



# Muscle tension dysphonia in children: Voice characteristics and outcome of voice therapy

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## KEYWORDS

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## Summary

**Objective:** The main object of this study is to elucidate the voice characteristics and the efficacy of voice therapy in children with muscle tension dysphonia (MTD).

**Methods:** A retrospective file review was undertaken of eight Korean male children diagnosed as having MTD. All subjects received perceptual, acoustical and laryngoscopic evaluation before and after the treatment.

**Results:** Markedly strained and breathy voices were detected in all patients. Pitch breaks and/or inadequately high or low speaking fundamental frequencies were noticed in five subjects. Laryngoscopic evaluation revealed anteroposterior contraction, false vocal fold approximation, decreased vibration of true vocal folds and incomplete glottal closure. Notably, seven out of eight subjects had bilateral vocal nodules. Voice therapy was focused on the awareness, relaxation, respiration and easy-onset phonation to reduce the tension around the laryngeal muscles. A few sessions of voice therapy resulted in dramatic improvement of their voice quality and pitch adjustment. Hyper-contraction of the supraglottic structures was also relieved.

**Conclusions:** These findings suggest that the proper diagnosis of MTD in children warrants prompt and favorable responses to voice therapy regardless of coexistence of vocal nodules.

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## 1. Introduction

Muscle tension dysphonia (MTD) is a behavioral voice disorder associated with hyperfunction of

intrinsic and/or extrinsic laryngeal muscles [1]. The term MTD has been originally introduced by Morrison et al. in 1983 as the condition having excess tension in the parapharyngeal and suprahyoid muscles, an open posterior glottic chink, larynx rise, and frequent mucosal changes on the vocal cords, which commonly seen in young and

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middle aged females [2]. This excessive muscle activity has been attributed to many sources, including psychological and/or personality factors that tend to induce tension, technical misuses of the vocal mechanism in the context of extraordinary voice demands, learned adaptations following an upper respiratory tract infection, and compensation for underlying diseases [3].

MTD has been mostly studied in adult patients. Adult patients with MTD usually complain of neck and shoulder tightness, excess vocal effort and fatigue, in which symptoms are intensified by extended voice use. Vocal symptoms of MTD can vary in severity and type, ranging from severely pressed to extreme breathiness with myriad combinations. A wide range of glottal configurations have been reported for MTD, including hyperadduction of the true and/or false vocal folds, hypoadduction of the true vocal folds, vocal fold bowing, and posterior glottal gaps [1,4]. MTD usually responds well to voice therapy. Various techniques of voice therapy have been introduced such as progressive relaxation, chewing exercise, yawn-sigh approach, biofeedback training and manual laryngeal musculoskeletal massage. The potential value of laryngeal topical anesthesia, botulinum toxin injection or excision of false vocal folds was also reported [5].

Although children may also exhibit muscle misuse voice problems in the absence of primary or secondary organic lesions [6], little has been reported about the voice characteristics or the effect of voice therapy in children having MTD. In this study, we aimed to elucidate the voice characteristics and the outcome of voice therapy in children with MTD.

## 2. Materials and methods

### 2.1. Subjects

Eight consecutive male children with hoarseness and tension of extrinsic and/or intrinsic laryngeal muscle activity were included for this study. Their age ranged from 4.2 to 12.2 years with a mean of 7.5 years. A comprehensive medical history was obtained from each subject. None of them had received previous voice therapy or medications for their voice problems. Duration of the symptoms ranged from 4 months to couple of years. Two boys reported that their voice problem started after the episodes of upper respiratory infection (Table 1). All the objective evaluation was performed before and after the voice therapy. An examination of the vocal folds was primarily done with stroboscopy. For the subjects with difficult cooperation, rigid or fiberoptic laryngoscopy was done. Perceptual and acoustic

**Table 1** Demographics and characteristics of the subjects

| Patient | Age (years) | Onset     | Associated findings or events        |
|---------|-------------|-----------|--------------------------------------|
| 1       | 4.2         | Baby      | Vocal nodules, articulation disorder |
| 2       | 4.6         | Baby      | Vocal nodules, dysfluency            |
| 3       | 6.4         | 4 M.A.    | Vocal nodules                        |
| 4       | 7           | 2 Y.A.    | Vocal nodules                        |
| 5       | 7.6         | Baby      | Vocal nodules                        |
| 6       | 8.4         | 7 M.A.    | Vocal nodules, post-URI              |
| 7       | 10          | Preschool | Vocal nodules                        |
| 8       | 12.2        | 6 M.A.    | Post-URI                             |

M.A. = months ago; Y.A. = years ago; URI = upper respiratory infection.

analyses of voice were performed by a speech–language pathologist (SLP).

### 2.2. Perceptual evaluation

Perceptual analyses were performed by one trained SLP. Voice qualities were graded on the basis of GRBAS scale. Other voice characteristics including diplophonia, abnormal registry, or phonatory breaks were noted. If present, articulatory problems were also evaluated.

### 2.3. Acoustic evaluation

Acoustical analyses were performed with the Multi-Dimensional Voice Programs (MDVP) 4305, in the Computerized Speech Lab (CSL) 4300 (Kay Elemetrics, NJ, USA). The patients were asked to produce sustained /a/ phonation in a comfortable pitch and loudness for about 3 s. The jitter, shimmer and noise to harmonic ratio (NHR) were obtained. For speaking fundamental frequency (SFF), the patients were asked to read or imitate a given sentence for 12 s.

### 2.4. Stroboscopic evaluation

A stroboscopic evaluation of the larynx was successful in five subjects. Fiberoptic or 70° rigid (4 mm thickness) laryngoscopic evaluation was done for the others. They were asked to sustain /i/ or /e/ phonation during the examination. Evaluation was focused on the glottal configuration, especially on presence of excessive laryngeal tensions.

### 2.5. Voice therapy

Voice therapy was provided by an experienced SLP once or twice a week and for 30 min in each session.

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