



The Effects of Neuromuscular Electrical Stimulation for Individuals with Dysphagia: An Evidenced Based Systematic Review

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Background

- For the purpose of this systematic review, a total of 521 adult participants diagnosed with dysphagia were used.
- 7 out of 10 articles indicated that NMES demonstrated a statistically significant improvement compared to the traditional dysphagia therapy. 2 articles reported that traditional and NMES therapy outcomes were comparable in terms of swallowing safety. 1 article compared sensory and motor approaches in NMES and concluded that motor approach is more beneficial for individuals with dysphagia.
- Traditional approach to dysphagia treatment involves compensatory interventions, including postural changes, swallowing maneuvers, and dietary restrictions and modifications, as well as rehabilitation treatments such as swallowing exercises.
- Neuromuscular electrical stimulation (NMES) technique is a dual-channel electrotherapy system designed specifically for the treatment of pharyngeal dysfunction. According to Moon and Shune (2012) "NMES is used frequently in physical medicine and rehabilitation facilities to support muscle strength development, including increasing muscle size, range of motion, and endurance; prevent or minimize muscle atrophy and fibrosis; and enhance muscle re-education, including increasing sensory awareness and volitional muscle control"
- The purpose of this project is to present a systematic review of the outcome of NMES when compared to traditional swallowing therapy.
<https://www.youtube.com/watch?v=1eoGXT5tpuc>

Literature Search

PICO Question: Will adults with dysphagia, given Neuromuscular Electrical Stimulation therapy compared to traditional therapy have greater reduction of swallowing dysfunction?

Literature Search:

- A list of the databases that were searched. CINAHL, EBSCO, ResearchGate, Pub Med
- Search terms: Vital Stim, Neuromuscular Electrical Stimulation, Dysphagia, Traditional Therapy
- Additional Criteria: Treatment based studies
Articles in English,
Articles published 2001 or later
Patients diagnosed with dysphagia
- Exclusion Criteria: Systematic Review
Not including statistics

Results

	Pretest			Posttest		
	TT	NMES	TT + NMES	TT	NMES	TT + NMES
Overall Severity of Dysphagia		2.8			2.2	
SSA	40.9	38.7	39.5	30.1	29.6	21.4
ANS	3	2.5	3	3	3.5	3
FOIS	1.23	885	2	2.214	4.4375	4.55
Safe Swallow Percentage		72			89	

- 6 studies used FOIS (Functional Oral Intake Scale). 4 compared NMES with TT. 1 compared TT to a combination of NMES and TT. A final study used FOIS for patients only receiving a combination of TT and NMES, progressing from a pretest score of 2 to a 6.
- An additional scale is the 6 point Actual Nutrition Scale (ANS) was used to compare TT, NMES, and TT combined with NMES and found that there was only growth in the NMES condition.
- The Overall Severity of Dysphagia scale was used in an additional study where a higher score indicates higher severity of dysphagia.
- The Standardized Swallowing Assessment (SSA) was used to compare NMES, TT, and NMES combined with TT showing lower scores on post-test in all conditions indicating less prevalence of dysphagia. The highest decrease was in the NMES combined with TT condition, showing that this condition was more effective for the participants.
- Additionally, one study used Safe Swallow Percentage to compare pre to post for only the NMES condition. This study found a higher percentage of swallow safety when patients received the NMES treatment.

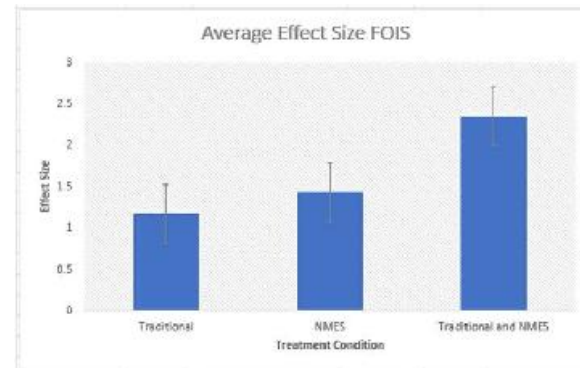
Patient Characteristics

- Across studies participants ages ranged from 18-91 years.
- Total number of 520 of participants contained 193 females and 327 males.
- Participants suffered from dysphagia due to various disorders including stroke, Parkinson's Disease, vagus nerve pathologies, dysarthrias.
- Number of participants in the studies ranged from 18 to 120.
- Participants demonstrated various range of severity (mild, moderate and severe dysphagia).

Dosage

TT was provided to patients for 30-60 minutes per day, with an average of 45 minutes. There were between 12 and 15 sessions in total, with an average of 13.5 sessions (13-14 sessions). NMES was provided to patients for 20- 60 minutes per day, with an average of 40 minutes. There were between 10 and 20 sessions in total, with an average of 15 sessions in total. NMES treatment was dominantly provided at a pulse rate of 80 Hz and was used with 700 μ s duration.

Research shows that there is an overall improvement of swallowing when using NMES compared to TT. Additional results were obtained from these studies which shows that NMES paired with TT has greater effect size.



TT=1.17, NMES=1.435, TT+ NMES=2.357

Clinical Recommendations

- Research shows there is greater improvement in swallowing when using NMES compared to TT, as NMES has a greater effect size.
- Based on the current research, we would recommend using NMES paired with TT for patients with dysphagia. We would also recommend using NMES with cognitively impaired patients since they have deficits in attention, memory and processing which is necessary for traditional therapy.
- The individual's dysphagia severity and tolerance for NMES will provide more accurate dosage information.
- Limitations:** The studies within this systematic review contains adult populations only. Additionally, NMES can only be used with clients who have dysphagia in the oral and pharyngeal phases, as the electrodes cannot access the esophagus for dysphagia in the esophageal phase.
- Future Research:** Additional research needs to be conducted on the effects of NMES paired with TT compared to only TT or NMES. Future research should also focus on whether there is a carryover when using neuromuscular electrical stimulation paired with traditional swallowing therapy.