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Mini Review

Nonmedical Treatment (Voice Therapy) for Vocal Nodules in Children

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ABSTRACT

Introduction
Voice disorders due to vocal nodules have been a major cause of voice problems in school-aged children. Several behaviors such as excessive speaking, shouting too loudly, yelling may contribute to voice disorders due to vocal nodules, vocal polyps, vocal cysts, etc. Hoarseness due to vocal nodules may have an impact on their overall communication, social and educational development. Many treatment approaches exist which attempt to treat vocal nodules and hoarseness related to it such as surgery (medical treatment), voice therapy (nonmedical), vocal hygiene, etc. Even after the surgical treatment voice therapy plays a crucial role for further prevention and care for reoccurring of vocal nodules. Voice therapy holds a significant role in the treatment of vocal nodules.

Aim
This mini-review attempts to summarize studies on the efficacy of voice therapy for vocal nodules especially in school-aged children.

Method
A literature search was conducted using an electronic database such as PubMed, Google Scholar, and Google for the keywords "voice therapy" in "school aged children". The results from the literature studies were summarized in a narrative manner.

Results
Existing findings from the literature review and the present review support the efficacy of voice therapy as a treatment option for vocal nodules. Various databases searched for the references related to the headings such as efficacy of voice therapy for vocal nodules in school children which were included in this mini-review were published from 1976 to 2018.

Conclusion
Treatment of voice disorders in children is one of the most challenging and difficult concerns for professionals. Voice disorders affect the overall development of the child in terms of oral communication and educational participation. Though many treatment modalities have been adapted for treating adult voice disorders but their efficacy in children is still a debatable concern. No one fixed voice therapy technique that can be generalized for all children and its time period/sessions. Several key factors play an important role in case of children learning these techniques such as child learning behaviors, environment, and parental participation, etc. But among all other treatments nonmedical (voice therapy) approach has been found to be helpful for vocal nodules in school-aged children. For effective voice management in school-aged children with hoarseness due to vocal nodules, the holistic approach may be up taken involving school teachers, parents, active participation of child and clinician to prevent such voice problems.

Keywords
School age children; Vocal nodules; Voice disorders; Hoarseness; Voice therapy.

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INTRODUCTION

Children as compared to adults are difficult to examine for the varied problems. Voice problems form a challenging area of treatment for children.[1] Among the many causes of voice disorders in children vocal nodules are commonly reported in children and may result in hoarseness.[2] Children are prone to voice problems due to misuse or abuse of their voice. Several behaviors such as excessive speaking, shouting too loudly, yelling,[2] etc. may contribute to voice disorders due to vocal nodules, vocal polyps, vocal cysts etc., and may attribute to communication difficulties.

The process of normal voice production happens in larynx or voice box.[3] The voice box is situated at the level near the level of Adam's Apple in the neck. The vocal folds also commonly referred as vocal cords are located in the larynx as two small muscles. During speech production, these vocal cords together come together and use the air from the lungs for their vibration.[3] The sound is thus produced from the vibration of these vocal cords and further, the movements of lips and tongue create individual speech sounds. During normal speech production vocal folds come closer and press firmly together.[3] Due to the occurrence of nodules on these cords they cannot close completely. Hence the extra air escapes and voice becomes breathy and hoarse. Vocal nodules are defined as the bilateral (symmetry not necessary) membranous folds thickening with normal to minimal impairment of vibratory properties of the mucosa.[4] The reported prevalence ratio of vocal nodules has been found as 21.6% in males and 11.7% in females school going children.[2] Vocal nodules can be caused due to several causative sources such as its abuse, misuse of voice, etc. Some of the vocal misuse causes can be the excessive rate of speech, insufficient breath support or use of incorrect pitch, loudness, and quality. Voice abuse which is the most prominent cause of vocal nodules in children may include excessive talking, excessive coughing, screaming, cheering or crying loudly, excessive throat clearing and abrupt hard vocal attacks.[5] In addition, several other factors may contribute as factors for vocal nodules such as smoking, air pollution, infections of upper respiratory tracts. Vocal abuse and misuse results in the excessive closing of vocal cords which result in the formation of vocal nodules at the point of maximum contact. The early signs of formation of vocal nodules can be marked as slight reddening on the margin of the cord followed by thickening on the edge of cord. This may finally lead to the formation of the bump on upper one-third of the vocal cords at the place of maximum vibration.[6,7] There may be no pain during the initial development of vocal nodule process. Vocal nodules can be initially identified by their notable symptom of breathy and hoarse quality of voice. Several treatments have been advocated for vocal nodules in children. Among such are vocal hygiene, voice therapy, and surgery.[8] Voice therapy has been in use for vocal nodules in children[9] regardless of whether nodules are surgically removed. There is a lack of studies in pediatric voice therapy. At present, the debate is still ongoing among the professionals on which treatment modality should be used for treating vocal nodules in children, i.e., voice therapy alone, or combination of voice therapy or surgery or no treatment. This mini-review attempts to summarize the literature findings for the effectiveness of voice therapy for treating vocal nodules in school-aged children. Treating hoarseness due to vocal nodules in children is a very challenging and of growing interest as it may have a severe impact on the overall educational development of children including their communication skills and self-esteem.

LITERATURE REVIEW

There is a dearth of literature supporting the effectiveness of a particular type of treatment to correct hoarseness in children due to vocal fold nodules. Limited evidence exists to confirm which treatment options such as voice therapy alone or in a combination of surgery or no treatment needs to be applied for pediatrics with voice disorders. However, there are literature studies which have found voice therapy to be useful in treating vocal nodules in school children.

In a study by Deal et al[9] the effectiveness of voice therapy for treating vocal fold nodules was reported. The study comprised patients in the age range of 5 to 13 years. Voice therapy of 30 min for 2-3 times per week showed a significant improvement. Eight hundred forty five had a reduction in nodules size and 65% had normal larynges. Tezcaner et al[10] in their prospective study analyzed the efficiency of the voice therapy in patients with vocal fold nodules. The subjects 39 in total aged between 7 years to 14 years. Post voice therapy treatment showed improvements in acoustic analysis parameters such as shimmer, jitter, and noise to harmonic ratio.[10] In another study by Mori[8] on 169 patients age range between 2-18 years with vocal fold nodules. Out of total 122 who underwent voice therapy and rest for vocal hygiene program. Among them who underwent at least seven sessions of voice therapy were found to have 69% improvement. Similarly, the effectiveness of voice therapy for vocal fold nodules was reported in study by Şenkal ÖA et al[11] on 99 out patients aged 7-15 years with hoarseness as the main complaint for 2 months. The subjective assessment was carried using scales such as GRBAS (Grade, Roughness, Breathiness, Asthenicity, Strain) S/Z ratio and MPT (Maximum Phonation Time). Data was collected for three different types of voice therapy techniques such as physiological, hygienic and symptomatic. Symptomatic voice therapy was reported to be better among all through subjective assessments carried post voice therapy for vocal nodules in school children. In another retrospective study by Şenkal ÖA et al[12] on 75 children aged 7-14 years voice therapy was reported as an effective treatment method for hoarseness in school children. Niedzielskaet et al[13] in their study on children aged 4 to 14 years found improved acoustic parameters-jitter, shimmer, and NHR and flattened nodules post voice therapy. Similar findings were found by Trani et al[14] on 6 to 11 aged children in terms of improved acoustic parameters-jitter, shimmer, fundamental frequency and NHR post voice therapy for vocal nodules treatment. Ramig and Verdolini et al[15] reported the literature findings are suggestive of the efficacy of vocal hygiene and direct voice therapy in the improvement of voice quality in children. Lee and Son[16] also found voice therapy efficacy in terms of improvements in the perceptual analysis (GRBAS), and acoustic parameters such as pitch, and jitter, shimmer and noise-to-harmonic ratio in children with hyper functional voice disorders (mostly nodules).

Literature review findings have been suggestive of the efficacy of voice therapy treatment in school children with vocal nodules. But the major challenge in reviewing the above findings is that the type of voice therapy, number of sessions required has not been clearly defined. Most of the results are based on perceptual measures or retrospective cohort studies. There is a lack of a control group against which it can be the efficacy of such a treatment approach can be generalized.

RESULTS

Existing findings from the literature review and the present review support the efficacy of voice therapy as a treatment option for vocal nodules. Various databases searched for the references related to the headings such as efficacy of voice therapy for vocal nodules in school children which were included in this mini-review were published from 1976 to 2018.

DISCUSSION AND CONCLUSION

Treatment of voice disorders in children is one of the most challenging and difficult concerns for professionals. Voice disorders affect the overall development of the child in terms of oral communication and educational participation. Though many treatment modalities have been adapted for treating adult voice disorders but their efficacy in children is still a debatable concern.[17-20] No one fixed voice therapy technique that can be generalized for all children and its time period/sessions. Though few voice therapy techniques such as manual laryngeal tension reduction or accent method, yawn sigh, vocal intensity reduction, vocal function exercises, resonant voice therapy techniques have been commonly reported to be useful for treating vocal nodules in children.[20] The combination of these is considered as the best protocol for children.[8-10] Many variables play a crucial role in the effectiveness of voice therapy for school children such as parental involvement, clinicians experience and acquisition of therapy principles by the child themselves on a daily basis. The environment of the child plays a very dominant role in providing the appropriate vocal model including home environment. For effective voice management in such children with a complaint of hoarseness due to vocal nodules, the holistic approach may be uptaken involving school teachers, parents, active participation of child and clinician to prevent such voice problems. Follow-up measures is equally important after voice therapy sessions so that it does not reoccur in proper adjunct with vocal hygiene program. Furthermore, studies are warranted with the control group, larger sample size, different population and application of different types of voice therapy techniques with defined time period/sessions on these school-aged children to confirm about voice therapy efficacy in the management of hoarseness due to vocal nodules.

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