# Review on Laryngeal Palpation Methods in Muscle Tension Dysphonia: Validity and Reliability Issues

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**Summary: Background.** Laryngeal palpation is a common clinical method for the assessment of neck and laryngeal muscles in muscle tension dysphonia (MTD).

**Objective.** To review the available laryngeal palpation methods used in patients with MTD for the assessment, diagnosis, or document of treatment outcomes.

**Study Design (Method).** A systematic review of the literature concerning palpatory methods in MTD was conducted using the databases MEDLINE (PubMed), ScienceDirect, Scopus, Web of science, Web of knowledge and Cochrane Library between July and October 2013. Relevant studies were identified by one reviewer based on screened titles/abstracts and full texts. Manual searching was also used to track the source literature.

**Results.** There were five main as well as miscellaneous palpation methods that were different according to target anatomical structures, judgment or grading system, and using tasks. There were only a few scales available, and the majority of the palpatory methods were qualitative. Most of the palpatory methods evaluate the tension at both static and dynamic tasks. There was little information about the validity and reliability of the available methods.

**Conclusion.** The literature on the scientific evidence of muscle tension indicators perceived by laryngeal palpation in MTD is scarce. Future studies should be conducted to investigate the validity and reliability of palpation methods.

**Key Words:** Palpation–Muscle tension dysphonia–Larynx–Assessment–Validity–Reliability–Review.

## INTRODUCTION

Muscle tension dysphonia (MTD) is referred to a functional voice disorder in which there is an excessive tension in the (para)laryngeal musculatures. This pathologic condition usually affects young to middle-aged females who use voice extensively.[1–3] Morrison et al[1] found 20% of their dysphonic patients are diagnosed as MTD. The MTD has been classified into two different categories: (1) primary and (2) secondary MTD. Primary MTD is diagnosed in the absence of known organic conditions affecting voice, without obvious psychogenic or neurologic etiologies. However, secondary MTD accompanies organic conditions and may be a reaction to them.[4] Although different synonym terms suggested in the literature to introduce this pathologic condition, now the MTD has been accepted as the most appropriate diagnostic label. Multiple abnormal psychological, medical, aerodynamic, perceptual-acoustic, and musculoskeletal characteristics have been documented in MTD[3,5,6]; so, assessment and diagnosis of MTD is based on several key features.[3] These features typically are explored through case history, psychological evaluations, perceptual-acoustic voice assessment, observation of the larynx and palpation.

Authors state that excessive tension of the (para)laryngeal muscles is a hallmark of MTD.[2,3,5,7,8] Also, excessive or atypical laryngeal activity was introduced as required criteria for medical diagnosis in both types of MTD.[4] Therefore, the assessment of laryngeal muscular tension may be an important part in the diagnosis of voice disorders, particularly MTD.[9–15] Muscular tension can be assessed using several instrumental and noninstrumental methods.[16] Palpation is a noninstrumental technique to document any visible or palpable tensions around the larynx observed especially in the extrinsic laryngeal muscles. However, the underlying cases of excessive tension in (para)laryngeal area in MTD have not been fully understood.[17] The extrinsic and intrinsic laryngeal muscle groups both play a role during phonation.[9,13–15] The intrinsic laryngeal muscles provide motion and tension of the vocal folds.[13] Free movement of the intrinsic laryngeal muscles depends on stable and natural position of the larynx provided by the extrinsic laryngeal muscles. In the presence of MTD, the tension of extrinsic musculature and thereby position of the larynx may be altered. Subsequently, the movement of cartilaginous structures of the larynx may be disturbed affecting the tension of intrinsic musculature.[13]

Assessment of the extrinsic and the intrinsic laryngeal muscles using reliable and valid method is essential to diagnose the MTD and to record treatment outcomes. The palpation method used routinely in the speech therapy clinics provides useful information about the degree of laryngeal muscles tension, pain, focal tenderness, tightness, laryngeal high position, decreased laryngeal spaces, and abnormal displacement of cartilages during rest and/or phonation.[9,10,15,18] Therefore, laryngeal palpation can facilitate clinical decision-making process in MTD.[15,18]

There are several laryngeal palpation methods in MTD used in the clinic and investigations. Although some of palpation methods have been introduced or discussed in the tutorial or review articles,[10,11,13,18] there is no review article to include all the palpation methods. The aims of the article are (1) to characterize all available laryngeal palpation methods used for the assessment of neck and laryngeal muscle tension in

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MTD and (2) to compare them in terms of target anatomical structures, criteria for judgment/grading, assessment tasks, validity, and reliability.

## METHOD

A systematic review of literature related to laryngeal palpation methods in MTD was undertaken. We performed a computerized search using the databases MEDLINE (PubMed), ScienceDirect, Scopus, ISI, Web of knowledge, And Cochrane Library from 1980 to 2013. The search terms used were "assess,*" "evaluat*," "diagnos,*" "muscle tension dysphonia," "muscle misuse dysphonia," "functional dysphonia," "functional voice disorder," "nonorganic dysphonia," "nonorganic voice disorder," and "vocal hyperfunction" for each database. Manual searching was also used to track the source literature. The articles in which the palpatory methods were used as a tool for the assessment and diagnosis of dysphonic patients or treatment outcome were included. The relevant tutorial and review articles also were included.

## RESULTS

We found five main laryngeal palpatory methods.[10–13,18,19] In nearly all methods, the client is at the sitting position, the examiner is on the one side, the client head is in a neutral position, and the thumb and middle (or index) finger of the other hand are used for palpation.[11,18] The degree of examiner hand force should be equal to the pressure required to cause the thumbnail tip to blanch against a firm surface.[10]

We found similarities and differences among the palpation methods particularly according to the target structures, criteria for judgment or grading, and assessment tasks. There were no sufficient data about validity and reliability of palpation methods. In the following, we characterize the available palpation methods.

### The laryngeal palpation method of Aronson

This method at first was introduced in 1990 by Aronson for the clinical assessment of voice disorders.[12] In this method, the laryngeal critical sites are the major horns of the hyoid bone, the superior cornu of the thyroid cartilage, and the thyrohyoid space. The clinician tests tension signs by encircling the larynx with the thumb and middle (or index) finger (C-shape) at rest.[11,12]

The criteria defined in the Aronson method to determine the presence of musculoskeletal tension are (1) pain in response to pressure on the larynx and hyoid bone; (2) elevation of the larynx and hyoid bone (diminished width of the thyrohyoid space); (3) resistance of the larynx to displacement; and (4) voice improvement while lowering the larynx.[12] This method is a qualitative tool with no rating scale. There are no studies on the validity and reliability of the Aronson method (Table 1).

### The laryngeal palpation method of Roy et al

Roy et al[20–23] documented effectiveness of laryngeal manual therapy by palpation. They recommended muscle tension should be assessed not only at rest but also during voicing attempts.[11]

At first, the Roy et al method was used by Roy and Leeper[20] as a judgment based on laryngeal elevation (narrowing of the thyrohyoid space) and pain during palpation. This method has been used in the literature with modifications between 1996 and 1998.[10,21,22] In the modified Roy et al method, muscle tension is judged according to focal tenderness, muscle nodularity, laryngeal pain, laryngeal elevation, and horizontal laryngeal mobility. Furthermore, tension in the medial submental regions during rest, modal pitch, and high phonation needs to be detected.[10] Finally, the examination of anterior border of the sternocleidomastoid (SCM) muscles at rest has been suggested to be included in the modified Roy et al method.[11]

The laryngeal palpation method of Roy et al has no grading system to rate the muscle tension and has not been evaluated for reliability and validity (Table 1).

### The laryngeal palpation method of Morrison

The Morrison method was suggested in 1997. This is a qualitative method in which clinician documents tenderness, tightness, closed spaces, and restricted mobility of the larynx. These signs can be observed in different functional areas like the suprahyoid region, the thyrohyoid muscles and space, the cricothyroid space, the inferior constrictor, and lateral laryngeal gutters. Tightness of the inferior constrictor and freedom of the lateral laryngeal gutters can be assessed while the larynx has rotated. Any displacement of the cricoid cartilage is also documented.[18]

The method of Morrison[18] is not restricted to rest but palpatory findings are compared between rest and voicing tasks. The original Morrison palpation method does not grade the severity of tension (Table 1) but Morrison et al presented a four-point scale to rate muscular tension in 1999. The authors palpated only four muscle groups including the suprahyoid, the thyrohyoid, the cricothyroid, and the pharyngeal constrictor muscles[24] (Table 2). There are no data about the validity and reliability of the Morrison palpation method.

### The laryngeal palpation method of Lieberman

This method was first introduced by Lieberman in 1998.[25] It is a comprehensive qualitative method that includes many structures in the head, neck, and body.[13,25,26] In this method, the laryngeal palpation is similar to that of the Morrison method[18] and the modified Roy et al method[10,11] but internal laryngeal structures (the arytenoid cartilages, the posterior cricoarytenoid muscles, and the interarytenoid muscles) are also evaluated. As well, laryngeal structures are palpated for position, tone, symmetry, and tenderness at rest and during swallowing and speech tasks[13,25,26] (Table 1).

Angsuwarangsee and Morrison developed a grading system based on the original work of Lieberman. In this system, only four muscle groups including the suprahyoid, the thyrohyoid, the cricothyroid, and the pharyngolaryngeal muscles are palpated at rest, phonation, and connected speech, then tension severity are graded using a four-point scale[16] (Table 2).