The Treatment of Muscle Tension Dysphonia: A Comparison of Two Treatment Techniques by Means of an Objective Multiparameter Approach

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Summary: The purpose of the present study is to measure the effectiveness of two treatment techniques—vocalization with abdominal breath support and manual circumlaryngeal therapy (MCT)—in patients with muscle tension dysphonia (MTD). The vocal quality before and after the two treatment techniques was measured by means of the dysphonia severity index (DSI), which is designed to establish an objective and quantitative correlate of the perceived vocal quality. The DSI is based on the weighted combination of the following set of voice measurements: maximum phonation time (MPT), highest frequency, lowest intensity, and jitter. The repeated-measures analysis of variance (ANOVA) revealed a significant difference between the objective overall vocal quality before and after MCT. No significant differences were measured between the objective overall vocal quality before and after vocalization with abdominal breath support. This study showed evidence that MCT is an effective treatment technique for patients with elevated laryngeal position, increased laryngeal muscle tension, and MTD. The precise way in which MCT has an effect on vocal quality has not been addressed in this experiment, but merits study. Further research into this topic could focus on electromyography (EMG) recordings in relation to vocal improvements with larger sample of subjects.

Key Words: Muscle tension dysphonia–Voice therapy–Manual circumlaryngeal therapy–Dysphonia severity index.

INTRODUCTION

The purpose of voice therapy is the improvement of the vocal quality by teaching the patient to use his/her vocal mechanism more efficiently. The voice therapist can use various indirect approaches (vocal hygiene education) and direct voice techniques (by working on breathing, glottic closure, lowering the larynx, and others) to establish a more efficient vocal quality. Although functional voice disorders are the most frequently occurring laryngeal pathologies,[1,2] very few data are available to measure the short-term effectiveness of different vocal techniques.

Muscle tension dysphonia (MTD) is a functional voice disorder caused by imbalanced laryngeal or perilaryngeal muscle activity that can result in vocal fold hyperadduction, constriction, or bowing.[3,4] According to Rubin et al,[5] there are four basic patterns that are termed muscle tension patterns (MTPs): type I is glottal, and types II, III, and IV are supraglottal. The etiologic factors for MTD are: inappropriate vocal behavior, gastroesophageal reflux, psychologic and personality factors that increase vocal fold tension.[6] An elevated larynx and hyoid bone owing to increased perilaryngeal muscle tension appeared to predominate in individuals presenting with MTD.

In literature, there are few treatment efficacy data for voice disorders, and even fewer examining the relative effects of treatments, such as the effect of laryngeal manual therapy. The primary aim of laryngeal manual therapy is to relax the excessively tensed laryngeal and perilaryngeal musculature, which inhibits normal phonatory function. The term laryngeal manual therapy has been used throughout this study as an umbrella term, which can be used to refer to any manual laryngeal treatment to decrease laryngeal and perilaryngeal tension. To date, there exist two techniques of laryngeal manual therapy: (1) the classic laryngeal manual therapy approach; and (2) the manual circumlaryngeal therapy (MCT) approach. The MCT is based on the laryngeal musculoskeletal reduction approach, as described by Aronson.[7] Mathieson et al[4] described the variations and similarities of the classic laryngeal manual therapy and MCT. The main differences between classic laryngeal manual therapy and MCT consist of whether or not palpatory evaluation is conducted by the clinician before (classic laryngeal manual therapy) or during the procedure (MCT), the active intervention is carried out using chiefly both hands (classic laryngeal manual therapy) or one hand (MCT), and the patient is asked to vocalize after (classic laryngeal manual therapy) or during manual therapy (MCT). A notable distinction between the two techniques is that, whereas MCT addresses a diminished thyrohyoid space by circular massage in this area, classic laryngeal manual therapy does not. In this study, the effect of MCT in patients with MTD is described. The MCT for the laryngeal area involves kneading the laryngeal musculature (and does not involve laryngeal reposturing maneuvers) in specific locations while observing changes in voice.[8] The specific therapeutic approach of MCT in this study is described in the methods.

Few studies investigated the impact of these manual laryngeal therapies on the vocal quality in pretreatment and posttreatment situations, as shown in Table 1. Roy et al[6,8,9] measured the effect of MCT (as described by Aronson[7]) in several patients with functional dysphonia associated with increased laryngeal muscle tension. Perceptual and acoustical measures of vocal function were used. These vocal measures indicated a significant change in the direction of normal vocal

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TABLE 1.
Literature Review of Research Assessing Therapy Outcome (by Comparing Pre and Posttreatment) Using Laryngeal Manual Therapy in Adults With Muscle Tension Dysphonia

Reference	*n*	Speech Sample	Duration and Type of Treatment	Method	Results After Single Treatment
Roy and Leeper (1993)[8]	17 (m.a.: 46.9 y)	Rainbow passage Sustained /a/	Single treatment approach (range: 60 min–3 h) Voice assessment: pre- and posttreatment MCT	Perceptual evaluation Acoustical analysis (cspeech)	Significant decrease of severity ratings Marked improvement of jitter, shimmer, and SNR measures in connected speech and sustained vowels No change in F_0
Roy et al. (1997)[9]	25 (m.a.: 40 y)	Rainbow passage Sustained vowels /a//i//u/	Single treatment approach (range: 50 min–3 h) Voice assessment: pre- and posttreatment MCT	Perceptual evaluation Acoustical analysis (cspeech)	Significant decrease of severity ratings (maintained over two follow-up sessions) Significant improvement of jitter, shimmer, and SNR measures No change in F_0
Roy and Ferguson (2001)[6]	75 (m.a.: 46 y)	Sustained vowel /a/	Single treatment approach Voice assessment: pre- and posttreatment and two follow-up sessions MCT	Acoustical analysis (*MDVP*)	Significant decrease of first three formants (hypothesis: decrease of laryngeal height and lengthening vocal tract)
Van Lierde et al (2004)[10]	4 (m.a.: 48.7 y)	Sustained vowel /a/	Twice a week 25 therapeutic sessions (50 min) Voice assessment pre- and posttreatment (after 25 sessions) Classic laryngeal manual therapy + facilitation techniques	Laryngologic evaluation Perceptual evaluation (GRBAS scale) Maximum phonation time Voice range Acoustic analysis (*MDVP*) DSI measurement	Improvement Improved (but not normal): S factor decreased Improved in 3/4 subjects Highest frequency higher F_0 closer to the norm, improved jitter and shimmer Improved
Mathieson et al. (2007)[4]	10 (m.a.: 30.3 y)	Sustained vowel /a/ Reading passage: "Arthur the Rat"	Single treatment approach (45 min) Voice assessment: pre- and posttreatment and 1 wk after treatment Classic laryngeal manual therapy	Acoustic analysis (*MDVP*) Formant frequency analysis (PRAAT) Vocal tract discomfort scale	Average perturbation during connected speech was significantly reduced (indicating a reduction in ab normal function) No changes Discomfort reduced

m.a. = mean age; SNR = signal-to-noise ratio; GRBAS scale = G: overall grade of hoarseness, R = rough, B = breathy, A = asthenic, S = strained.