# REVIEW



# The mechanism of action for laryngeal manual therapies: the need for an update

Walt Fritz

#### **Purpose of review**

To propose a pathway for expanding the understanding of potential mechanisms of action with laryngealbased manual therapy (LMT) for muscle tension dysphonia (MTD). This review may help determine if current LMT literature has kept up with advances in the more general manual therapy (MT) findings.

#### **Recent findings**

Studies over the past thirty years, including recently published articles, have confirmed the efficacy of various manual therapy interventions in treating MTD. However, gaps exist between current LMT literature and that being presented in the more general MT field. Instead of viewing peripheral manipulation's influences as a local cause/effect process, the MT literature paints a richer tapestry of centrally mediated impacts.

#### Summary

Evidence from outside the LMT field has introduced a broad tapestry of factors that may contribute to the efficacy of MT, extending beyond the local effects reported in LMT literature. To better understand the effect and mechanism of action touch-based interventions have on a patient's voice and to potentially improve outcomes, it is necessary to broaden investigations to include a broader range of perspectives.

#### **Keywords**

laryngeal manual therapy, mechanism of action, muscle tension dysphonia, outcomes

# **INTRODUCTION**

Laryngeal manual therapy (LMT) first appeared as a possible intervention option for muscle tension dysphonia (MTD) in 1980 (Aronson) and began to be studied in 1993 [2]. Without attempting to simplify individual perspectives excessively, outcomebased studies reported that soft tissue manipulation explicitly applied to the perilaryngeal and related oral musculature, followed by externally applied laryngeal reposturing, was said to create a local reduction in laryngeal muscle tension [3-5], allowing a more normal voice expression. Recent papers [6<sup>•</sup>] continue to restate explanations of changes gained via LMT without exploring the accuracy and comprehensiveness of those descriptions. A summary of the narratives used to explain mechanisms tended towards viewing excessive muscle tension being reduced with appropriately applied soft tissue manipulation and mechanical stretching of the larynx in a caudad direction, coupled with activation of voicing, allowing a normalized voice to be sustained.

Based on the explanations given through many of the studies listed in this review, one might conclude that the physical action of hands-on manipulation was the sole mechanism that reduced vocal dysfunction or a local-effect consequence of that intervention at the peripheral level. Although not implicitly stated in any study, other influences of change are seldom mentioned. Over the past 30 years, little attention has been paid to the nuances of how those changes occur throughout the LMT literature. Without implying that these perspectives are incorrect, newer models proposed from outside the LMT field (explored below) give us a richer understanding of the multifactorial and variable nature of the influences of MT, indicating a need for, at a minimum, stating a proposed mechanism of action for LMT that stays current with general models and hypotheses.

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# **KEY POINTS**

- Laryngeal manual therapy (LMT) is shown to be an effective intervention for muscle tension dysphonia.
- Mechanisms of action for LMT appear to have been only minimally explored.
- Understanding the mechanisms of action in research external to the LMT field conveys a richer and more comprehensive understanding of the complexities of touch-based intervention.
- The multifactorial explanation for the impacts of manual therapy may expand our ability to serve our patients.
- Researchers in the LMT field may consider investigating and including similar multifactorial narratives in future studies.

The reliance on previously published literature to provide a framework for current research is a regular phenomenon in analysis, with subsequent new understanding building on the shoulders of the previous studies. Readers will be familiar with the first few paragraphs of outcome-based studies that attempt to summarize complex reasoning in a few sentences. Invariably, the authors tend to align with a specific perspective and cite background literature that supports those views. Roy and Leeper [2] reached back to Aronson [7] to provide a rationale for the inclusion of LMT-type intervention and reiterated Aronson's contention that less aggressive means often fail "because of the powerfully resistive force of musculoskeletal tension" (Roy and Leeper, 1990, p. 243). Roy and Leeper use Aronson's protocol and rationalization in their study, wherein the kneading and manipulation of the laryngeal musculature were said to cause a reduction in local tension and reinforce that a dysphonic voice "is often a complex mixture of physiologic, psychologic, and social factors" (Roy and Leeper, 1993, p. 243). Based on the language used, it was thought that the process of LMT went deeper than the locally applied intervention. This paper sought to accept or reject Aronson's contentions, with the former being the outcome. The outcomes of the Roy and Leeper study established the efficacy of LMT with certain aspects of MTD, cautioning that the specificity of reduced muscle tension as a sole contributor to voice change was not confirmed via electromyography or other means. Roy and Leeper were testing the effects of LMT on voice quality scales, steering clear of speculating on the mechanisms by which those gains occurred.

Mathieson *et al.* [8] identified variations in LMT from gentler to more aggressive forms. The authors

state that the "primary aim of manual therapies in the perilaryngeal and laryngeal area is to relax the excessively tense musculature which inhibits normal phonatory function" (Mathieson *et al.*, 2009, p. 353). A mechanism of action for LMT was superficially mentioned. However, such was not the purpose of their study; instead, they stated that voice changes were accomplished via manual techniques, which allowed a reduction in tension and changes in laryngeal elevation.

In newer studies, manual interventions continue to show promise and expand on traditional LMT interventions' more specific nature and applied location. Nasrin *et al.* [9] demonstrated the effectiveness of the cricothyroid visor maneuver, though they chose not to discuss the underlying mechanisms of such interventions. Flock and King [10<sup>••</sup>] compare various LMT styles, seeing common ground among the stated underpinning of each model, with recommendations for further study. Though not a stated goal of the Flock and King paper, mention of a uniform understanding of the mechanism of action of many analyses and models explored was not discussed, nor has it given much comment in the LMT literature since its inception.

Many studies speak to the perceived actions of LMT, implying a mechanism for that action. "(T)he application of lateral pressure to the thyroid cartilage is used to decrease tension in the perilaryngeal musculature" (Ahmadi *et al.*, 2023, p. 3) is one such example [11<sup>•</sup>]. However, deeper explorations of such mechanisms are rarely seen. The literature in the LMT field demonstrates MT's utility as one of many valuable resources clinicians use. Nevertheless, how do these manipulations create that change?

As a career-long student of manual therapy, I have witnessed similar dilemmas throughout my initial coursework and continuing education. The variability in explanations of potential mechanisms is confusing to clinicians and patients alike. With my early MT training in myofascial release, where dysfunction and solutions were explained in fascial (connective tissue) terms, relating to the explanatory narratives of other models was challenging to accept. Tribalism ruled, with each group staying within their lanes, using narrow views of mechanisms of action when it came to intervention. Parallels can be drawn in the LMT field, as some see their manipulations as having a local impact on muscle tension [12], myofascial restrictions [13], postural deviations [14], and trigger points [15], all managed with various forms of LMT.

The LMT literature lacks broader views regarding mechanisms of action and effect, though a few newer papers [16,17] look at potential mechanisms through brain-based changes from peripheral

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manipulations via fMRI studies, introducing a more complex tapestry of impact.

# **A BROADER VIEW**

Outside the LMT literature, some more general MT research reveals varied perspectives on possible mechanisms of action. These papers have deconstructed the presumed mechanisms of action of the various types of MT used in the physiotherapy, osteopathic, and manual therapy communities and come up with numerous possible underlying actions. None are complete, and there is considerable variability in the models presented. However, this uncertainty may point to the complexities of defining a well defined and narrow protocol for how a human being reacts and responds to the touch of another.

Kolb *et al.* [18] address the issue head-on, calling for wholesale changes to teaching manual therapy. Seeing the historical biomechanical model of touchbased interventions continuing to be taught, they called on educators to begin including broader mechanisms, including the effects of contextual factors and the fundamentals of the patient-provider dynamics, and to better convey the bottomup perspective, where peripheral structures act as signalers to higher centers, instead of being the primary vessels of change. Lunghi *et al.* [19] follow a similar line of reasoning.

Bialosky *et al.* [20] present a multifactorial model for the mechanisms of action for MT that lays out a general blueprint. Noting the complexities of the individual experience, the authors speculate that striving for one universal mechanism is improbable. Instead, they present possibilities that include autonomic, peripheral, and central nervous system factors, biomechanical and neurophysiological inputs, and nonspecific responses, all capable of influencing dysfunction via touch.

Baroni et al. [21] write from the osteopathic perspective on the role of touch in interoceptive influences, seeing the clinician's role as fostering self-regulation on the patient's part. Such views contrast significantly with historical tissue and pathology-based models, where the clinician acts as the conduit of change. Models like Baroni et al. place the clinician as the therapeutic partner, cocreating impact. Cerritelli et al. [22] used brain-based fMRI studies to demonstrate specific self-regulating including interoceptive influences, insular responses, from the application of MT (in this case, osteopathic treatment). "Understanding factors that influence how individuals experience their voice disorder can enhance patient-centered care and guide intervention" [23].

Geri *et al.* [24] addresses the narrowed range of traditional physiotherapy models for describing the mechanisms of action of MT by offering possibilities that leverage the emotional impacts that compassionate, empathetic touch can instill. These represent wholly different mechanisms but are no less wrong than others discussed here. "Clinicians should remember that manual techniques are not tools to fix the patient's body rather they provide the opportunity to communicate with the patient's brain similar to words (Geri *et al.*, 2019, p. 3).

Clinical models of MT and LMT frequently overlook the influence of the clinician in the therapeutic process. Studies are frequently written from a mechanistic perspective where the researcher acts as an observer, applies an intervention, and witnesses the response. Does the presence of the clinician matter? Cerritelli et al. [25] force us to examine our influence on the clinical encounter when MT is used, as the clinician's attention to the touch-based task influences the patient's degree of brain activation, a necessary factor in influencing change. While not seeking to replicate Cerritelli, Spengler et al. [16] and Roy et al. [17] introduce brain-based findings to imply that MT and LMT are much more than mechanistic manipulation of a troublesome tissuebased problem.

Moving away from manual therapy studies, the interaction between the clinician and patient presents us with questions. Is the intervention the treatment effect based solely on the technique we are providing? Or is it how we present the information that surrounds the technique that matters? Helou [27] introduces concepts relating to metatherapy, where the technique itself may be less meaningful than the therapeutic wrapping in which it is applied. How the clinician contextualizes the intervention may be a significant influencer of outcomes. Although the mechanistic technique may be helpful, the multiple variables that go into a clinical encounter, even in the more controlled setting of a randomized controlled intervention.

No matter how categorized, touch conveys meaning and can be affective when applied appropriately. The touch style dictates such determinants and how the receiver perceives the touch. More than just a standardized intervention, manual therapy holds the potential to reach the receiver in different ways. Educating clinicians on this research may expand our ability to reach another person and avoid conflicts where touch styles are mismatched [26].

When we employ LMT, we engage with another human being capable of having hopes, fears, expectations, and values. Traditional mechanistic models may overlook this factor by emphasizing technique

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specificity and accuracy. While the specificity of an LMT intervention for voice disorders may matter, sufficient evidence exists that it may matter less than perceived [27]. Targeting patient-centered aspects of touch may positively influence outcomes, which falls under the meta-therapy umbrella [29,30<sup>•</sup>,31].

Why is a deeper understanding of the complexities of the mechanisms at play in LMT interventions needed? Beyond the obvious need to better comprehend the work we use and teach, the additional potential for impact comes with each possible new mechanism. Witness the large number of studies presented here and elsewhere that define unique protocols and perspectives on how LMT can positively influence vocal disorders. Many of the subcategories of LMT appear to be unique, yet all report positive influences. If we accept that MT and LMT outcomes may not be solely predicated on the exactness of the clinician's skill, the potential to leverage aspects gained from understanding newer models to broaden and enhance potential outcomes increases (Supplemental Data, http://links.lww.com/COOH/ A59).

Sherriff *et al.* [32<sup>•</sup>] discussed how contextual factors influence patient outcomes, seeing that certain factors were more influential than others. Though referencing issues outside of the typical realm of LMT, our professions may benefit from investigating how contextual factors apply in the LMT context. Given that contextual factors are influential [33], might not understanding how to enhance those factors increase the possibility of successful outcomes?

Can we use this information to provide further benefit if we accept how the treatment is applied? Can it be enhanced through empathy and promoting a therapeutic alliance [34]? If we know that a specific touch style may amplify brain-based awareness [25], might we be willing to explore strategies that challenge our biases and tendencies? If we accept that the exactness of the technique or superiority of one specific model is an inaccurate way to view the application of LMT, might that not open the door to leveraging newer information? The dynamics and quality of the relationship built with our patients is a significant driver of change, as is the inclusion of patient-led experiences [30<sup>•</sup>,34].

The information presented here is not intended to discredit those who have significantly contributed to our appreciation of the utility of LMT. Instead, a challenge is created for researchers to look for ways to broaden and deepen our understanding of the complexities of the effects of touch concerning MTD and other voice disorders. If recent papers published in the LMT domain explore these concepts, an apology is offered for the omission in this review.

#### **CONCLUSION**

Through thirty years of research, LMT has been shown to be an influential therapeutic intervention for voice disorders. However, the explanations of its mechanisms of actions cited tend towards narrowed, local tissue-based perspectives and have yet to be updated. In contrast, newer literature from the broader MT field has introduced a more comprehensive range of potential narratives to understand how MT influences the recipient. These newer views expand our understanding of the global effects of touch-based interventions and open a door for improving outcomes. Researchers in the LMT field should consider integrating the sources mentioned in this review to advance our understanding of a complex intervention [28,35].

#### Acknowledgements

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Note: Though other descriptors are used, the abbreviation LMT is used here as an umbrella term for the many named and unnamed styles of laryngeal manual therapies. Despite references to the contrary, individual styles of LMT may be more similar than often thought [1<sup>•</sup>]. Additional reading

\*\*McDevitt, A.W., O'Halloran, B., Cook, C.E. "Cracking the code: unveiling the specific and shared mechanisms behind musculoskeletal interventions." Archives of Physiotherapy 13.14 (2023): https://doi.org/ 10.1186/s40945-023-00168-3.

Using examples from various therapeutic interventions, including manual therapy, the authors discuss how seemingly disparate treatments have shared mechanisms of action. A richer understanding of these actions allows better tailoring of therapy. Instead of asking if the treatment works, we should look at why. This information may serve as a philosophical blueprint for emerging LMT research.

*Kopf, D. "Massage and touch-based therapy." Zeitschrift für Gerontologie und Geriatrie* 54 (2021): 753–758.

\*\*Schirmer, A., Croy, I., Ackerley, R. "What are C-tactile afferents and how do they relate to "affective touch"?" Neuroscience and Biobehavioral Reviews 151 (2023): 105236.

Affective touch is linked to the stimulation of unmyelinated mechanosensitive cutaneous afferent fibers. This pathway is one of many possible pathways in the various sorts of touch used with LMT. While these fibers do not uniquely impact voice, they are a part of the general autonomic responses that play a role in all interventions, including touch-based ones.

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None.

### **Conflicts of interest**

There are no conflicts of interest.

#### **REFERENCES AND RECOMMENDED** READING

Papers of particular interest, published within the annual period of review, have been highlighted as:

- of special interest
- of outstanding interest
- 1. Degenhardt B, van Dun PLS, Jacobson E, et al. Profession-based manual therapy nomenclature: exploring history, limitations, and opportunities. J Manual Manipulative Ther 2023; 32:96-110.

This paper represents a three-year effort to standardize manual therapy terminology, pointing out the relative lack of differences between manual therapy interventions

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- 10. Flock L, King SR. A manual therapy in need of a manual: conceptualizing and comparing existing vocal massage protocols and their use in the treatment of voice
- problems. Voice Speech Rev 2023. doi:10.1080/23268263.2023.2262181. The authors identify gaps in voice rehabilitation's various manual therapy ap

proaches. Recommendations are made on seeking a consensus on terminology and practice to allow greater consistency and comparability across the vocal manual therapy research spectrum.

- 11. Ahmadi N, Abbott KV, Rajati F, et al. Effects of laryngeal manual therapy on primary muscle tension dysphonia (MTD-1): implications for MTD-1 type. J Voice 2022. https://doi.org/10.1016/j.jvoice.2022.04.002
- The authors discuss the efficacy of LMT on a range of primary MTD. 12. Rubin JS, Lieberman J, Harris TM. Laryngeal manipulation. Otolaryngol Clin North Am 2000; 33:1017-1034.
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- 19. Lunghi C, Tozzi P, Fusco G. The biomechanical model in manual therapy: is there an ongoing crisis or just the need to revise the underlying concept and application? J Bodyw Movem Ther 2016; 20:784-799.
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- 22. Cerritelli F, Chiacchiaretta P, Gambi F, et al. Effect of manual approaches with osteopathic modality on brain correlates of interoception: an fMRI study. Sci Rep 2020; 10:3214.
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Discussed is the role and influence of patient self-sensing and awareness with primary MTD, where those with diminished interoceptive capabilities in being attuned to their bodily sensations. With an understanding of how touch car influence interoceptive properties (#22 above), it is possible for MT to be impactful in reducing primary MTD in these cases. Such information can set a course for improved intervention strategies by giving patients a richer understanding of their voice condition

- 24. Geri T, Antonello V, Minacci M, et al. Manual therapy: exploiting the role of human touch. Musculoskel Sci Pract 2019; 44:102044.
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In this article, the authors look at the evidence for shared decision-making having the effect of improving patient outcomes. Though the evidence for improved outcomes with the inclusion of shared decision-making is limited, they point to

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Evident in even very recent works, historical mechanisms of actions are stated

- without questioning the veracity and comprehensiveness of those explanations. 33. Fulton B. The placebo effect in manual therapy. Handspring Pub Ltd; 2015.
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The author summarizes the premise of meta-therapy regarding voice therapy, seeing successful interventions as more significant than the applied techniques. Meta-therapy involves concepts handed down from supervisors and peers and self-acquired information on the context of the technique application, and it gives excellent clinical value. While Helou does not mention LMT, the concept of metatherapy is a substantial part of the umbrella of influencers of its application.