

| Reference | Subjects/ etiology | Treatment groups | Outcome / Follow-up | Evaluation techniques | Results | Comment |
|--|--|---|--|---|--|---|
| Heijnen et al, 2012. Included in Tan, et al meta-analysis) | 109 patients randomized, 88 analyzed -Patients with Parkinson's disease confirmed by a neurologist. . -With oropharyngeal dysphagia with preserved swallowing reflex. -Stable course of Parkinson's disease. . | <u>Group 1</u> N=28. Mean age 69 yrs. Received traditional logopedic dysphagia treatment. <u>Groups 2 &3:</u> n=27 and n=30. Mean age 66 yrs. Received the same treatment as group 1 plus NMES using the Chattanooga device; 80 Hz, 700 µs Group 2 NMES (Motor level) group 3 sensory level current. - All groups received 13-15 treatment sessions 30 min each, 5 days/wk., for 3-5 wks. | Quality of life and swallow function. Follow-up: 3 months post treatment. Open- label. | -Functional Oral Intake Scale (FOIS) -SWAL-QOL -MD. Anderson dysphagia inventory (MDADI) -Dysphagia Severity Scale (DSS) | All three groups showed significant improvement on DSS and small positive effect on QoL. -No significant difference between the treatment groups. | -Improper randomization (quasi randomized). -Nonblinding. -3 months follow-up. -109 patients randomized, 88 analyzed -No effect on QOL. -Included patients with moderate severity. -Parkinson's disease; results, may not be generalized to severe cases. -Treatment period 3 weeks may be insufficient. |
| Baijens et al, 2013. | 90 patients with stable course of Parkinson's disease. -With oropharyngeal dysphagia with preserved swallowing reflex. | Similar to Heijnen et al's study (?? overlap) Patients in all three groups received daily one 30 minute treatment sessions for 5 days a week, for 3 weeks. | Swallow functions. Immediate evaluation. Blinded evaluation. | Fiberoptic endoscopic evaluation of swallowing (FEES) -Videofluoroscopy (VFS). | Statistically significant improvement. No significant difference between groups. | -Quasi-randomization (consecutive allocation). - No significant improvement with the addition of electrical stimulation to the traditional logopedic dysphagia treatment. |
| Ryu et al, 2009. (Included in Tan, et al meta-analysis) | 46 patients (2006-2007) with head and neck cancer due to mixed etiology -With surgical or radiation therapy. -Dysphagia due to treatment. -VFS confirmed dysphagia. -On restricted diet, stable vital signs. | <u>Experimental group</u> N=21 Mean age 63 yrs. NMES (Chattanooga device) 30 min, 80 Hz, 700 ms pulse duration + Conventional rehab. For 30 min <u>Control group</u> N=25 Mean age 60.8yrs. Sham TENS low intensity + 30 min Conventional rehab. .10 sessions of 60 min All: 5 days/wk for 2 wks. | Swallow function. Immediate evaluation: 2 weeks post inclusion Double-blind | -Functional dysphagia scale (FDS) - Clinical dysphagia scale (CDS) - American Speech - Language- hearing Association national outcome measurement system swallowing level scale (ASHA NOMS) - M.D. Anderson dysphagia inventory (MDADI) | Statistically significant improvement in FDS in NMES group (p 0.039). No significant difference between the two groups in the other measures. | -Double -blind -Very small, short follow-up, -43% lost to follow-up. |
| Long et al, 2013. | 60 patients with nasopharyngeal carcinoma, and radiation induced stricture and safe swallowing (2007-2010). | <u>Group 1:</u> N=31 Combination of NMES (using Chattanooga device; 80 Hz, 700 µs, and 0-25 mA, 5days/wk for 4 months) + Balloon dilatation + routine rehabilitation for 4 months <u>Group 2 (controls , N=29):</u> Routine rehabilitation 15 cycles of exercise 3 times/day | Swallow function Evaluated after 4 months of treatment. Blinding not discussed. | Functional assessment using -Water swallow test (WST) -Videofluoroscopic swallowing study (VFSS) | 2 patients in group 1 experienced adverse events (chest pain and bleeding). | -Small study, blinding not discussed, and the experimental group received both NMES and balloon dilatation in addition to the routine rehab, which does not allow determining whether the positive effect was due to the balloon dilatation, the NMES or the combination of both. |