

# Adherence to Voice Therapy Recommendations Is Associated With Preserved Employment Fitness Among Teachers With Work-Related Dysphonia

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**Summary: Objectives.** Referral to voice therapy and recommendations for voice rest and microphone use are common interventions in occupational medicine aimed at preserving the working capability of teachers with occupation-related voice problems. Research on the impact of such interventions in terms of employment is lacking. This study examined changes in fitness (ie, ability) to work of dysphonic teachers referred to an occupational clinic and evaluated employment outcomes following voice therapy, voice rest, and microphone use.

**Study design.** A historical prospective study was carried out.

**Methods.** Of 365 classroom teachers who were first referred to a regional occupational medicine clinic due to dysphonia between January 2007 and December 2012, 156 were sampled and 153 were followed-up for an average of 5 years (range 2–8). Data were collected from medical records and from interviews conducted in 2014 aimed at assessing employment status. Logistic regression models were used to assess associations between interventions and employment outcomes. Survival analyses were performed to evaluate the association between participating in voice therapy and length of retained employment fitness.

**Results.** Thirty-four (22.2%) teachers suffered declines in working capabilities due to dysphonia. Voice therapy was demonstrated as being a protective factor against such declines (odds ratio = 0.05 [0.01–0.27]). Adherence to recommendation of voice therapy was <50%. Most of the decline in working fitness among nonadherent teachers occurred within 20 months after referral. Unlike voice therapy, voice rest and microphone use were not associated with retention of working capabilities.

**Conclusions.** Voice therapy, especially when instituted early, is a strong predictor for retaining fitness for employment among dysphonic teachers.

**Key Words:** Voice therapy–Voice disorders–Fitness to work–Teachers–Occupational dysphonia.

## INTRODUCTION

Vocal problems among classroom teachers are considered a professional hazard, leading to reductions in physical, social, and emotional quality of life and negatively affecting their professional performance.<sup>1–3</sup> Occupational dysphonia can lead to absenteeism, decline in fitness to work and early retirement, as well as to a subsequent decrease in the trained workforce.<sup>4,5</sup> In Israel, laryngeal disorders are recognized as an occupational disease subject to compensation, and voice disorders represent 9.8% of all occupational diseases reported to the Israeli Registry of Occupational Diseases in 2013.<sup>6,7</sup> The point prevalence of voice disorders among teachers was reported to range from 9% to 37%, and the 12-month prevalence to range from 15% to 80%.<sup>8,9</sup> In the USA, the cost of absenteeism and treatment related to voice problems in teachers, who comprise 4% of the workforce, has been estimated to be \$2.5 billion annually.<sup>10,11</sup>

The most common clinical findings of professional voice users with dysphonia are benign lesions, laryngitis or edema, and functional dysphonia.<sup>12</sup> Functional voice disorders, which account for 41% of all voice problems among professional voice users, are characterized by the absence of structural organic lesions.<sup>12</sup> Clinical trials have demonstrated significant efficacy of voice therapy for both structural and functional dysphonia, measured mainly by improvement in voice quality parameters or, more rarely, evaluated by vocal fold morphology (ie, a reduction in the size of vocal fold nodules) and improved self-evaluation in quality of life questionnaires.<sup>13–16</sup> The impact of voice therapy on employment status, however, has not been evaluated to date.

The role of occupational physicians is to identify and prevent work-related injuries, as well as to treat and rehabilitate the affected individuals with the aim of enabling their re-entry into the workforce.<sup>17</sup> Secondary prevention aims to reduce the impact of an injury that has already occurred to prevent repercussions on quality of life and working capability over time.<sup>18</sup> The latter is assessed by the evaluation of fitness to work, defined by the ability of a worker to effectively continue to fulfill the job requirements.<sup>19</sup> Full retirement or change of employment due to a disability can result from a total lack of fitness for a duty, whereas medical recommendation for diminished working hours or prolonged sick leave can be given when fitness to work is less compromised.<sup>20</sup> There are sparse data on the impact of profession-associated voice disorders on the affected individual's level of fitness to work. Reports of effects of dysphonia on employment are limited mainly to self-reported sick leaves due to the condition.<sup>4,5,21,22</sup>

Accepted for publication September 8, 2016.

Presented at the 52nd Annual Conference of the Israeli Speech Hearing and Language Association, Jerusalem, Israel, February 16, 2016.

Presented in part in the Master's thesis of the first author as partial fulfillment for the degree of M.Occ.H in School of Public Health in Tel Aviv University.

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Journal of Voice, Vol. 31, No. 3, pp. 386.e19–386.e26

0892-1997

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<http://dx.doi.org/10.1016/j.jvoice.2016.09.011>

Referral to voice therapy by occupational physicians is common for teachers already exhibiting some degree of impairment (ie, at the secondary prevention stage). Additional interventions which are widely accepted in occupational medicine (despite a paucity of data on their efficacy) include prescribing a period of reduced phonation or voice rest, either alone or combined with voice therapy, and guiding the teacher on ergonomic measures, such as microphone use.<sup>23–25</sup>

The aims of this study were, first, to evaluate the impact of occupational medicine interventions, namely, voice rest, microphone use, and especially voice therapy, on the preservation of fitness to work among dysphonic teachers referred to an occupational health clinic and, second, to estimate the rate of decline in fitness to work in this population.

## METHODS

### Study population

This study was conducted among patients of Clalit Occupational Medicine Clinic, the largest health maintenance organization (HMO) in the Jerusalem district, which provided occupational services to 80% of the district population during the study follow-up period. We included kindergarten and primary, secondary, and high school teachers between 20 years of age and the age of retirement (62 years for women and 67 for men) who were first referred to the clinic for voice problems between January 2007 and December 2012. They all had undergone evaluations by an ear, nose, and throat (ENT) specialist. Forty-five teachers who had already experienced a decline in fitness to work upon first referral to the occupational medicine clinic or did so within the first 3 months from initial referral (ie, not in the secondary prevention stage) were excluded. The historical cohort study was carried out on 153 dysphonic teachers who agreed to participate in the study out of 156 who were randomly sampled from a total of 365 suitable candidates.

Decline in fitness for work, as opposed to preservation of full fitness for work, was defined as one of the following conditions, each of them due to dysphonia: (1) permanent retirement from teaching; (2) permanent part-time employment, meaning a gap between the initial weekly working hours and those at the time of interview; (3) prolonged (more than 3 months) inability to work in the classroom; (4) prolonged duration of part-time employment. A 3-month cutoff is frequently used in the long-term disability insurance world,<sup>26</sup> and we adopted it for determining a decline in fitness to fulfill the requirements of a classroom teacher.

### Voice therapy

Voice therapy was conducted by licensed speech therapists with either a bachelor's or master's degree level. In most cases, individual sessions were conducted for 45 minutes on a weekly basis. Therapy sessions combined elements from both direct and indirect therapeutic approaches aimed at recovering vocal function, reducing vocal abuse, and improving voice quality.<sup>27,28</sup> Direct techniques focused on the components of voice production, such as such as breathing, laryngeal re-posturing, and others.<sup>14</sup> Indirect approaches were based on the patient's knowledge of

identifying factors that perpetuate the voice disorder (eg, gained from vocal hygiene programs) and his or her ability to eliminate them.<sup>23,29</sup> Adherence to voice therapy recommendations, as collected from medical records, was defined by attendance at a minimum of five sessions (which included a first diagnostic session) before any decline in fitness for work. This cutoff was demonstrated in the literature as a predictor for course completion and for the successful treatment of presbyphonia.<sup>30–32</sup> Teachers who attended a minimum of five sessions comprised the “Adherent Voice Therapy” (AVT) group, whereas the rest comprised the “Non-Adherent Voice Therapy” (NAVt) group.

### Data collection

The data were collected from comprehensive electronic medical records of the HMO, which included the entire medical history of each patient, such as encounters, prescriptions, billing, etc. The following data were collected from those electronic records: demographics (age, gender, ethnicity or religion), smoking status, occupational variables (seniority, government or private employer, school level, main teaching subject, changes in weekly teaching hours before first referral and during the occupational clinic follow-up and their cause), variables describing the vocal problem (symptom duration until first clinic visit and until initiation of voice therapy, aphonia, vocal fold pathology, history of vocal fold surgery, reflux, number of sick days taken due to dysphonia before first clinic visit, number of ENT visits), variables of adherence to occupational recommendations (number and dates of voice therapy sessions or completion, use of microphone, and voice rest period [1–3 months of sick leave following medical recommendation]) before any decline in fitness to work. A structured telephone interview was conducted at the end of 2014 to determine the current occupational status and actual changes in employment attributed to voice problems implying decline in fitness to work. The interview included questions about history of changes in weekly teaching hours and their cause. In addition, it included questions about occupational variables (seniority, government or private employer, school level, main teaching subject) and adherence to medical recommendations (number and timing of voice therapy sessions, microphone use, number of sick days used due to dysphonia before and after first occupational medicine referral) to fill in missing data in the medical records. We used data in the medical records in cases of discrepancy with the data obtained from the interview.

### Statistical analysis

We performed descriptive statistics on characteristics of the participants and an estimation of the rate of reduced fitness to work among the dysphonic teachers attending the occupational clinic. Univariate analyses of associations between the characteristics of participants and attendance in voice therapy programs were evaluated using a chi-square test for comparison of categorical variables, the Student *t* test, or the nonparametric Mann-Whitney *U* test for continuous variables. Two-sided tests of significance were used, and statistical significance was set at  $P < 0.05$ . The association between fitness to work and interventions (primarily voice therapy) was estimated by odds ratios (ORs) with 95% confidence intervals (CIs) using univariate analyses

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