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+15878858911
editorial-office@sciformat.ca

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MUSCLE TENSION DYSPHONIA AMONG PROFESSIONAL VOICE USERS: CURRENT DIAGNOSTIC AND THERAPEUTIC APPROACHES

Jakub Buziak (Corresponding Author, Email: Kbuziak11@gmail.com)

Franciszek Raszeja Municipal Hospital in Poznan, Poland

ORCID ID: 0009-0004-5833-975X

Julita Papińska

Cardinal Stefan Wyszyński University in Warsaw, Warsaw, Mazovia, Poland

ORCID ID: 0009-0007-1758-1373

Szymon Bojanowski

Medical University of Lublin, Poland

ORCID ID: 0009-0005-4264-102X

Katarzyna Cencelewicz

1st Military Clinical Hospital with the Outpatient Clinic, Lublin, Poland

ORCID ID: 0009-0000-5318-4606

Patrycja Bzdziuch

John Paul II Western Hospital, Grodzisk Mazowiecki, Poland

ORCID ID: 0009-0007-6830-0287

Paulina Miciuda

Hospital of the Order of the Bonifraters of St. Jan Grande in Krakow, Poland

ORCID ID: 0009-0006-0719-5260

Aleksandra Wojtera

Franciszek Raszeja Municipal Hospital in Poznan, Poland

ORCID ID: 0009-0007-7288-676X

Patrycja Małyszczek

Cardinal Stefan Wyszyński University in Warsaw, Warsaw, Mazovia, Poland

ORCID ID: 0009-0006-7324-573X

Franciszek Cezary Pastuszak

Cardinal Stefan Wyszyński University in Warsaw, Warsaw, Mazovia, Poland

ORCID ID: 0009-0003-8064-5377

Magdalena Lengier

Cardinal Stefan Wyszyński University in Warsaw, Warsaw, Mazovia, Poland

ORCID ID: 0009-0007-3402-6005

ABSTRACT

Background: Muscle Tension Dysphonia (MTD) is a common functional voice disorder characterized by excessive laryngeal and paralaryngeal muscle activity during phonation. The disorder negatively affects vocal quality, communication, occupational functioning, and quality of life.

Aim: This narrative review summarizes current evidence regarding the pathophysiology, epidemiology, diagnosis, and treatment of Muscle Tension Dysphonia.

Material and methods: A PRISMA-informed narrative literature review was conducted using PubMed, Scopus, and Web of Science databases. Publications from 2003–2025 concerning functional dysphonia, laryngeal muscle tension, diagnostic methods, psychosocial factors, and voice therapy were analyzed.

Results: Current evidence indicates that MTD is a multifactorial disorder associated with excessive laryngeal tension, maladaptive vocal behaviors, occupational voice overuse, stress, and impaired respiratory-phonatory coordination. Diagnostic assessment should include perceptual voice evaluation, videolaryngostroboscopy, acoustic analysis, and patient-reported outcome measures. Behavioral voice therapy remains the primary evidence-based treatment. Manual circumlaryngeal therapy, semi-occluded vocal tract exercises, respiratory retraining, and psychosocial interventions may additionally improve clinical outcomes.

Conclusions: MTD is a complex biopsychosocial disorder requiring individualized and interdisciplinary management. Further high-quality studies are necessary to standardize diagnostic criteria and optimize therapeutic protocols.

KEYWORDS

Muscle Tension Dysphonia; Functional Voice Disorder; Voice Therapy; Laryngeal Tension; Dysphonia; Vocal Rehabilitation

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1. Introduction

Voice production is a complex physiological process requiring coordinated interaction among respiratory, laryngeal, resonatory, and articulatory systems. Disturbances within these mechanisms may result in functional voice disorders characterized by altered phonation without identifiable structural pathology. Among these conditions, Muscle Tension Dysphonia (MTD) represents one of the most frequently diagnosed functional voice disorders in contemporary phoniatric and laryngological practice (Ferrán et al., 2024).

MTD is characterized by excessive activity of intrinsic and extrinsic laryngeal musculature leading to inefficient phonation, strained voice quality, vocal fatigue, throat discomfort, and increased phonatory effort (Ferrán et al., 2024; Thomas et al., 2025; Rezaee Rad & Khoddami, 2024). The disorder may occur as primary MTD without visible laryngeal pathology or as secondary MTD developing in response to structural or neurological vocal fold abnormalities (Ferrán et al., 2024).

Available studies indicate that MTD is a multifactorial biopsychosocial disorder associated with maladaptive phonatory behaviors, occupational voice overuse, respiratory dysfunction, vocal fatigue, and psychosocial stressors (Ferrán et al., 2024; Rezaee Rad & Khoddami, 2024; Dietrich et al., 2008; Behlau et al., 2015). Occupational dysphonia is particularly prevalent among professional voice users, especially teachers exposed to prolonged vocal loading and unfavorable acoustic environments (Bhattarai et al., 2024; Roy et al., 2005; Atalik et al., 2025).

Psychological factors additionally appear to influence symptom severity and treatment outcomes. Increased prevalence of stress, anxiety, depressive symptoms, and communicative participation limitations has been observed among patients with functional voice disorders (Dietrich et al., 2008; Nguyen-Feng et al., 2021).

Despite increasing scientific interest in MTD, substantial heterogeneity persists regarding diagnostic criteria, objective assessment methods, and therapeutic protocols (Ferrán et al., 2024; Thomas et al., 2025). Contemporary management therefore requires multidimensional assessment integrating perceptual, instrumental, acoustic, aerodynamic, and psychosocial evaluation methods (Patel et al., 2018).

1.1 Study Objectives

Particular attention was given to mechanisms contributing to the development of MTD, the clinical utility of currently available diagnostic methods, and the effectiveness of contemporary therapeutic interventions. The review additionally aimed to identify limitations within current scientific literature and areas requiring further investigation. The review focused on the role of multidimensional diagnostic evaluation and combined therapeutic approaches in the management of MTD. The review also evaluated the potential benefits of combined therapeutic interventions in the management of MTD. Occupational and psychosocial factors contributing to the pathogenesis and persistence of Muscle Tension Dysphonia were also analyzed.

2. Materials and methods

2.1. Study design

This study was designed as a narrative literature review using PRISMA-informed methodology.

2.2. Literature search strategy

Electronic searches were conducted using PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar databases. The following search terms were used: “Muscle Tension Dysphonia”, “functional voice disorder”, “voice therapy”, “manual circumlaryngeal therapy”, “surface electromyography”, “semi-occluded vocal tract exercises”, “vocal fatigue”, and “occupational voice disorder”. Priority was given to systematic reviews, meta-analyses, randomized controlled studies, and clinical guidelines published between 2015 and 2025.

2.3. Inclusion and exclusion criteria

The inclusion criteria comprised peer-reviewed English-language publications involving adult populations diagnosed with Muscle Tension Dysphonia, as well as studies evaluating diagnostic or therapeutic interventions related to functional voice disorders. Systematic reviews, meta-analyses, observational studies, and clinical recommendations were preferentially included in the analysis. Exclusion criteria involved case reports, pediatric-only studies, non-peer-reviewed publications, and studies unrelated to functional dysphonia.

3. Results of Literature Analysis

3.1. Pathophysiology and Classification of Muscle Tension Dysphonia

Understanding the complex pathophysiology of MTD is essential for accurate diagnosis and effective therapeutic planning. Available literature indicates that Muscle Tension Dysphonia is a multifactorial functional voice disorder involving abnormal activation of intrinsic and extrinsic laryngeal musculature (Ferrán et al., 2024; Rezaee Rad & Khoddami, 2024). Excessive muscular tension contributes to inefficient phonation, supraglottic compression, elevated laryngeal posture, and increased vocal effort (Ferrán et al., 2024).

Contemporary literature increasingly supports a biopsychosocial model of MTD pathogenesis. Functional dysphonia appears to result from interactions among biomechanical dysfunction, maladaptive phonatory behaviors, occupational voice overuse, respiratory dyscoordination, vocal fatigue, and psychosocial stressors (Ferrán et al., 2024; Dietrich et al., 2008; Behlau et al., 2015).

Hyperfunctional phonation may progressively impair aerodynamic efficiency and neuromuscular control mechanisms involved in normal voice production (Zhang, 2016). Chronic vocal overloading additionally contributes to persistent vocal fatigue and compensatory muscular tension patterns (Welham & Maclagan, 2003).

Psychological distress represents another important contributing factor. Increased prevalence of anxiety, stress, and depressive symptoms has been observed among patients with functional voice disorders (Dietrich et al., 2008; Nguyen-Feng et al., 2021). These psychosocial factors may exacerbate muscular hyperfunction and negatively influence treatment outcomes (Nguyen-Feng et al., 2021).

Current classifications distinguish primary MTD, which occurs without identifiable structural laryngeal pathology, and secondary MTD, which develops as a compensatory mechanism associated with organic or neurological laryngeal disorders (Ferrán et al., 2024). Despite increasing scientific interest in functional voice disorders, substantial heterogeneity persists regarding pathophysiological definitions and phenotypic classification systems for MTD (Ferrán et al., 2024; Thomas et al., 2025).

3.2. Epidemiology and Risk Factors

In addition to biomechanical and functional abnormalities, several demographic, occupational, and psychosocial factors appear to influence the development of MTD. Functional voice disorders affect a substantial proportion of the adult population, particularly professional voice users (Roy et al., 2005). Occupational voice overload is considered one of the most important risk factors for MTD development (Bhattarai et al., 2024; Roy et al., 2005; Atalık et al., 2025).

Teachers constitute a particularly vulnerable population because of prolonged speaking duration, environmental noise exposure, poor classroom acoustics, insufficient vocal recovery, and limited awareness regarding voice hygiene and rehabilitation strategies (Bhattarai et al., 2024; Atalık et al., 2025; Turzyński & Sulikowski, 2019). Previous studies demonstrated that occupational dysphonia negatively affects quality of life, communicative functioning, and work productivity (Atalık et al., 2025).

Additional risk factors associated with MTD include chronic vocal misuse, smoking, laryngopharyngeal reflux, respiratory dysfunction, psychological stress, anxiety disorders, poor vocal hygiene, and inadequate hydration (Dietrich et al., 2008; Behlau et al., 2015; Zhang, 2016). Women additionally appear to demonstrate increased susceptibility to functional voice disorders due to anatomical, hormonal, and occupational factors (Roy et al., 2005).

3.3. Diagnostic Strategies in Muscle Tension Dysphonia

Given the multifactorial nature of MTD, accurate diagnosis requires integration of several complementary assessment modalities. Available studies strongly support multidimensional assessment as the diagnostic gold standard for MTD (Patel et al., 2018). Accurate diagnosis requires integration of perceptual, instrumental, acoustic, aerodynamic, and psychosocial evaluation methods (Ferrán et al., 2024; Patel et al., 2018). The principal diagnostic modalities currently used in the assessment of MTD are summarized in Table 1.

Table 1. Diagnostic Methods Used in Muscle Tension Dysphonia

Diagnostic Method	Clinical Purpose	Main Advantages	Major Limitations
Perceptual voice assessment	Evaluation of vocal quality, strain, breathiness, instability, and phonatory effort	Widely available, inexpensive, clinically practical	Subjective interpretation and inter-rater variability
Videolaryngostroboscopy	Visualization of supraglottic hyperfunction and exclusion of structural pathology	Essential for differential diagnosis and laryngeal visualization	Limited standardization of interpretation
Acoustic voice analysis	Objective measurement of vocal parameters such as jitter, shimmer, CPP, and HNR	Non-invasive quantitative assessment	Weak correlation with subjective symptom severity
Aerodynamic assessment	Evaluation of respiratory-phonatory coordination and airflow efficiency	Provides functional assessment of phonatory mechanics	Limited availability in routine clinical practice
Voice Handicap Index (VHI)	Assessment of psychosocial burden and communicative limitations	Patient-centered evaluation of voice-related quality of life	Dependent on subjective self-report
Surface electromyography (sEMG)	Assessment of excessive laryngeal muscle activity	Potential objective biomarker of muscular tension	Lack of standardized protocols and limited reproducibility
Multidimensional voice assessment	Integration of perceptual, instrumental, acoustic, and psychosocial evaluation methods	Most comprehensive diagnostic approach	Time-consuming and methodologically heterogeneous

Source: authors' own elaboration based on the reviewed literature.

Perceptual voice assessment remains one of the most widely used clinical tools in the evaluation of MTD. Commonly assessed features include vocal strain, roughness, breathiness, instability, reduced vocal endurance, and phonatory effort (Welham & MacLagan, 2003; Van Stan et al., 2015).

Patient-reported outcome measures such as the Voice Handicap Index provide valuable information regarding psychosocial burden and communicative limitations associated with dysphonia (Nguyen-Feng et al., 2021; Behrman et al., 2004).

Videolaryngostroboscopy plays a central role in excluding structural laryngeal pathology and identifying supraglottic hyperfunction patterns characteristic of MTD (Ferrán et al., 2024). Frequently observed findings include false vocal fold constriction, anteroposterior supraglottic compression, elevated laryngeal posture, and irregular vibratory behavior (Ferrán et al., 2024; Rezaee Rad & Khoddami, 2024).

Acoustic analysis additionally provides objective measurements including jitter, shimmer, cepstral peak prominence, and harmonics-to-noise ratio (Lopes et al., 2017). However, correlations between acoustic measurements and subjective symptom severity remain inconsistent (Lopes et al., 2017). Current ASHA recommendations emphasize that instrumental voice assessment should integrate acoustic, aerodynamic, and imaging modalities rather than relying on isolated measurements (Patel et al., 2018).

Surface electromyography has been investigated as a potential objective marker of excessive laryngeal muscle activity (Thomas et al., 2025; Lopes et al., 2017). Nevertheless, methodological variability, limited reproducibility, and absence of standardized protocols currently restrict its routine clinical applicability (Thomas et al., 2025; Wang & Yiu, 2024).

Importantly, no universally accepted diagnostic criteria for MTD currently exist (Ferrán et al., 2024; Thomas et al., 2025). This diagnostic inconsistency contributes substantially to heterogeneity among published studies and complicates comparisons of therapeutic outcomes.

3.4. Therapeutic Approaches

The complexity of MTD pathophysiology necessitates individualized and multidimensional therapeutic management strategies. Behavioral voice therapy remains the first-line treatment modality for MTD, while comprehensive rehabilitation strategies play a crucial role in improving communication and quality of life in patients with voice disorders (Behlau et al., 2015; Turzyński & Sulikowski, 2019; Borowik et al., 2022).

Current therapeutic approaches focus on reducing excessive muscular tension, improving respiratory-phonatory coordination, optimizing vocal efficiency, and modifying maladaptive vocal behaviors (Van Stan et al., 2015; Barsties Latoszek et al., 2024). The major therapeutic interventions currently used in the management of MTD are summarized in Table 2.

Table 2. Therapeutic Approaches Used in Muscle Tension Dysphonia

Therapeutic Approach	Main Therapeutic Goal	Clinical Benefits	Major Limitations
Behavioral voice therapy	Modification of maladaptive phonatory behaviors	Improvement of vocal efficiency and reduction of phonatory effort	Requires patient adherence and long-term practice
Resonant voice therapy	Reduction of excessive laryngeal tension during phonation	Improved voice resonance and vocal comfort	Variable patient responsiveness
Vocal function exercises	Strengthening and balancing laryngeal muscle activity	Improved vocal endurance and stability	Requires regular exercise performance
Respiratory retraining	Optimization of respiratory-phonatory coordination	Reduction of compensatory hyperfunctional behaviors	Limited standardization of protocols
Manual circumlaryngeal therapy	Reduction of excessive extralaryngeal muscle tension	Immediate improvement in laryngeal relaxation and voice quality	Operator-dependent therapeutic outcomes

Therapeutic Approach	Main Therapeutic Goal	Clinical Benefits	Major Limitations
Semi-occluded vocal tract exercises (SOVTEs)	Improvement of vocal fold vibration efficiency	Reduced phonatory effort and enhanced vocal economy	Limited long-term outcome data
Vocal hygiene education	Elimination of harmful vocal behaviors	Prevention of chronic vocal overloading	Dependent on patient compliance
Psychosocial interventions	Reduction of stress, anxiety, and behavioral contributors	Improved treatment adherence and quality of life	Limited evidence regarding isolated efficacy

Source: authors' own elaboration based on the reviewed literature.

Voice therapy protocols commonly include resonant voice therapy, vocal function exercises, respiratory retraining, relaxation techniques, vocal hygiene education, and posture correction strategies (Behlau et al., 2015; Turzyński & Sulikowski, 2019). Increasing evidence supports the effectiveness of manual circumlaryngeal therapy in reducing laryngeal tension and improving vocal quality (Rezaee Rad & Khoddami, 2024; Barsties Latoszek et al., 2024). Meta-analytic findings demonstrated significant improvements in perceptual and patient-reported outcomes following manual therapy interventions (Barsties Latoszek et al., 2024; Pozzali et al., 2024).

Semi-occluded vocal tract exercises additionally demonstrate promising clinical efficacy. These exercises improve vocal fold vibration efficiency by modifying supraglottic pressure and reducing phonatory effort (Pozzali et al., 2024).

Respiratory retraining interventions may further improve vocal efficiency and reduce compensatory hyperfunctional behaviors (Lowell et al., 2022).

Emerging evidence additionally highlights the importance of psychosocial interventions in MTD rehabilitation (Dietrich et al., 2008; Nguyen-Feng et al., 2021). Anxiety reduction, stress management, and behavioral counseling may improve treatment adherence and long-term rehabilitation outcomes (Nguyen-Feng et al., 2021; Portone et al., 2008).

Despite encouraging therapeutic findings, available studies demonstrate substantial variability regarding treatment duration, therapy intensity, outcome measures, follow-up protocols, and patient selection criteria (Rezaee Rad & Khoddami, 2024; Van Stan et al., 2015; Barsties Latoszek et al., 2024). This heterogeneity significantly limits direct comparison of therapeutic efficacy across studies.

4. Discussion

Collectively, the reviewed studies demonstrate that MTD remains a diagnostically and therapeutically challenging functional voice disorder. Available literature supports the conceptualization of Muscle Tension Dysphonia as a complex biopsychosocial functional voice disorder involving interactions among muscular hyperfunction, maladaptive phonatory behaviors, occupational voice demands, respiratory dysfunction, and psychosocial stressors (Ferrán et al., 2024; Dietrich et al., 2008; Behlau et al., 2015).

One of the most important findings emerging from contemporary literature is the absence of universally accepted diagnostic criteria for MTD (Ferrán et al., 2024; Thomas et al., 2025). Although videolaryngostroboscopy, perceptual voice assessment, acoustic analysis, and patient-reported outcome measures are commonly utilized, substantial variability exists regarding diagnostic interpretation and clinical classification (Ferrán et al., 2024; Patel et al., 2018). This diagnostic inconsistency represents a major limitation in current research because it complicates comparison of therapeutic outcomes among studies.

Another important limitation concerns the lack of objective biomarkers capable of reliably quantifying laryngeal muscle tension (Thomas et al., 2025; Wang & Yiu, 2024). Surface electromyography demonstrates theoretical potential; however, methodological heterogeneity, limited reproducibility, and inconsistent electrode placement protocols currently prevent widespread clinical implementation (Behlau et al., 2015). Consequently, MTD diagnosis remains largely dependent on subjective clinical interpretation and multidimensional assessment strategies (Patel et al., 2018). Collectively, these findings suggest that no single diagnostic modality is currently sufficient for comprehensive MTD assessment.

Current evidence consistently supports voice therapy as the primary evidence-based treatment modality (Behlau et al., 2015; Van Stan et al., 2015). Nevertheless, therapeutic protocols remain highly heterogeneous

regarding intervention type, treatment duration, frequency, and outcome assessment (Van Stan et al., 2015; Barsties Latoszek et al., 2024; Pozzali et al., 2024; Sarin & Chatterjee, 2023). Many available studies additionally involve relatively small patient populations and limited long-term follow-up, reducing the overall strength of evidence.

Manual circumlaryngeal therapy, semi-occluded vocal tract exercises, and respiratory retraining appear to demonstrate promising therapeutic efficacy (Barsties Latoszek et al., 2024; Pozzali et al., 2024; Lowell et al., 2022). However, direct comparison between therapeutic approaches remains difficult because of inconsistent study methodologies and absence of standardized rehabilitation protocols.

Psychosocial and occupational factors additionally appear to play a substantial role in symptom persistence and rehabilitation outcomes (Dietrich et al., 2008; Atalık et al., 2025; Nguyen-Feng et al., 2021). Elevated stress levels, anxiety, communicative participation limitations, and occupational vocal overload may contribute both to disease development and reduced treatment responsiveness (Dietrich et al., 2008; Nguyen-Feng et al., 2021). These findings support the need for interdisciplinary management integrating otolaryngologists, speech-language pathologists, psychologists, and physiotherapists. Overall, available evidence supports multidisciplinary and individualized treatment approaches as the most effective management strategy for MTD.

From an occupational health perspective, MTD represents a clinically important disorder among professional voice users exposed to chronic vocal loading and adverse acoustic environments. The disorder may negatively influence communication efficiency, professional performance, psychosocial well-being, and work-related quality of life. These findings further support the necessity for interdisciplinary management strategies integrating medical, behavioral, and occupational interventions.

The current body of literature is additionally affected by several methodological limitations. These include the predominance of observational studies, limited numbers of randomized controlled trials, relatively small sample sizes, publication bias toward positive therapeutic outcomes, inconsistent inclusion criteria, lack of standardized outcome measures, and insufficient long-term follow-up data. These limitations reduce the overall generalizability of available findings and emphasize the necessity for larger multicenter randomized studies. Future research should therefore focus on the development of standardized diagnostic criteria, validation of objective tension measurement techniques, creation of unified rehabilitation protocols, long-term assessment of therapeutic outcomes, investigation of psychosocial and occupational determinants of MTD, and identification of predictive factors influencing treatment response. Establishing standardized evidence-based diagnostic and therapeutic algorithms may substantially improve clinical management and rehabilitation outcomes in patients with Muscle Tension Dysphonia. Taken together, contemporary literature suggests that effective management of MTD requires not only reduction of excessive laryngeal tension, but also comprehensive consideration of psychosocial, occupational, and behavioral determinants contributing to dysfunctional voice production.

5. Limitations of the Review

Several limitations of the present review should be acknowledged. First, the available literature concerning Muscle Tension Dysphonia demonstrates considerable methodological heterogeneity regarding diagnostic criteria, treatment protocols, outcome measures, and follow-up duration. This variability limits direct comparison among studies and reduces the overall generalizability of reported findings.

Additionally, a substantial proportion of the included studies consisted of observational investigations with relatively small sample sizes, while high-quality randomized controlled trials remain limited. Publication bias toward positive therapeutic outcomes may also have influenced the interpretation of treatment efficacy. Furthermore, the absence of universally accepted objective biomarkers for laryngeal muscle tension continues to complicate standardization of diagnostic assessment in MTD (Ferrán et al., 2024; Thomas et al., 2025; Wang & Yiu, 2024).

Another limitation involves the narrative nature of this review, which may increase the risk of selection bias despite the use of a structured literature search strategy. Nevertheless, the present review aimed to provide a comprehensive and clinically relevant synthesis of contemporary evidence regarding the diagnosis and management of Muscle Tension Dysphonia.

6. Conclusions

Despite important advances in diagnostic and therapeutic approaches, several challenges remain in the clinical management of Muscle Tension Dysphonia. Current evidence indicates that MTD is a complex biopsychosocial functional voice disorder involving excessive laryngeal muscle tension, maladaptive phonatory behaviors, occupational voice overload, and psychosocial stressors. Accurate diagnosis requires multidimensional assessment integrating perceptual, instrumental, acoustic, and psychosocial evaluation methods. Behavioral voice therapy remains the primary evidence-based treatment modality, while manual circumlaryngeal therapy, respiratory retraining, and semi-occluded vocal tract exercises demonstrate promising therapeutic efficacy. Nevertheless, substantial heterogeneity regarding diagnostic criteria, treatment protocols, and outcome measures continues to limit standardization of clinical management. Further high-quality randomized controlled studies are therefore necessary to establish evidence-based diagnostic and therapeutic guidelines for patients with Muscle Tension Dysphonia. Particular attention should be given to professional voice users, in whom occupational vocal demands may substantially contribute to symptom persistence and reduced quality of life.

Author Contributions:

Conceptualization, J.B.; methodology, J.B., J.P.; literature search, J.P., S.B., K.C., P.Mi.; formal analysis, J.B.; writing—original draft preparation, J.B.; writing—review and editing, J.B., M.L., P.Ma.; visualization, F.P., A.W., P.B. The authors have read and agreed to the published version of the manuscript.

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