

The Biber Protocol® and NMES in the Treatment of Dysphagia and Myasthenia Gravis

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Executive Summary

The Biber Protocol® employs physiologically informed neuromuscular electrical stimulation (NMES) as an adjunct to skilled swallowing therapy. Swallowing involves over 36 muscles and 6 cranial nerves, and dysphagia can result from weakness, incoordination, or impaired timing.

Key Points:

- Integrating functional swallowing during stimulation
- Custom programming ensures individualized, targeted intervention
- Ongoing reassessment optimizes outcomes

Real-World Evidence:

Over one million treatments have been delivered globally, supporting safety and efficacy when applied according to protocol.

In MG Patients:

- NMES can be applied safely under careful monitoring
- Documented improvements observed in:
 - Bolus control
 - Hyolaryngeal excursion
 - Penetration/aspiration
 - Mealtime endurance

Overview of the Biber Protocol®

Structured, physiologically driven NMES targets swallowing muscles with task-specific activation.

Key Principles:

- Functional swallowing during stimulation (active, not passive)
- Custom programming tailored to patient needs
- Continuous clinical reassessment

NMES and Myasthenia Gravis (MG)

MG is an autoimmune disorder affecting neuromuscular transmission, leading to fatiguable skeletal muscle weakness and often dysphagia.

Clinical Considerations:

- Literature is mixed: some reports caution against repeated stimulation, while others demonstrate functional improvements
- Risk mitigation in the Biber Protocol®:
 - Symptom-based dosing
 - Monitoring for fatigue
 - Task-specific activation
 - Interdisciplinary collaboration

MG Pathophysiology:

- Reduced acetylcholine receptor availability
- Decreased neuromuscular transmission safety factor
- Fatiguability with repeated activation

Peripheral NMES:

- Repeatedly depolarizes motor nerves
- Corrects synaptic transmission defects
- Could theoretically worsen fatiguability, though data is inconclusive and limited (2 case reports, 1 clinical trial underway)

Clinical Experience and Real-World Evidence

In practice, NMES has been applied to MG patients with observed outcomes including:

- Improved bolus control
- Increased hyolaryngeal excursion
- Reduced penetration/aspiration
- Improved mealtime endurance

Theoretical Considerations:

- NMES could risk rapid fatigue but may enhance motor unit recruitment at partially functional junctions
- Swallowing muscles may respond differently than limb muscles
- Carefully titrated parameters are critical

Clinical Recommendations for MG Population

Key Recommendations:

- Perform baseline swallowing assessment before NMES
- Begin with conservative intensity and short duration, increasing gradually
- Monitor fatigue and adjust therapy in real-time
- Combine NMES with task-specific swallowing exercises
- Maintain interdisciplinary communication (neurologist, SLP, dietitian)
- Evidence from other neurogenic dysphagia populations should not be assumed to generalize to MG due to its unique pathophysiology

NMES in MG: Evidence-Based Perspective

When applied within a structured, physiologically guided protocol, NMES represents a targeted and evidence-informed intervention for dysphagia. In patients with myasthenia gravis (MG), NMES can be considered safely under careful clinical monitoring and individualized judgment. It should not be categorically dismissed based on limited data. As Carl Sagan noted, “absence of evidence is not evidence of absence.” Scientific understanding is continually evolving, and historical assumptions—such as the belief that exercise exacerbates fatigue in amyotrophic lateral sclerosis (ALS)—have been challenged and revised through rigorous investigation. Similarly, emerging evidence may redefine the role of NMES in MG-related dysphagia.

Conclusion

Applied within a structured, physiologically guided protocol, NMES is a targeted, evidence-informed intervention for dysphagia. In MG patients, NMES can be safely considered with careful clinical monitoring. Emerging evidence may continue to refine its role and expand therapeutic possibilities.

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