharyngeal reflux (LPR).<sup>8</sup> Structural and functional abnormalities observed included muscle tension dysphonia (MTD), incomplete glottic closure, asymmetry of amplitude, asymmetry of phase, unilateral or bilateral VF hypomobility, unilateral or bilateral VF mass (cyst, pseudocyst, nodule, polyp, others), unilateral or bilateral VF tear, unilateral or bilateral VF vascular abnormality (ectasia, varicosity, or hemorrhage), and unilateral or bilateral sulcus (vocalis and vergeture). The diagnosis of MTD was based on stroboscopic findings as described by Morrison et al<sup>9</sup>: increased laryngeal muscle tension, abnormal glottal closure, and excessive supraglottic activity. Increased muscle tension can occur in the external and/or internal laryngeal musculature and can be identified by neck palpation. Different staging systems have been developed for MTD, including the Koufman and Blalock classification<sup>10</sup>; however, none are universally accepted. As a result, no classification system was used for MTD in our study.

Statistical analysis was performed using Excel 2010 (Microsoft, Inc., Redmond, WA), and descriptive statistics were calculated. Chi-square test ( $\chi^2$ ) was performed to analyze the number of abnormal findings in the initial and subsequent symptomatic examinations.<sup>11</sup> All the subsequent examinations (ie, second, third, fourth, etc) that were performed when the patient had acute dysphonia were grouped together to compare with the initial asymptomatic examinations. The degree of freedom for each comparison was one; thus, any  $\chi^2$  value greater than 3.841 was considered significant with an *a priori* probability level set at 0.05.

## RESULTS

The charts of 51 students (age  $26 \pm 3$  years, male/female 28/23) with a total of 188 SVL reports were reviewed. Table 1 summarizes demographic data of the study population. There were a total of 137 subsequent examinations. The average number of follow-up examinations per subject was  $2.69 \pm 2.24$ , and the median time between the initial and subsequent examinations was 266 days with interquartile range of 60 days to 615 days.

The most common abnormal finding was LPR with 69.0% of students presenting with this pathology at the time of their initial SVL examination and 90.3% during the subsequent examinations (Table 2). LPR was also the only pathology that was increased significantly between the initial and follow-up examinations with  $\chi^2$  of 7.043 ( $P < 0.05$ ). The least common finding for the students during the initial examination was the presence of VF tear (3.9% for unilateral VF tear and 2.0% for bilateral tear). On the initial examination, 90.2% of students had one or more abnormal findings. Subsequent examinations revealed that 94.9% of the students had one or more abnormal findings, which was not significantly different from the initial examination. Excluding LPR, 88.2% of the students at the time of their initial examinations, and 94.2% of the students during their subsequent examinations, had at least one abnormal finding. Abnormal findings in the subsequent examinations included MTD (40.1%), VF masses (unilateral 48.9%, bilateral 30.7%), VF vascular abnormalities (unilateral

**TABLE 1.**  
**Demographic Data of the Study Population**

|  |               |
|--|---------------|
| Age at first examination (y)                                 |               |
| Mean $\pm$ standard deviation                                | 26 $\pm$ 3    |
| Range (minimum–maximum)                                      | 19–32         |
| Male/female  | 28/23         |
| Number of years of singing experience at first examination   |               |
| Mean $\pm$ standard deviation                                | 9.7 $\pm$ 3.2 |
| Range (minimum–maximum)                                      | 5–14          |
| Voice types  |               |
| Soprano  | 13            |
| Mezzo/mezzo-soprano  | 10            |
| Tenor  | 15            |
| Baritone   | 8             |
| Bass-baritone  | 2             |
| Bass   | 3             |
| Duration of time between initial and subsequent examinations |               |
| Median (interquartile range) days                            | 266 (60–615)  |
| Number of examinations per patient                           |               |
| One (initial examination)                                    | 51            |
| Two  | 51            |
| Three  | 31            |
| Four   | 20            |
| Five or more   | 35            |

Note: All the patients were opera students at an elite opera conservatory. A total of 51 students who had 137 follow-up visit for a total of 188 stroboscopy examinations.

Download English Version:

<https://daneshyari.com/en/article/1101222>

Download Persian Version:

<https://daneshyari.com/article/1101222>

[Daneshyari.com](https://daneshyari.com)