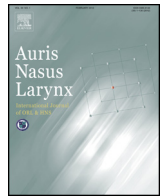




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Is voice therapy effective for the treatment of dysphonic patients with benign vocal fold lesions?

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ABSTRACT

Objective: To update our knowledge regarding the effectiveness of voice therapy for the treatment of vocal disturbance associated with benign vocal fold lesions, including vocal polyps, nodules and cysts, and for determining the utility of voice therapy in treating organic voice disorders, while highlighting problems for the future development of this clinical field.

Methods: We conducted a review of the most recent literature on the therapeutic effects of voice therapy, vocal hygiene education or direct vocal training on vocal quality, the lesion appearance and discomfort felt by patients due to the clinical entity of benign vocal fold mass lesions.

Results: Although voice therapy is principally indicated for the treatment of functional dysphonia without any organic abnormalities in the vocal folds, a number of clinicians have attempted to perform voice therapy even in dysphonic patients with benign mass lesions in the vocal folds. The two major possible reasons for the effectiveness of voice therapy on vocal disturbance associated with benign vocal fold lesions are hypothesized to be the regression of lesions and the correction of excessive/inappropriate muscle contraction of the phonatory organs. According to the current literature, a substantial proportion of vocal polyps certainly tend to shrink after voice therapy, but whether or not the regression results from voice therapy, vocal hygiene education or a natural cure is unclear at present due to the lack of controlled studies comparing two groups with and without interventions. Regarding vocal nodules, no studies have investigated the effectiveness of voice therapy using proper experimental methodology. Vocal cysts are difficult to cure by voice therapy without surgical excision according to previous studies. Evidences remains insufficient to support the use of voice therapy against benign vocal fold lesions.

Conclusion: Evidences at present is therefore still insufficient to support the use of voice therapy for the treatment of benign vocal fold lesions.

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1. Introduction

In the classification of voice disorders, functional and organic voice disorders can be distinguished terminologically. However, in actual clinical practice, both clinical entities for

voice disorders are occasionally observed in the single dysphonic patient [1–6]. In such cases, it is difficult to determine the degree to which the dependence of the voice disturbance depends on functional or organic components, as these components have a complex reciprocal cause–effect relationship. Benign vocal fold lesions develop due to hyperfunctional phonation [2–4], and also generate secondary functional laryngeal abnormalities in dysphonic patients [5,6].

Benign vocal fold mass lesions arising in the vocal folds, such as vocal polyps, nodules, and cysts, are common diseases

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resulting in vocal disturbances for otorhinolaryngologists and are thought to develop as consequences of vocal abuse/misuse [7,8]. Vocal disturbances observed in patients with benign vocal fold mass lesions have generally been considered to belong to organic voice disorders.

To treat voice disorders associated with benign vocal fold mass lesions, a number of laryngologists have previously reported the effectiveness of laryngomicrosurgery for improving the vocal quality [9–13]. The principle concept of laryngomicrosurgery is the removal of the lesions impairing the vibratory property of the vocal fold tissues, as Zeitels et al. [11] described that, “the premise underlying successful phonomicrosurgery is maximal preservation of the vocal folds (layered microstructure epithelium and laminae propria) in order to optimize glottal closure and epithelial pliability.” This concept is based on the fact that the vocal fold mass lesions mechanically hamper the periodical vibration of the surrounding vocal fold membranous tissues due to differences in the physical properties, such as mass and stiffness. Indeed, this phenomenon has been successfully simulated in mathematical models [14,15]. However, the mechanisms underlying voice disorders associated with benign vocal fold mass lesions remain to be fully elucidated.

2. How do benign vocal fold mass lesions impair vocal quality?

If the vocal fold mass lesions mechanically affect vocal fold vibration, the vocal fold vibration should be disturbed more severely with increasing lesion size and indeed, several studies have shown that the size of vocal polyps was significantly associated with acoustic perturbation parameters reflecting vocal quality [16,17]. However, patients with vocal nodules have shown no association between the values of computed acoustic parameters and the nodule size [18]. This suggests the existence of other factors causing vocal disturbances in patients with vocal nodules, aside from the mechanical effect of the mass lesions.

Microscopically, vocal polyp lesions show fibrin deposition, fibrosis, hemorrhaging, dilatation/neoproliferation of blood vessels and vascular thrombosis, whereas the characteristics of vocal nodules include thickening of the basal membrane as the most prevalent change as well as edema/fibrosis in the lamina propria and epithelial parakeratosis [19–21]. Such differences among the entity of the vocal fold lesions may determine the physical properties of the mass lesions, leading to differences in the dependency of the mechanical effect of the mass lesion on the surrounding vocal fold membrane tissues.

As mentioned above, both organic and functional abnormalities have been known to co-exist in a single dysphonic patient, raising the possibility that functional factors impair the vocal quality in patients with benign vocal fold lesions. Indeed, several previous studies have demonstrated that the performance of extremely short-term vocal training immediately improved the vocal quality in patients with various benign vocal fold lesions [22,23]. Dejonkere and Lebacqz [22] evaluated “the plasticity of voice quality,” defined as the degree of improvement in voice quality that can be observed immediately

or soon after short-time training by changing basic voicing condition, and found that patients with vocal nodules, Reinke’s edema or polyps tended to show a substantial improvement in the vocal quality, and those with vocal nodules showed the greatest improvement in the vocal quality after short-term voice therapy sessions. Vlot et al. [23] also demonstrated that the conduction of humming, one of vocal training techniques immediately induced significant decreases in the perturbation parameters of electroglottographic signals in patients with vocal nodules or polypoid degeneration, but not in those with vocal polyps or cysts. In particular, humming has been reported to have various immediate and beneficial effects on the phonatory laryngeal dynamics as follows: (1) release of excessive supraglottic compression [24], (2) regularization of vocal fold vibration [25], (3) reduction in the velocity of vocal fold adduction at vocal onset [26], (4) elimination of a prephonatory transient laryngeal closure [26] and (5) positioning of the vocal folds in a barely abductive state just before phonation [26]. Accordingly, it is assumed that short-term voice training can eliminate the functional components of the vocal disturbance co-existing with vocal fold mass lesions, correct inappropriate laryngeal adjustment, including excessive muscular tension of the vocal tract, and optimize the phonatory dynamics, leading to an improved vocal quality in dysphonic patients with benign vocal fold mass lesions. Accordingly, the differences for the degree of the vocal improvement among the entities of the vocal fold lesions in these study using extremely short-term vocal training [22,23] may be explained by a difference in the dependency of functional vocal abnormalities among vocal fold lesion entities rather than these lesions’ responsiveness to voice therapy.

3. Has the evidence for selecting voice therapy to treat vocal disturbance associated with benign vocal fold lesions been increased?

A survey of members of the American Academy of Otorhinolaryngology-Head & Neck Surgery reported by Sulica and Behrman [27] showed that 41% and 53% of respondents favors lesion excision by surgery as the initial treatment for polyps and cysts, respectively, and that only 30% and 22% preferred voice therapy as the initial treatment for polyps and cysts, respectively, whereas 91% would likely recommend voice therapy for nodules. This suggests that laryngologists choose medical interventions according to the clinical entities of benign vocal fold lesions. In addition, they [27] mentioned that laryngologists determine therapeutic interventions by tradition, habit, or accident of training, due to a lack of information of clinical evidences regarding many aspects of therapy for lesions, particularly nontechnical interventions undertaken outside the operating room.

In 2006, a systematical and thorough review by Speyer [28] reported a series of studies investigating the effectiveness of voice therapy on the disturbances associated with benign vocal fold lesions. However, the number of reliable studies and evidences for the effectiveness of voice therapy was insufficient. The aims of the present review article are (1) to update the current literature regarding the therapeutic effectiveness of

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