

# Effects of Voice Therapy on Muscle Tension Dysphonia: A Systematic Literature Review

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**Summary:** The present study aimed to carry out a systematic review of the effects of voice therapy on individuals diagnosed with muscle tension dysphonia (MTD) or hyperfunctional dysphonia. This is a systematic literature review on the databases Medline (via PubMed), Cochrane Library, Scopus, and Lilacs using a search strategy related to the theme of the study. The selection included clinical trials that assessed the effects of speech therapy intervention on patients diagnosed with MTD or hyperfunctional dysphonia published over the last 10 years in Portuguese, English, or Spanish. The Physiotherapy Evidence-Based Database (PEDro) Scale was used to assess the methodology of the studies. Of the 634 publications, 12 studies were included in this review, of which three were excluded due to a low score on the PEDro Scale, resulting in a final number of nine publications. Regarding the techniques approached, semioccluded vocal tract exercises (22.22%), nasal sound and frequency modulation (22.22%), maximum phonation time (MPT) technique and vocal hygiene (11.11%), vocal function exercises (11.11%), respiratory exercises along with phonoarticulatory sounds (11.11%), manual laryngeal therapy (11.11%), and manual laryngeal therapy associated with respiratory exercises (11.11%) were identified. These techniques promoted the following effects: improvement in intraoral and subglottal pressure, positive alterations in the glottal contact quotient, significant changes in fundamental frequency measures, increased MPT, and reduced voice roughness. Methodology was identified to be a shortcoming in the studies. The clinical trials reviewed showed positive results in using the therapeutic techniques selected in the speech therapy approach.

**Key Words:** Voice–Dysphonia–Voice therapy–Muscle tension–Systematic review.

## INTRODUCTION

Voice production depends on the complex and interdependent action of all muscles involved and on the integrity of the speech apparatus. However, when muscle action is imbalanced due to excessive tension in the (para)laryngeal muscles, muscle tension dysphonia (MTD) occurs,<sup>1,2</sup> which manifests as characteristic signs in the extrinsic laryngeal support and postural musculature, such as deviation in head and neck posture with hyperextension, short and compressed respiration, larynx in a high position, tension on the face, and locked joints.<sup>1,3</sup>

As for the glottal source, the most common signs are hyperadduction of vocal and vestibular folds, the presence of triangular chinks of different lengths, and reduced vocal fold opening angle,<sup>1,3</sup> which lead to complaints of a feeling of tightening and pain in the throat, irritation, and fatigue when speaking as a consequence of the alteration in the perilaryngeal musculature pattern.<sup>3,4</sup> Signs related to voice quality include tense, compressed, breathy, and hoarse voice; jitter and shimmer alterations; instability during emission; and laryngopharyngeal resonance.<sup>2,5</sup>

The literature contributes with a variety of nomenclatures for this disorder, such as hyperfunctional dysphonia, hyperkinetic dysphonia, musculoskeletal tension dysphonia, musculoskeletal tension syndrome, and isometric larynx dysphonia, among others.<sup>6</sup> Overall,

the term MTD is preferred because this marker assumes the physiopathology of the disorder.<sup>1</sup> For etiological purposes, MTD is categorized according to the following classification: primary, related to the absence of structural alteration in the larynx; and secondary, with the presence of tissue reactions.<sup>1-3</sup>

The global objective of voice therapy is the reduction or correction of improper voice use and a therapy program comprising indirect and direct therapy, yielding benefits in most cases.<sup>1</sup> The literature reports the beneficial use of indirect therapy, composed of raising awareness to healthy vocal habits and their importance, along with direct therapy, composed of voice therapy techniques.<sup>6,7</sup> The direct approach aims to correct posture; relax (para)laryngeal and cervical musculatures; promote respiratory control, efficient glottal closure, and resonant equilibrium; reduce voice symptoms; improve articulation; and reduce tension in the laryngeal musculature.<sup>1,5</sup>

Given the complexity of building a broad therapeutic plan that aims to reduce the variety of body and voice manifestations in this voice disorder, the present study aims to systematically review the effects of voice therapy on subjects diagnosed with MTD or hyperfunctional dysphonia, as well as assess the uniformity of evidence on this voice disorder.

## MATERIAL AND METHODS

### Study design

This is a systematic literature review, developed according to the guidelines of the Prisma protocol for systematic reviews and meta-analyses,<sup>8</sup> which aims to answer the following question: What interventions are selected for voice therapy on MTD, and what effect do they promote?

### Search strategies

The search was carried out on May 20th, 2016 on the databases Medline (via PubMed), Cochrane Library (Central Register

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of Controlled Trials), Scopus, and Lilacs. Those databases were chosen for being widely used by the health-care sciences community and for being internationally renowned reference sources. The MeSH terms “muscle tension dysphonia” and “hyperfunctional dysphonia” were used in association with the Boolean term OR for the search on PubMed and equivalent terms on the other databases.

### Eligibility criteria and data extraction

Paper selection began with title analysis, which excluded duplicates and studies that were not related to the key words defined by the search strategy, as well as papers whose full text was not available. After the abstracts were read, clinical trials that assessed the effects of voice therapy intervention on patients diagnosed with MTD or hyperfunctional dysphonia published over the last 10 years in Portuguese, English, or Spanish were selected. However, those whose samples comprised subjects below 18 years old, with syndromic or neurological diagnostic, or head and neck cancer were excluded. Due to the limited number of clinical trials in the area, both randomized controlled trials and nonrandomized or uncontrolled studies were selected for a full-text review.

The studies that lacked sufficient information in the abstract were also included in the full-text analysis. Finally, the papers were read in full and analyzed in order to include only those that matched the eligibility criteria. The following information was extracted from the full-text reading: sample characteristics, study design, voice assessment methods, and intervention protocol and its effects on the subjects' voice. The analysis of the title and the abstract, and the full-text reading of the papers found were carried out by three independent judges, and the differences among them were settled through consensus. Moreover, only the information regarding the effects obtained by the interventions on patients diagnosed with MTD were considered, and the other groups in the studies that had other voice disorders were excluded.

### Methodology evaluation

The Physiotherapy Evidence-Based Database (PEDro) Scale was used to assess the methodological quality of the studies.<sup>9,10</sup> It comprises 11 criteria, and for each criterion met, one point is scored. Criteria 2–9 assess internal validity, and criteria 10 and 11 verify whether the studies have sufficient statistical information for the results to be interpretable. Criterion 1, which relates to the external validity, has been retained so that the Delphi list is complete, but it is not calculated. Therefore, the final score can range from 0 to 10 points.

Methodological quality was assessed by three independent researchers. The assessors of the PEDro Scale analyzed only what was reported in the manuscript, and when there was doubt due to unclear information, the studies were scored as not meeting the criterion, such as those that reported blinding but did not explain the blinding procedure. For studies featuring a single group of participants in the sample, the answer “does not apply” was added to the criteria involving the analysis of groups (criteria 3, 4, 8, and 10). In addition, the studies that scored below 3 in the analysis were excluded.<sup>11</sup>

## RESULTS

After 634 publications were acquired and verified through the search strategy adopted, 24 were selected for full-text reading and 12 were included in the review according to the eligibility criteria. All stages of the paper selection and analysis process are shown in [Figure 1](#), based on recommendations by Prisma.<sup>8</sup> Next, three studies were excluded for scoring below 3 on the PEDro Scale. In face of that, this review worked with a final number of nine papers.

### Study characterization

[Table 1](#) shows the characterization of the studies. The subjects were between 18 and 84 years old, most ( $n = 172$ ) were women,<sup>12–16</sup> and 80 subjects were men. Eight studies (88.88%) had subjects with primary MTD or hyperfunctional dysphonia. Among the nine articles, two (22.2%) are randomized and controlled clinical trials,<sup>13,14</sup> while four (44.44%) are controlled clinical trials.<sup>12,16–18</sup>

### Effects of interventions

[Table 2](#) shows the effects of the interventions proposed by the studies selected. The table lists the methods assessed, the techniques used, and the results of speech therapy on the subjects with MTD or hyperfunctional dysphonia. The survey of techniques employed identified semi-occluded vocal tract exercises<sup>12,17</sup> (22.22%), maximum phonation times (MPTs) and vocal hygiene<sup>13</sup> (11.11%), nasal sounds and frequency modulation<sup>18,19</sup> (22.22%), vocal function exercises<sup>14</sup> (11.11%), manual laryngeal therapy<sup>15</sup> (11.11%), manual laryngeal therapy associated with respiratory exercises<sup>20</sup> (11.11%), and respiratory exercises along with phonoarticulatory sounds<sup>16</sup> (11.11%).

### Approach with semi-occluded vocal tract exercises

The studies<sup>12,17</sup> applied the technique with resonance tubes of different diameters and length whose end was in open air or submerged in water at a depth of 3 and 10 cm. In addition, one study<sup>17</sup> also used lip and tongue trill exercises, hand over the mouth, and bilabial plosive sound. The exercises took between 5<sup>17</sup> and approximately 30<sup>12</sup> minutes and were applied one<sup>17</sup> and three<sup>12</sup> times in the session.

### Approach with MPTs along with vocal hygiene

This intervention, employed by one study,<sup>13</sup> comprises information on voice health and the MPT technique for 6 weeks, although the duration and weekly frequency of the application of this therapy approach were not described.

### Approach with nasal sounds and frequency modulation

The studies<sup>18,19</sup> that adopted the nasal sound technique, along with frequency modulation, chose at least 3 seconds of emission with five repetitions of the same task.

### Approach with manual laryngeal therapy

Of the two studies<sup>15,20</sup> that selected manual laryngeal therapy, one<sup>20</sup> chose to combine it with respiratory approaches for

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