

Voice Workshop / UWTSD MA in Voice Pedagogy

Independent Study Module (Extended) (BMPF7013)

Exploring the potential for the therapeutic use of Yoga for Muscle Tension Dysphonia: A review of the literature

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Introduction

Muscle Tension Dysphonia (MTD) is among the most common causal factors in those attending voice clinics with voice disorders (Kempster et al., 2009; Sielska-Badurek et al., 2017). It is recognised to have causes and symptoms that are both physical and psychological in nature, and effective treatments have included those focussing on the release of the muscular hypertension; better control of the breath; and, emotional/psychological relaxation techniques (Altman, Atkinson and Lazarus, 2005; da Cunha Pereira et al, 2018).

Since these key elements of body, breath and mind are also the core components of yoga practice and training (Carman, 2012), and as yoga is increasingly used in the training of singers (Lloyd, Hoffman-Ruddy, Silverman and Lehman, 2017; Moliterno, 2008) the hypothesis of the author is that targeted yoga practice could form an effective, holistic therapy for MTD. This literature review aims to explore the current understanding of MTD and its various treatments, and the application of yogic techniques in voice training and therapy, to form a basis for further research.

The author has worked as a vocal coach for over 20 years with professional singers in the Musical Theatre and CCM¹ fields, both in private practice and as Director of Voice Faculty at READ College. He has provided specialist singing coaching for those rehabilitating from vocal injury since 2011, receiving referrals from Speech & Language Therapists and Multi-Disciplinary Voice Clinics. He has practiced and studied yoga for 6 years and regularly includes both yogic breathing (prāṇāyāma) and physical postures (āsanas) in his voice teaching work.

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Literature Review

To make the clearest sense of the current available information, the literature review is split into two sections: MTD and Yoga in Singing Training.

MTD

A definition:

The term Muscle Tension Dysphonia was first coined in 1983 by Morrison et al to describe a pathophysiology that includes the hypertension of the extrinsic laryngeal muscles, leading to an elevated laryngeal position (Sielska-Badurek et al., 2017), posterior glottal chink and consequently a breathier sound (Altman, Atkinson and Lazarus, 2005), and isometric and/or supraglottic constriction within the vocal tract (Van Houtte, Van Lierde and Claeys, 2011). Alongside this pathophysiology in the neck and vocal tract, it has been noted that the resulting abnormal tension in other parts of the system – such as the chest, tongue, jaw and the abdominal wall – can lead to a lack of healthy function in the laryngeal musculature resulting in loss of resonance and control, hoarseness and vocal fatigue. (Sielska-Badurek et al., 2017; Jafari et al., 2017).

Additionally, symptoms for singers (using a broader range of frequency and longer phrasing than speakers) can include limited access to the full vocal range, fatigue after short periods of singing and a shorter maximum phonatory time (MPT) (Emerich Gordon and Reed, 2019; Sielska-Badurek et al., 2017). Those with high vocal demands – such as singers – are reported by Van Houtte et al (2011) to have a greater prevalence of MTD diagnosis, and it is noted that improper use of the phonatory musculature can cause disturbances to the resonance focus, loss of pitch/loudness

control and, if left untreated, decompensation of the voice (Van Houtte, Van Lierde and Claeys, 2011).

It is widely agreed that MTD can be a causal factor in mucosal changes to the vocal folds themselves, such as vocal nodules, polyps and cysts (Kempster et al., 2009; (Altman, Atkinson and Lazarus, 2005). Conversely, MTD can be viewed as a compensatory vocal gesture for these pathologies (Altman, Atkinson and Lazarus, 2005) and also for other underlying organic disorders including LPR², and Reinke's oedema (Van Houtte, Van Lierde and Claeys, 2011).

There is also general agreement in the current literature that MTD has multiple contributing factors and etiologies which include high vocal demands, inefficient or incorrect posture, psychological factors and underlying organic pathology. (Altman, Atkinson and Lazarus, 2005; Sielska-Badurek et al., 2017; Kempster et al., 2009).

Earlier literature has referred to MTD in a variety of terms, including 'hyperfunctional dysphonia', 'musculoskeletal dysphonia' (da Cunha Pereira, de Oliveira Lemos, Dalbosco Gadenz and Cassol, 2018) and even 'muscle misuse dysphonia' (Van Houtte, Van Lierde and Claeys, 2011).

Van Houtte et al (2011) also note, importantly, that MTD as a term is not simply synonymous with functional voice disorder, but specifically refers to the excessive tension in the paralaryngeal muscles resulting in dysphonia.

Diagnosis:

The method of diagnosis for MTD is quite consistent across all of the literature, with the following key themes emerging:

² Laryngopharyngeal Reflux

1. Video Laryngostroboscopy examination is the most commonplace approach, allowing an ENT or SLT to look for laryngeal/pharyngeal constriction and any vocal fold pathology that may either be causal or an effect of MTD (Sielska-Badurek et al., 2017; Altman, Atkinson and Lazarus, 2005; Lowell et al., 2020; Van Houtte, Van Lierde and Claeys, 2011)
2. Visible and/or palpable tension in the neck and surrounding the larynx is also an important assessment technique (Van Houtte, Van Lierde and Claeys, 2011; Emerich Gordon and Reed, 2019; Altman, Atkinson and Lazarus, 2005). Sielska-Badurek et al (2017) put forward a detailed palpation protocol for the vocal tract structures, including the abdominal wall, lower chest, upper chest, sub-mandibular area, lateral pharyngeal walls, thyrohyoid space and the mandible.
3. Perceptual measurements of the voice were also commonplace in establishing the level of dysphonia, including acoustic analysis, VHI-10³, MPT and measurement of F° (Fundamental Frequency) (Jafari et al., 2017; Gelfer and Van Dong, 2013; Lowell et al., 2020).

Da Cunha Piera et al (2018) also note the importance of distinguishing between primary and secondary MTD diagnoses. A classification of primary MTD relates to the absences of any other pathology or structural changes in the larynx, whereas a secondary MTD classification would note the presence of tissue reactions.

Treatments:

Both direct and indirect voice therapies have been used to treat MTD (da Cunha Pereira et al, 2018) and studies using Vocal Function Exercises (VFE) have also

³ Voice Handicap Index Questionnaire

shown a positive effect on releasing vocal tensions (Jafari et al., 2017; Gelfer and Van Dong, 2013).

There is consensus that a multi-disciplinary approach to treatment is most effective (Altman, Atkinson and Lazarus, 2005; da Cunha Pereira, de Oliveira Lemos, Dalbosco Gadenz and Cassol, 2018; Lowell et al., 2020). This may include standard voice therapy techniques such as yawn-sigh and muscle tension reduction (Jafari et al., 2017), working with a vocal coach using Stemple's Vocal Function Exercises (VFE's) (Gelfer and Van Dong, 2013), circumlaryngeal manual therapy with a qualified manual therapist (Van Houtte, Van Lierde and Claeys, 2011), or respiratory training such as the Accent Method (Altman, Atkinson and Lazarus, 2005) or Respiratory Lung Volume-based Training (RLVT) (Lowell et al., 2020).

Since it is also noted by Altman et al (2005), da Cunha Piera (2018) and Jafari (2017) that personality and psychological factors are also contributing factors to MTD, it can also be said that counselling, psychotherapy, or other mental health treatments may prove beneficial in some cases as part of a holistic approach to treatment.

In all examples above, it is agreed that the primary goal of treatment for MTD is to release the excessive paralaryngeal tensions and thereby restore normal phonation.

Yoga in Singing Training

Breathing:

Most evidently of all in the research, it is agreed that the practice of deliberately controlling the breathing is common to both yoga and singing (Carman, 2004; Emmons, 1988; Lloyd, Hoffman-Ruddy, Silverman and Lehman, 2017). An efficient, deep inhalation followed by a controlled, slow exhalation is necessary to sing long phrases of music in a vocally healthy way (Emmons, 1988) and this can be linked to the yogic practice of prāṇāyāma (Carman, 2012; Moliterno, 2008) where very similar exercises are employed.

Such techniques have not only been used to train the breath, but also to help performers to overcome anxiety in performance, often termed MPA or Music Performance Anxiety (Lloyd, Hoffman-Ruddy, Silverman and Lehman, 2017; Edman, Kondrad and Rakel, 2012).

Lung vital capacity is higher in singers than in non-singers due to this training (Irzaldy, Wiyasihati and Purwanto, 2016), and the same study notes that people attending regular yoga classes increase their vital capacity, creating an advantage when singing. Desjardins and Bonilha (2020) also note that 8 out of 13 studies looking at breathing exercises for adults included prāṇāyāma and showed a positive impact on voice outcomes.

In 1995, Wrycza Sabol, Lee and Stemple noted the similarity of prāṇāyāma and singing training (specifically VFE's) with participants often describing the exercises as 'yoga for the voice'. The VFE's were again shown to have a positive outcome on the voice quality and control.

Yogic breathing uses several 'bandhas' (variously translated as locks or bonds) in the abdominal region, which have benefit for the singer's breath training (Neely, 2020; Carman, 2012). The 'mula bandha' refers to the pelvic floor region, and the 'uddiyana bandha' refers to the abdominal wall, and both are engaged in prolonged, controlled exhalation (Neely, 2020; Emmons, 1988; Carman, 2004).

Physical Postures:

The physical postures, or āsanas, in traditional yogic practice are used to both strengthen and stretch muscles around the body, and to bring focus to the body to provide awareness of tension and/or injury (Carman, 2004; Moliterno, 2008; Neely, 2020).

In her book 'Yoga for Singing: A Developmental Tool for Technique & Performance' (2012), Judith Carman details a full programme of 57 different yoga āsanas, laying out their application for singing training. Postures include specific strengthening and stretching for the abdominal muscles, the back, the neck and the face, amongst others, and have a direct application to the training for good posture, breath technique, and physical awareness for singers (Moliterno, 2008; Carman, 2004; Carman, 2012).

Similar applications are used for singers by Neely (2020) and Lloyd et al (2017) and were observed by Catherine Fitzmaurice in her founding work towards Fitzmaurice Voice Work (Nilsson, Laukkanen and Syrjä, 2020). The regular practice of yoga as part of a singing warm up has also been shown to improve posture, vocal accuracy and concentration (Cook-Cunningham and Grady, 2018).

Excess tensions in the body, which can often cause difficulty to the singer, can be highlighted by the practice of āsanas (Moliterno, 2008) and supervised yoga practice is also recommended by Bussieres et al (2016) for the clinical treatment of neck pain

associated disorders, which have commonality with the paralaryngeal musculature seen in MTD.

Āsanas such as 'Table Top', 'Boat Pose', 'Reverse Crunches with Eagle Legs', 'Reverse Triangle Pose' and 'Warrior II' were noted by Neely (2020) to develop abdominal strength and flexibility that was beneficial for singers' breath and posture.

Psychological, Emotional and Other Applications:

Yoga practice has benefits for the emotional wellbeing of the performer, as well as their physical health (Edman, Kondrad and Rakel, 2012). Control of the exhalatory breath slows the respiratory rate (Carman, 2012; Irzaldy, Wiyasihati and Purwanto, 2016) and thus has a calming effect on the singer (Lloyd et al, 2017).

So-called 'alternative medical therapies' (which included the use of yoga for therapeutic reasons) are prevalent among singers (Surow and Lovetri, 2000), and in a study looking at the voice demands of professional newsreaders in India, Gunasekaran, Boominathan and Seethapathy (2016) noted that the phonation and breathing exercises taught in yoga showed a beneficial effect in maintaining vocal health in this group of professional voice users.

Chan (1994) noted in a study looking at vocal hygiene education for teachers (another statistically high vocal load group), that one subject reported more improvement in her vocal health than others. It transpired that she was attending regular yoga classes, and that the relaxation and breathing training from these classes served as a therapy for her voice, bringing about significant vocal improvements alongside the training offered in the study.

Cook-Cunningham and Grady (2018) noted that, in his book 'Teach Music', Kuhn (2006) saw an improvement in concentration, accuracy and posture when yoga was

added to warm-ups for singer, which links to the mindful awareness of our breath/body connection noted by Carman (2004). Amongst the problems presented by singing students that could be addressed by yogic practice, Carman includes a lack of physical strength/co-ordination and poor breathing technique, alongside a distracted mind and a lack of emotional connection to the material.

In the only paper found by the author within the scope of this literature review to deal specifically with yoga in voice therapy (rather than voice training), the authors note its positive impact on the upper airway physiology, on disruptive posture, co-ordination and as a behavioural treatment for hyperfunctionality in phonatory gestures (Lloyd, Hoffman-Ruddy, Silverman and Lehman, 2017).

Analysis

In conducting this literature review the author sought to deepen and clarify current knowledge and understanding of MTD and to look for links in the symptoms and treatment for MTD with exercises commonly practiced in yoga.

The research shows that primary MTD most commonly affects the paralaryngeal musculature of the neck and vocal tract, and that releasing this tension and restoring normal muscular function is common amongst treatments for the condition (Altman, Atkinson and Lazarus, 2005; da Cunha Pereira et al, 2018; Jafari et al., 2017; Lowell et al., 2020; Sielska-Badurek et al., 2017; Van Houtte, Van Lierde and Claeys, 2011).

The literature also shows that singers (and other professional voice users with a high vocal load) are statistically more likely to present with MTD, and that alongside traditional voice therapies, singers will often seek 'alternative medical therapy' which may not have proof of its efficacy and requires further understanding and research.

(Altman, Atkinson and Lazarus, 2005; Cazden, 2012; Edman, Kondrad and Rakel, 2012)

Yoga has been used for singing training in a variety of settings and has been anecdotally successful in its application. Studies have also been conducted which have shown that yogic breathing techniques (prāṇāyāma) are effective in developing breathing technique in singers and can help with performance anxiety and general stress levels. Such anxiety/stress levels can be one of the etiologies for MTD. (Carman, 2004; Carman, 2012; Chan, 1994; Cook-Cunningham and Grady, 2018; Singh Sekhon, 2016; Emmons, 1988; Gunasekaran, Boominathan and Seethapathy, 2016; Irzaldy, Wiyasihati and Purwanto, 2016; Lloyd, Hoffman-Ruddy, Silverman and Lehman, 2017; Moliterno, 2008; Neely, 2020; Nilsson, Laukkanen and Syrjä, 2020; ÖZGÜR, 2020).

Yoga postures (āsanas) have been recommended for the clinical treatment of muscular injury in the neck by physical therapists, and the combination of strength and flexibility training in yoga postures is beneficial to developing good posture in singers, and thus the instrument as a whole (Bussieres et al., 2016; Carman, 2004; Moliterno, 2008; Nilsson, Laukkanen and Syrjä, 2020; Özgür, 2020). There are also specific yoga postures that can target inhalation, exhalation, and specific tensions in the abdominal wall, neck and chest (Carman, 2012), and the increase in lung vital capacity which can be created using such breathing exercises, is beneficial for singers (Desjardins and Bonilha, 2020; Irzaldy, Wiyasihati and Purwanto, 2016; Singh Sekhon, 2016).

The only paper discovered by the author to discuss the use of yoga in voice therapy (rather than training) concludes that regular yoga practice creates a co-ordinated body alignment, improves strength, decreases tension and relaxes the mind of the

performer (Lloyd, Hoffman-Ruddy, Silverman and Lehman, 2017). This paper includes the use of 'resonant voice strategies' which show similarities to so-called VFE's and also to yogic chanting, both of which have documented positive effects of MTD (Wrycza Sabol, Lee and Stemple, 1995; Carman, 2012; Gelfer and Van Dong, 2013).

Drawing on this information, it is possible to see how a targeted and well-designed programme of yoga (both prāṇāyāma and āsana practices) could have a beneficial and potentially therapeutic effect on singers with MTD. Such a programme would need to take a holistic approach to the singer, with practices to work on:

- Performance or other unrelated anxiety (meditation)
- Breathing practices to encourage lung vital capacity and controlled exhalation without tension (prāṇāyāma)
- Physical postures to bring awareness to, and ultimately release, tension of the vocal tract and paralaryngeal muscles (āsana)

Where the current literature shows that such work is already being employed in singing training, a programme designed specifically for the treatment of MTD would need to take an evidence-based approach, drawing on a thorough understanding of the diagnosis, etiologies, and multi-disciplinary treatments for this functional voice disorder. There appears to be enough evidence to warrant further research in this area, initially in the design of the programme and then perhaps in a pilot study to trial the effects of yoga on MTD. Ethical consideration must be given to recruiting a cohort of participants who have received a clinical diagnosis of MTD, and the creation of a control group to test the results.

Conclusion

From reviewing the most recent literature on MTD, a widely agreed set of symptoms, emerges. These are an excessive and improper muscular tension in the vocal tract, taking in the abdominal wall, chest, neck, pharynx, tongue, jaw and intrinsic laryngeal muscles. The resulting loss of phonatory volume control, resonance, and vocal fold closure lead to a specific functional disorder that is the most widely reported problem amongst those attending voice clinics and is most prevalent in those with high vocal loads, such as singers and actors. Primary MTD presents without any mucosal or structural changes within the larynx, whereas secondary MTD will be diagnosed where there is evidence of these. It is noted that organic pathology of the vocal folds can be both causal and an effect of MTD. Aside from the physical causation, MTD can be brought about by psychological factors including personality type/disorder and performance anxiety.

MTD is diagnosed using a combination of endoscopic evaluation of the internal structures of the larynx, observation and/or palpation of the external paralaryngeal musculature, and perceptual evaluation of the voice by both the client (using VHI-10 or similar) and a qualified professional using acoustic analysis and observations of F⁰ and MPT.

There is a good base of literature showing the application of yoga to both spoken voice and singing training. There is evidence of positive outcomes from practicing both yogic breathing and postures in training singers and in assisting vocal hygiene and good practice in spoken voices.

At the present time, there is very little research showing an evidence-based approach to using yoga as a holistic therapy for MTD although the literature on both MTD and

yoga shows an interesting crossover and good potential for such a programme to be researched and developed.

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