Is Voice Therapy Effective in the Management of Vocal Fold Nodules in Children?

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BACKGROUND
The term “vocal fold nodules” refers to bilateral thickening of the membranous folds, with minimal impairment of the vibratory properties of the mucosa. They are considered to be related to repetitive mechanical stress, typically related to voice use patterns. Diagnosis is made in the office via either rigid or flexible laryngeal stroboscopy. The reported incidence of vocal fold nodules in school age children is 17% to 30%, with reported resolution in most cases by puberty. Traditionally, conservative management has been recommended for these lesions, although voice hygiene approaches, voice therapy techniques, and surgery also have been advocated. Voice hygiene typically includes education about healthy voice care, increased hydration, and elimination of abusive habits. Voice therapy encompasses a variety of behavioral techniques including, but not limited to, progressive relaxation, yawn-sigh, laryngeal massage, vocal intensity reduction, pitch elevation, vocal function exercises, and confidential and resonant voice therapy. Children with voice disorders often are seen as more aggressive and are viewed more negatively than their peers. Given the negative social and academic effects that can result from pediatric voice disorders, should voice therapy be used to treat children with vocal fold nodules?

LITERATURE REVIEW
There is a dearth of literature on the use of voice therapy to treat vocal fold nodules in children. Of the five references identified (summarized in Table I), only Mori et al. compares voice therapy to an alternate treatment option (vocal hygiene). The remaining four are observational series, three of which include acoustic analysis, and only two of those contain statistical analysis.

In 1976, Deal et al. looked at 31 children (ages 5–13, mean 8 years) with vocal fold nodules who underwent voice therapy for 30 minutes 23 times per week. Therapy focused on reduction in loudness, increased easy initiation, and maintenance of phonation. They found that, after 6 months, 84% had reduction in nodules size and 65% had normal larynges. In 1999, 20 years later, Mori reported his experience with 169 patients with vocal fold nodules (ages 2–18, mean 9 years), 47 of whom were taught vocal hygiene and 122 of whom underwent voice therapy (accent method). He found that 16% of vocal hygiene patients and 52% of voice therapy patients had improvement in their voice (perceptual evaluation method not specified). Of those patients who underwent at least seven sessions of voice therapy (time period not specified), 69% had improvement. This is the only published comparison of voice therapy to an alternative treatment modality.

In 2001, Niedzielska et al. published their report of 46 children (ages 4–14, mean 10 years) who underwent a combination of pharmacologic treatment, physical therapy, psychotherapy, occupation therapy, relaxation therapy, and speech therapy (type of therapies not specified). These children were compared to a control group of children without voice disorders. After therapy, they noted a flattening of the nodules on stroboscopy. The group also noted that, on acoustic parameters, jitter approached that of the control children, and that shimmer and noise to harmonic ratio (NHR) also improved (no statistical data analysis performed). These children were compared to a control group of children without voice disorders. After therapy, they noted a flattening of the nodules on stroboscopy. The group also noted that, on acoustic parameters, jitter approached that of the control children, and that shimmer and noise to harmonic ratio (NHR) also improved (no statistical data analysis performed). This study did compare children with vocal fold nodules to a control group of children without vocal pathology; however, it did not evaluate voice therapy against any other treatment modality such as vocal hygiene or observation.

In 2007, Trani et al. treated 16 children (ages 6–11, mean 9 years) with vocal fold nodules using voice therapy techniques, described by Borragan, that focus on proprioceptivity and elasticity. The patients underwent 10 sessions of initial therapy and five sessions of maintenance. The group found improvements in jitter, shimmer, NHR, fundamental frequency, and diplophonia, but none.
reached statistical significance. They also noted improvements in perceptual parameters, including grade, roughness, and breathiness (no statistical analysis performed).

In 2009, Tezcaner et al. treated 39 children (ages 7–14, mean 10 years) with vocal fold nodules with therapy that began with vocal hygiene and progressed to laryngeal massage, yawn/sigh, chewing method, and resonant voice, depending on patient cooperation. Therapy last for 45 minutes per week for 8 weeks. They also found statistically significant improvements in jitter, shimmer, and NHR. Perceptually, there also were statistically significant changes in overall grade, roughness, breathiness, and strain.

A major challenge in reviewing the literature on vocal fold nodules and voice therapy is the variable definitions of both elements. Often, the type of voice therapy technique used is not specified. No study uses a staging system, blinded reviewers for perceptual evaluations, pre- and post-videoendoscopy examinations, or self (or proxy) voice quality-of-life questionnaires. In addition, these are largely cohort studies without a control group against which to measure the efficacy of treatment.

**BEST PRACTICE**

Despite the paucity of randomized control or case control evidence, the published literature does suggest that there is some benefit from an acoustic and perceptual standpoint in using voice therapy to treat vocal fold nodules. None of the studies reported worsening of voice in patients undergoing therapy, and there are no known reported negative side effects from voice therapy. In summary, while further research needs to be conducted on this topic, a variety of voice therapy techniques can be useful in improving voice quality in children with vocal fold nodules.

**LEVEL OF EVIDENCE**

In this review, there was one level 3b study and four level 4 studies.

**BIBLIOGRAPHY**