Nonmedical Treatments of Vocal Fold Nodules: A Systematic Review

*Banafshe Mansuri, †Seyed Abolfazl Tohidast, *Nasibe Soltaninejad, ‡Mohammad Kamali, *Leila Ghelichi, and §Hadi Azimi, *‡§Tehran and †Semnan, Iran

Summary: Objectives. The aim of the present systematic review was to investigate the nonmedical treatments of vocal fold nodules (VFNs).

Study Design. The present study is a systematic review.

Methods. The following electronic databases were searched from inception until August 2016: PubMed, Scopus, ScienceDirect, Ovid, ISI (Web of Sciences), Cochrane, PsychINFO, The Cochrane Central Register of Controlled Trials, and Google Scholar. Reference lists of included articles were evaluated for additional data. Preferred Reporting Items for Systematic Review and Meta-Analysis guidelines were used to carry out and report the review. The methodological quality of the articles included was evaluated using the Physiotherapy Evidence Database scale. Due to the heterogeneity of the studies, a narrative synthesis of the evidence was performed to summarize the evidence.

Results. Out of 2,099 records identified, 21 articles met the inclusion criteria and thus were included in the review. The studies investigated in the present review were different in terms of study design, participant characteristics, types of assessments and treatments, and treatment delivery. However, nonmedical treatments of VFNs were found to be successful in improving vocal quality, decreasing VFN sizes, and resolving these nodules.

Conclusions. The results of the present review could provide primary evidence related to the effectiveness of nonmedical treatment of VFNs. Yet further studies with a high level of evidence, a rigorous methodological quality, and long-term follow-up evaluations are required to make stronger claims.

Key Words: Vocal fold nodules–Treatment–Nonmedical–Voice therapy–Systematic review.

INTRODUCTION

Patients with vocal fold nodules (VFNs) can frequently be seen in voice clinics.[1,2] In fact, VFNs are among common benign vocal fold lesions.[3] In addition to the high prevalence of VFNs in adult females and children,[2,4] it is one of the most common causes of hoarseness in children.[5–7] Vocal hyperfunction and vocal abuse or misuse, such as excessive talking, speaking loudly, laughing, crying, yelling, screaming, cheering, and singing, can cause chronic mechanical trauma and are often associated with VFNs.[4,5,7]

Fibronection in superficial lamina propria (Reinke's space), epithelial layer proliferation, and basal membrane thickening are the histological characteristics of VFNs.[5,8] The occurrence of bilateral thickening in the anterior and middle thirds of vocal folds (the site of the greatest contact of vocal folds) is one of the morphological changes in nodules.[4,5,8] VFNs, as well as other benign vocal lesions, can cause dysphonia, dryness or tightness, reduced vocal range, vocal fatigue, and husky or breathy voice, while among these symptoms dysphonia is the most common in VFNs.[3,4] The perceptual characteristics of VFNs include breathy voice, strained vocal quality, roughness, low pitch, instability, and vocal fry.[9]

Phonosurgery, pharmacological treatments, and voice therapy are the usual management options for the treatment of voice disorders.[10] Generally, voice therapy and laryngeal microsurgery are the treatment options for treating VFNs.[11] Also, oral anti-inflammatory corticosteroids have been used in some studies to decrease edema and inflammation in patients with VFNs.[12] The risks of general anesthesia and scar formation are the adverse effects of surgery in the treatment of nodules. So, the first-line recommended treatment strategy for VFNs is conservative management approaches.[13] To most authors, among these options, voice therapy is the primary treatment[1,11,14] and surgery is recommended only when voice therapy is not helpful in the management of VFNs.[11] There are many approaches for treating VFNs in voice therapy,[15] including vocal hygiene and patients' education, relaxation exercises, direct facilitation, respiratory exercises, and so on.[2,16]

Meanwhile, there is a lack of a thorough review of the literature on the therapy approaches used for treating VFNs. Accordingly, and more specifically, the present systematic review was conducted to investigate the nonmedical treatments of VFNs.

METHOD

The review was registered in the International Prospective Register for Systematic Reviews database (CRD42017054192), and we used the Preferred Reporting Items for Systematic Review and Meta-Analysis guidelines to conduct the review and to report the results.[17]

Eligibility criteria

The following criteria were used to include the selected studies for final analyses: (1) patients with confirmed diagnosis of VFNs; (2) adults patients (16 years old and above); (3) studies that had

Accepted for publication August 24, 2017.

From the *Department of Speech and Language Pathology, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran; †Neuromuscular Rehabilitation Research Center, Semnan University of Medical Sciences, Semnan, Iran; ‡Department of Basic Sciences in Rehabilitation, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran; and the §English Language Teaching Department, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Addresses correspondence and reprint requests to Seyed Abolfazl Tohidast, Department of Speech Therapy, School of Rehabilitation, Semnan University of Medical Sciences, Basij Blvd, Semnan, Iran. E-mail: slp.tohidast@gmail.com; Banafshe Mansuri, Department of Speech and Language Pathology, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran 15459-13487, Iran. E-mail: slp.banafshe@gmail.com

Journal of Voice, Vol. ■■, No. ■■, pp. ■■-■■
0892-1997

https://doi.org/10.1016/j.jvoice.2017.08.023

clearly described the assessment (types of assessments, detailed process of assessment, and instruments used for assessment); (4) studies that had clearly described the treatment (types of treatments, detailed process of treatment, treatment groups, and duration of treatment); (5) studies that were published in English; and (6) studies that included outcome data (review and editorial articles excluded). No other restrictions were considered on study design, sample size, geographical location, or duration of follow-up.

Search strategy

A systematic electronic search was conducted on PubMed, Scopus, ScienceDirect, Ovid, ISI (Web of Sciences), Cochrane Database of Systematic Reviews, PsychINFO, The Cochrane Central Register of Controlled Trials (CENTRAL), and Google Scholar databases, from the inception until August 2016, to find articles concerning the nonmedical treatments of vocal nodules. The following keywords were used in the electronic search: "vocal nodule," "treatment," "therapy," and "voice therapy" (see also Appendix A). The reference lists of the retrieved articles were hand-searched for additional data.

Screening and data extraction

All the articles obtained from the search strategy were imported in Endnote X5 (Thomson Reuters). Duplicates were removed using the Endnote program, and then two reviewers (BM and SAT) screened the titles and abstracts of the remaining articles against the eligibility criteria. The two authors (BM and SAT) assessed articles and independently extracted data from the papers. For each included article in the present review, the following information was extracted: study aim and design, study population, assessments used, the main effect of treatment, publication details, and setting. Any disagreement between the two reviewers in the screening and data extraction was resolved by discussion.

Methodological quality assessment

The National Health and Medical Research Council (NHMRC)[18] was used to determine the level of evidence for the articles included. As a result, two authors (BM and SAT) reviewed the articles and classified them into the appropriate level of evidence according to their methodology. Then, the methodological quality of the included articles, classified into levels II or III of evidence based on the NHMRC, was evaluated using the Physiotherapy Evidence Database (PEDro-P) scale, which is a reliable scale adapted from the PEDro scale consisting of 11 items.[19,20] PEDro-P was developed to assess the methodological quality of the randomized controlled trials (RCTs) and nonrandomized controlled trials. Also, the usefulness of the PEDro-P scale was confirmed for the speech and language pathology field.[19] The two reviewers (BM and SAT) independently performed methodological quality assessments, and possible disagreements were resolved by a discussion with the third author (MK).

Data analysis

The studies included in the current review were not homogenous in the study design, assessments used, or participant characteristics. Therefore, a narrative synthesis of the evidence was performed to summarize the evidence.

RESULTS

Search results

The search resulted in 2,032 records (569 records from ScienceDirect, 16 records from Web of Science (ISI), 741 records from Scopus, 51 records from Ovid, 31 records from PubMed, 620 records from Google Scholar, 4 records from the Cochrane Library, and 12 records from CENTRAL). Adding papers from reference lists and other resources increased the number of records to 2,099. After removing duplicate records and screening the titles and abstracts, 2,024 records were excluded. In the next stage, 75 more records were reviewed and 40 records were omitted. Next, 30 full-text articles were assessed for eligibility. Finally, 21 studies that met inclusion criteria were included in the review. Figure 1 presents a flow diagram illustrating the review process.

Study characteristics

The level of the evidence for the included studies in the present review, according to the NHMRC classification, includes 2 case reports,[21,22] 10 case series (level IV),[10,14,15,23–29] 6 comparative studies with concurrent controls (III-2),[1,9,30–33] and 3 pseudo-RCTs (III-1)[16,34,35] (see Table 1).

Participant characteristics

In 14 of 21 studies, all the participants were female. Six studies included participants from both sexes, and in all these six studies, the number of females was higher than that of males. In one study, participants' gender was not mentioned.[30] The number of patients who participated in the selected studies varied from 1 to 60. Similarly, participants' age varied widely from 16 to 81.

In most studies, the procedure of diagnosing VFNs was described; only three studies did not describe the diagnostic procedure.[21,31,34] Despite the importance of using stroboscopy in the diagnosis of VFNs, only seven studies had used it.[9,10,14,27,32,33,35] More details about participant characteristics are presented in Table 1.

Methodological quality assessment

Nine of 21 included articles were classified into levels II or III of evidence based on the NHMRC. An assessment of the methodological quality of these studies showed that four studies were considered high quality,[9,31,34,35] two studies were considered poor quality,[1,30] and others were considered fair quality.[16,32,33] More details about the methodological quality assessment of the studies are given in Table 2.

Types of treatment

In six studies, the treatment content included only one method, and these methods were different from one another.[10,16,21,22,26,32,34] These different methods include reciprocal inhibition, optimal pitch, the Smith Accent Method, hydration, the Voice Use Reduction (VUR) program, and tongue trill.