VOCAL FATIGUE AND DYSPHONIA IN THE PROFESSIONAL VOICE USER: BOGART-BACALL SYNDROME*†

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ABSTRACT

Over the past 5 years, the authors have treated 67 adult professional voice users with a musculoskeletal tension disorder involving the larynx and supporting structures and leading to vocal dysfunction. Common clinical features in both sexes were muscle tension in the neck, poor control of the breath stream, and an abnormally low-pitched speaking voice. Most of the men sounded like Humphrey Bogart and the women like Lauren Bacall. These cases represent a discrete clinical vocal fatigue syndrome, the treatment of which is patient education and voice therapy.

Stress-related dysfunction and, particularly, musculoskeletal tension disorders are frequently encountered by the otolaryngologist. The most commonly recognized syndromes are tension headache and the temporomandibular joint syndrome. While stress-related conditions involving the larynx and voice, especially among professional voice users, may be common, there is little information available in the otolaryngologic literature on such disorders. This may be due, in part, to the fact that objective criteria such as laboratory tests, radiographs, and special procedures are rarely useful in diagnosing such conditions, and, in general, functional diagnoses are made clinically.

In 1982, we reported 52 patients with functional voice disorders and classified them into five major groups: conversion reaction; postviral chronic hoarseness; inappropriate falsetto; postoperative dysphonia; and the vocal misuse/abuse syndromes. Fifty-two percent of our patients were diagnosed as having vocal misuse/abuse syndromes; the majority of these patients had a laryngeal musculoskeletal tension disorder characterized by chronic intermittent dysphonia and vocal fatigue. In lieu of the two older terms—"hyperkinetic dysphonia" and "myasthenia laryngis"—we coined the term, "laryngeal tension-fatigue syndrome" (TFS). Interestingly, all of the TFS patients had normal laryngeal examinations and most were professional voice users. We classified TFS as a functional syndrome, since abnormal pitching of the voice and poor breath stream control were characteristic features and because the syndrome could be corrected by voice therapy.

In 1983, Sander and Ripich reviewed the relationship of vocal pitch, intensity, and breath support on the development of vocal fatigue and noted that low pitching of the speaking voice was a major causative factor.

Since our initial report, we have made the diagnosis of tension-fatigue syndrome (TFS) in 123 cases. In a recent review of our case material, we found that TFS was still the diagnosis in 25% of our patients with functional voice disorders and that we have made the diagnosis on an average of once every 2 weeks since 1981. Furthermore, as our population of vocal professionals has increased, so has our number of cases of TFS.

In contemporary society, a low-pitched voice is considered desirable for both men and women. In men, a low voice is viewed as masculine, authoritative, and confident; in women, it is viewed as dramatic, sensual, and worldly. Many early radio, television, and movie personalities had (or have) low voices, including Walter Cronkite, Edward R. Murrow, John Wayne, Humphrey Bogart, Bette Davis, Greta Garbo, and Lauren Bacall.

Whether it is a conscious or unconscious phenomenon, we have found that professional voice users, as a group, pitch their speaking voices very low. The purpose of this report is to present data on TFS in the professional voice user, a syndrome that we believe represents one of the most common of the functional voice disorders.

MATERIALS AND METHODS

Over the 5 years from July 1981 to July 1986, we diagnosed and treated 67 adult professional voice users with musculoskeletal tension disorders involving the larynx and/or its supporting structures and leading to vocal dysfunction. The study population was divided into two groups: elite vocal performers (Level I), in whom even slight aberrations of voice were considered serious, e.g., actors, opera singers; and professional voice users (Level II), e.g., teachers, clergy. The occupations of the 67 subjects are shown in Table I.

Patients were included in the study if they were Level I or Level II vocal professionals who demonstrated fluctuant or stable dysphonia, pitch aberration, and/or vocal fatigue with normal mirror and/or transnasal fiberoptic laryngoscopy. Additional diagnostic criteria were muscular tension in the neck and laryngeal region, poor breath support patterns for speaking, a low-pitched speaking voice, and odynophonia.
Specifically excluded were all patients with histopathologic changes in the vocal fold(s) and patients whose symptoms and observed findings might be explained by any other diagnostic condition. Also excluded were patients in whom reflex laryngitis, allergy, hypothyroidism, or neurological disorder had been seriously considered in the differential diagnosis. While smokers were not excluded, very few of the study subjects used tobacco.

Two control groups were used for purposes of comparison and analysis of the vocal data: nonprofessional voice users with TFS (Level III group) seen during the same time period, and a second true control group obtained by collecting normative data on speaking fundamental frequency and vocal range of nonsmoking adult men and women. Therefore, for data analysis, there were four groups: Level I — professionals (elite performers) (n=33); Level II — professionals (nonprofessional voice users) (n=54); Level III — nonprofessionals with TFS (n=41); and Controls — non-smoking adults (n=24).

Presenting symptoms for the study population (n=67) were tallied separately for men and women. For the 41 female patients, the most common complaint was dysphonia (85%), followed by vocal fatigue (73%), and odynophonia (33%). For the 26 male patients, the most common complaint was vocal fatigue (88%), followed by dysphonia (66%) and odynophonia (29%). Characteristically, the symptoms were intermittent over a period of months or years, frequently interfered with the patient’s work schedule, and were occasionally exacerbated following an upper respiratory infection. However, none of the patients studied were experiencing upper respiratory infections at the time of evaluation. (Such patients with viral laryngitis, for example, had been excluded from the study group.) In addition, many of the patients were aware of muscle tension in the laryngeal region, although this was not a common presenting complaint. A few of the Level I patients who were singers presented with isolated vocal pitch alterations or changes in vocal resonance.

The duration of symptoms before presentation correlated with the level of vocal use. Elite performers (Level I) sought medical attention more quickly than professional (Level III) or nonprofessional (Level III) patients. The mean duration of symptoms before presentation of the three groups was, respectively, 9, 20, and 24 months.

The Otolaryngology Evaluation

In the first phase of the evaluation, a detailed patient history was taken, based on the history-taking approach to patients who are professional voice users reported by Setaloff.3 The patient was asked about the nature of the vocal complaint, when the voice gave out (i.e., how long after initiation of vocalization), and whether or not odynophonia was present. The patient’s overall medical status was investigated, as well as smoking history, exercise history, and detailed professional history including the patient’s schedule for practice and performance and the environment in which he or she performed. The patient was also questioned about stress and stress-related conditions, including questions as to whether stress seemed to worsen the vocal problem.

The otolaryngologic examination was thorough and included a careful examination of the larynx. Flexible transnasal endolaryngoscopy was done by the laryngologist (G.A.R.) in 47 (70.1%) of the patients, using an Olympus ENF rhinolaryngoscope type P (Olympus Corp., Lake Success, NY). This was especially important in patients who had hyperkinetic-sounding voices, but in whom excessive neck and laryngeal muscle tension was not obvious. (In such cases, contraction of the supraglottic structures could usually be visualized during phonation.)

Voice Assessment and Therapy

Following the otolaryngologist’s evaluation, the patient was referred to the voice therapist for evaluation and documentation of baseline vocal information. Voice recordings were made using a Sony reel-to-reel tape recorder TC-105 (Sony Corp., Tokyo, Japan) and an Ampex 242 microphone (Ampex Corp., Elkh Grove Village, IL) placed 6 inches from the mouth of the patient with the volume unit set to the maximal gain minus gain value. For

patients who lived outside our area, one extended visit to the otolaryngologist and voice therapist was the only therapeutic intervention. In other words, diagnosis, documentation, therapy, and education of the patient were carried out all on the same day.

Determination of Speaking Fundamental Frequency (SFF) and Vocal Range.—A Madsen Vocal-2 control unit model VC-76 and video monitor VM-78 (Madsen Electronics, Buffalo, NY) were used. The display was continuous, and vocal signals were processed as recommended by the manufacturer.

Vocal range was determined by instructing the patient to phonate the lowest tone possible (LN) on the vowel “a” without producing a glottal fry, then phonating the highest tone possible on the vowel “i.” Next, the patient was instructed to sustain each tone for a minimum of 3 seconds. These tasks were repeated until both the experimenter and the patient were satisfied that the highest and lowest tones had been obtained.

The SFF was determined by having the patient read “The Rainbow Passage” into the microphone of the Vocal-2 set for an 8-second sample. The average SFF was obtained by measuring the peak frequency over each syllable nucleus; ten or more peak frequencies were averaged. A similar procedure was performed with the patient counting from one to ten. If the SFF calculated from the counting sounded higher than the standard reading passage varied by more than 10 Hz, the higher of the two values was selected as representative of the estimated SFF. All determinations were made by one examiner (P.D.R.).

Determination of Respiratory Adequacy.—Respiratory adequacy and breath stream control were assessed by obtaining the phonatory durations of selected vowels, /s/ and /æ/ ratio values, and by observation.4 The observations were graded as follows: normal, shallow, uses functional residual capacity, and shallow and uses functional residual capacity. Pulmonary function tests, including spirometry, were obtained in eight patients whose observed residual capacity seemed diminished (patient asked to fill lungs with air and exhale until empty). Pulmonary function tests were abnormal in only one of those eight patients. (These tests were performed in the laboratory of the Pulmonary Medicine Department.)

Adequate respiration for efficient speech is a critical determination that is usually independent of actual pulmonary function. Shallow breathing was assessed by lack of observed abdominal or chest-wall movement during inspiration while speaking or inaudible inspiration. Use of functional residual capacity (FRC) was presumed when patients spoke using run-on sentences, without air replenishment, and had obvious voice strain at the end of such sentences. Use of FRC was also presumed when a patient’s larynx moved cephalad during the end of such lengthy phrases of speech.

Assessment of Musculoskeletal Tension.—Musculoskeletal tension was evaluated by clinical palpation and graded as either present or absent. The technique of Aronson was employed. Laryngeal “musculoskeletal tension can be detected manually... The tension produces elevation of the larynx and hyoid bone.” The clinician tests for this elevation by “encircling the larynx with the thumb and middle finger in the region of the thyrohyoid space, feeling to determine whether the space has been narrowed by laryngeal elevation.”4 Discomfort or pain elicited in the region is another sign of musculoskeletal tension. The pitch range measurements were also interpreted as reflecting the degree of laryngeal tension. We assumed a negative linear function; namely, that a decreasing vocal range was associated with increasing muscular tension.

Techniques of Therapy.—Voice therapy was carried out on three levels by both the otolaryngologist and the voice therapist. The first level was reassurance; the second level was remedial voice therapy; and the third level was patient education to help prevent future occurrences.

Following the vocal assessment and an analysis of voice data, the voice therapist made a judgment about the relationship of the patient’s speaking voice to the patient’s estimated optimal pitch.
TABLE I.
Occupation of the Professional Voice Subjects by Subgroup.

<table>
<thead>
<tr>
<th>A. Elite vocal performers (Level I)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opera singer</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Singer (other)</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Actor/actress</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>TV / radio announcer</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>23</td>
<td>33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Professional voice users (Level II)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Public speaker</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Clergy</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Telephone operator</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Salesperson</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Judge</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>18</td>
<td>34</td>
</tr>
</tbody>
</table>

First, the SFF was compared to the LN. If the SFF was within 30 Hz of the LN, the speaking voice was judged to be too low. Second, the SFF was compared to the estimated optimal SFF, which was assumed to lie between 10% and 50% of the vocal range. For example, if a patient's lowest "note" was 100 Hz and the highest "note" was 300 Hz, then the range was 200 Hz. An SFF above 120 Hz or below 200 Hz was considered in the optimal range.

If the pitch was not within the optimal range, one of three corrective methods was employed: the Fairbanks method; the Murphy technique, as reported by Boone; or the most comfortable pitch selection technique. Once the optimal pitch was selected, the Vocal-2 frequency analyzer was used for stabilization as a biofeedback instrument. In addition, patients with unstable pitch were encouraged to use a pocket tape recorder or a pitch pipe. Patients with unstable pitch (characterized as the inability to repeatedly initiate speech using the same SFF) were more likely to require a course of voice therapy than those who could be stabilized during the initial counseling session.

Although such patients could comfortably achieve the optimal SFF, auto-feedback self-monitoring was poor in these cases. Typically, the SFF during conversation would sequentially decrease or resolve to a very low pitch without the patient's conscious awareness of this phenomenon. Such patients with unstable SFF usually declined themselves during the initial voice-therapy session.

Traditional techniques were used to establish optimal breath support (breath stream patterns) in this group of patients who almost uniformly demonstrated inadequate breath stream control.

Finally, progressive musculoskeletal relaxation techniques were used to reduce musculoskeletal tension associated with the syndrome.

Psychological Evaluation and Profile

The Minnesota Multiphasic Personality Inventory (MMPI) was used to assess the possible role of psychological factors in 20 of the study patients (six men and 14 women). Early in the study (1981-1983) this was a routine test; however, due to the unremarkable results in the initial group of patients, the routine use of the MMPI was abandoned. We mention its use here because it is a useful diagnostic test in patients in whom the clinician suspects a significant psychopathological disorder; it has a reasonably high sensitivity to the diagnosis of functional disorders; and we have previously examined and reported the results of MMPIs in patients with similar functional voice disorders, and our data continued to show that the majority of those patients are normal.

Indeed, the MMPI was a routine part of our protocol until it became apparent that the trend toward normal evaluations was consistent.

TABLE II.
Age and Sex Distribution of Study Subjects, Level III Subjects, and Controls (Age in Years).

<table>
<thead>
<tr>
<th></th>
<th>Female</th>
<th>SD</th>
<th>Male</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Level I</td>
<td>22</td>
<td>2.8</td>
<td>10</td>
<td>34.4</td>
<td>3.6</td>
</tr>
<tr>
<td>Prof. Level II</td>
<td>18</td>
<td>2.2</td>
<td>16</td>
<td>43.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Nonprof. (Level III)</td>
<td>25</td>
<td>3.4</td>
<td>16</td>
<td>42.1</td>
<td>3.8</td>
</tr>
<tr>
<td>Controls</td>
<td>13</td>
<td>3.5</td>
<td>11</td>
<td>43.7</td>
<td>5.6</td>
</tr>
</tbody>
</table>

*The mean age (Level I groups) was significantly lower than the other groups (p<0.001).

Treatment

Voice therapy was recommended for almost all patients in the study group. Occasionally, patients were referred to other institutions or therapists. Of the 67 patients in the study population, 29 (44%) underwent only one therapeutic session, most often at the time of the initial evaluation. Nineteen patients (28%) underwent voice therapy for two or more sessions. (The average patient in this group was seen on a weekly basis for 6 weeks.) Twelve patients (18%) refused voice therapy, and for seven patients (10%) voice therapy was not recommended. It was felt that those seven patients understood the explanations of the senior author on the nature of this problem (during which, in actuality, he did perform voice therapy of a kind) sufficiently well that they opted not to go on to formal voice therapy, although baseline data were still collected.

Follow-up

Follow-up data are available on 52 of the 67 study subjects (78%). Thirty-seven patients (56%) were seen for follow-up examination in the office of the senior author, an otolaryngologist. An additional 16 patients were interviewed by telephone to evaluate whether or not they believed they still had vocal fatigue and dysphonia. The follow-up telephone interviews were used because we are a tertiary referral institution seeing voice patients from a wide area, including performers on tour, who could not have returned for a follow-up visit. The mean duration of follow-up was 8.3 months, with a standard deviation of 2.0 months.

Statistical Methods

Differences among the control, the nonprofessional patient, and the professional patient groups with respect to SFF, vocal range, and SFF deviation from the lowest note (LN) were contrasted using analyses of covariance while controlling for the age and sex distributions. Any differences among the groups that reached statistical significance were further explored with New- man-Keuls multiple comparisons. The duration of symptoms of the nonprofessional versus professional patients was compared using analyses of covariance. We also examined the relationship of each subject's speaking voice to his or her LN. Treatment results for the patient groups were tallied in frequency tables. For all hypothesis tests, the p<0.05 level was used to define statistical significance.

RESULTS

Age and Sex Distribution of the Study Subjects

The mean ages of the four groups studied are shown in Table II. Results of analysis of variance performed on the mean-age scores reveal that the mean age of the professional Level I group was significantly lower than those of the other three groups (p<0.001) and that there were no other significant differences. Two possible explanations are bias of the sample (i.e., inclusion of voice students from the North Carolina School of the Arts and Wake Forest University) and the fact that Level I professional
performers in their early 20s are at higher risk for developing TFS due to their relative inexperience. (The other three groups were age and sex matched statistically; the significance of the age difference observed in the Level I group is addressed in the discussion.)

**Speaking Fundamental Frequency (SFF)**

The mean SFF for the study subjects (Levels I and II combined) was 203.5 plus or minus 8.6 Hz for female subjects and 106.1 plus or minus 3.0 Hz for male subjects. For the nonprofessional (Level III) group, the SFF was 220.1 plus or minus 11.3 Hz for female subjects and 157.9 plus or minus 18.7 Hz for male subjects. The differences observed between professional (Levels I and II) and nonprofessional (Level III) groups are statistically significant (p<0.05).

The SFF for each of the subgroups is shown in Table III. The lowest mean values were seen in the professional men (Levels I and II), and in Level I women. The mean SFF for the Level II women was not significantly different from that for the nonprofessional group or the control group.

The mean deviation of the SFF from the LN of each subgroup is shown in Table IV. Professional Level I and II men pitched the speaking voice an average of less than 5 Hz above their lowest note. For professional Level I women, that value was 17 Hz. Level I and II men and Level I women had statistically significant lower values (p<0.05). Interestingly, 52% of the Level I and II men used a speaking voice that was identical in frequency to their lowest frequency note (SFF=LN).

**Vocal Range**

The mean vocal range for the study group (Levels I and II combined) was 293.9 plus or minus 13.4 Hz for female subjects and 326.9 plus or minus 16.7 Hz for male subjects. When compared to the vocal ranges of the nonprofessional group and the control group, the vocal range of the professional group was significantly different at a level of p<0.0001. For male and female subjects, the differences observed between all the groups were statistically significant when compared to normals (p<0.0001).

When the professional group was broken down by level, it was noted that Level I professionals had a greater mean vocal range than Level II professionals, and that Level II professionals had a greater mean range than nonprofessionals (Level III), but that none of the groups had ranges that were comparable with those of the control group. This trend was apparent for both male and female subjects (Table V).

**Results of Therapy**

In 37 of the 52 patients (71%) for whom follow-up data were available, the symptoms had completely resolved. Nine patients (17%) had occasional relapses, three (6%) had frequent relapses, and another three (6%) had persistent symptoms.

Investigation of the records of those patients having persistent symptoms revealed that they were among the patients who had refused voice therapy. Most of the patients with relapses were not terribly concerned about their symptoms, and seemed to feel that they understood the problem, presumably on the basis of previous counseling.

**Psychological Evaluation**

Seventy-five percent of the MMPIs administered to six male and 14 female patients were within normal limits. Five other investigations were mildly abnormal: 1 man and 1 woman showed anxiety; 1 woman showed depression; and 1 man and 1 woman showed both anxiety and depression. There was no evidence of severe thought disorder or psychosis in any patient, and only two patients in the study population were referred for psychological counseling.

**DISCUSSION**

In our experience, vocal fatigue and musculoskeletal tension disorders involving the larynx and voice are often underdiagnosed or misdiagnosed. The most common referral diagnoses in this group of patients were chronic sore throat, recurrent or persistent vi-
TABLE VI
Summary of the Typical Distinguishing Clinical Signs and Symptoms of the Bogart-Bacall and the Tension-Fatigue Syndromes.

<table>
<thead>
<tr>
<th></th>
<th>Bogart-Bacall</th>
<th>Tension-Fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional voice user</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Pitch of speaking voice (SFF)</td>
<td>Very low</td>
<td>Variable</td>
</tr>
<tr>
<td>Breath support</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Muscle tension</td>
<td>Subtle</td>
<td>Obvious</td>
</tr>
<tr>
<td>Pitch range reduction</td>
<td>Minimal</td>
<td>Marked</td>
</tr>
<tr>
<td>Odynophobia</td>
<td>Infrequent</td>
<td>Common</td>
</tr>
</tbody>
</table>

Vocal fatigue is itself a symptom that implies a functional disorder, particularly when it presents with a constellation of related symptoms. However, disorders to be considered in the differential diagnosis are reflux laryngitis, hypothyroidism, rheumatoid arthritis, myasthenia gravis, multiple sclerosis, amyotrophic lateral sclerosis, parkinsonism, and adductor spastic dysphonia. In general, however, neurological diseases lead to degeneration or decay of the vocal signal in a progressive fashion. The TFS is associated with hoarseness or vocal fatigue characterized by fluctuant vocal quality, which is worse after strain and during times of stress, and is associated with a low SFF and poor breath support. In addition, odynophonia is almost always a symptom of musculoskeletal tension.

Of the conditions that occasionally confound diagnosis, the single most potentially troublesome can be the differentiation between TFS and early adductor spastic dysphonia. We have seen patients who appeared to have spastic dysphonia but who proved to have TFS; we have also seen two patients who initially were thought to have musculoskeletal tension disorders but proved to have adductor spastic dysphonia. The usual clinical differentiation is made through vocal analysis and therapeutic trial.

The majority of patients with TFS will have a dramatic improvement during the initial voice therapy session. With relaxation, lungs that are filled with air, selection of a midrange pitch, and use of white-noise masking, most patients with musculoskeletal tension dysphonias will convert to normal. In addition, under those circumstances, patients with musculoskeletal TFS who are using a falsetto, or high-pitched voice will improve, while those with spasticity will worsen. Occasionally, however, only the passage of time will confirm one or the other of the diagnoses.

Not all patients with TFS have dysphonia at the time of presentation. However, those who do have dysphonia often sound as if they are working too hard to speak. The trained ear can appreciate hyperkinetic supraglottic contact; such voices sound raspy, breathy, and diplophonic. If those patients are asked to sing a scale while the larynx is lightly palpated, the larynx will be found to ascend in the neck with contraction of the suprahypoid musculature.

In addition to vocal fatigue and dysphonia, there are other clinical features of TFS that should alert the clinician to the actual diagnosis. Poor use of the breath stream is almost always present. Since the breath stream provides the driving force for phonation, shallow breathing (a small tidal volume), or overuse of the functional residual capacity (FRC), or both, contribute to the development of excessive glottic tension and subsequent vocal fatigue, dysphonia, or both. To maintain pitch and volume using FRC air, one needs to increase glottic tension, especially when the voice is low-pitched. (Try rereading this paragraph out loud, in your lowest pitched voice, in one breath. This will produce exaggerated TFS symptoms.)

The final clue to the diagnosis of TFS, particularly in a professional voice user, should be abnormal pitching of the speaking voice. Furthermore, it is the speaking voice, and not the performing voice, that causes problems in most of the professional voice patients with the syndrome. (Actors and media personnel who use character voices in their work can also experience muscle tension and vocal fatigue, but those patients often prove to have vocal process ulcers or granulomas.)

The data on SFF revealed that most of the professional voice user patients, both male and female, employed very low-pitched speaking voices. Nonprofessional adults with tension-fatigue had substantially higher mean SFFs. While there were some nonprofessionals with low speaking voices, the range of frequencies was much broader in the nonprofessional group. In particular, many nonprofessional voice women tended to have elevated pitches, pitches well above those that would be expected or predicted.

The observed alterations in the vocal range are probably manifestations of laryngeal tension. It would appear then, that along the spectrum of musculoskeletal tension, well-trained professionals (Level I patients) tend to develop vocal fatigue as a result of low pitch of the speaking voice and poor breath support rather than as a result of extreme muscle tension. (Interestingly, singers with TFS demonstrate excellent breath support while singing but are poor speech breathers.) On the other hand, many of the untrained, nonprofessional, Level III patients had significantly contracted vocal ranges,
especially those with elevated SFFs, suggesting a high degree of muscle tension. In other words, trained professionals tend to develop tension-fatigue primarily as a result of low pitching of the voice, whereas untrained nonprofessionals are more prone to develop tension-fatigue as a result of muscle tension. Both groups demonstrate poor breath stream control.

Stoicheff reported the SFF of 111 nonsmoking adult female subjects, age 20 to 82 years; and Hohlen and Shipp reported a similar study of 175 male patients, ages 20 to 89 years. In both sexes, the SFF declined with age until age 70 years, after which it tended to rise slightly.

The significance of our data in the Level I professional group is, therefore, even more striking since they would be expected to have higher, not lower, pitched SFFs than their counterparts in the other groups (Level II professionals, TFS nonprofessionals, and the normal nonsmoking volunteers). For our Level I male patients, the mean SFF was 102.6 plus or minus 3.8 SD; the mean reported for normal male patients in that age group was 120 Hz. For our Level I female patients, the mean SFF was 192.2 plus or minus 4.5; the mean reported SFF for normal female patients in that age group was 224.3 Hz. These differences highlight the tendency of young Level I professional voice users, both male and female, to pitch their speaking voices at the lower end of their vocal ranges.

We believe that it is reasonable to differentiate two functional tension-fatigue syndromes, one occurring in professional voice users and the other in nonprofessional voice users. We propose to coin the term “Bogart-Bacall syndrome” to define the variant of the TFS in the professional voice user with a low-pitched speaking voice. The distinguishing signs and symptoms of each group are summarized in Table VI.

Finally, many of our professional voice user patients presented weeks or months after having had viral laryngitis or upper respiratory infection. It is our impression that compensatory mechanisms occurring with such illnesses may, by altering one or more of the factors intrinsic in the development of the syndrome—pitch, breath support, and muscle tension—tip the balance in patients already predisposed to vocal fatigue. Even when these patients present following an organic illness, it is still our feeling that the disorder is primarily functional, especially since remedial voice therapy is so promptly effective.

The techniques of voice therapy currently available and practiced by experienced personnel are adequate for the treatment of these conditions. However, we believe that tension-fatigue syndromes are still underdiagnosed, but that physician knowledge that such functional voice conditions occur commonly in professional voice users should facilitate their diagnosis in the future. When the clinician sees a patient with an abnormal voice and a clinically normal larynx, or a dysphonia that is out of proportion to laryngeal findings, a functional voice disorder should be considered. Even patients with organic lesions may have significant coexisting functional problems. A systematic approach should be employed, including an evaluation of the major components of vocal production that might be abnormal; namely, breath stream control, muscle tension, and abnormal pitching of the voice. With further research, we hope to elucidate additional diagnostic criteria.

CONCLUSIONS

1. We have chosen to coin the term “Bogart-Bacall syndrome” to call attention to a particular variation of the tension-fatigue syndrome in the professional voice user. The triad of low-pitched speaking voice, musculoskeletal tension in the laryngeal region, and poor breath support in a professional voice user with chronic intermittent dysphonia and/or vocal fatigue suggests the diagnosis.

2. The disorder seems to have a pattern that is clearly distinguishable from more worrisome medical and neurological conditions.

3. Recognition of the syndrome is still primarily clinical; however, objective measurements can suggest the diagnosis.

4. A team approach using both an otolaryngologist and a voice therapist is necessary to diagnose and treat the condition, which has a good prognosis for correction with short-term voice therapy.

BIBLIOGRAPHY


