<table>
<tr><th>Study</th><th>Design</th><th>Analysis</th><th>Results</th><th>Validity/ Conclusions</th></tr>
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<td>Tan et al, 2013.

Study type:
Meta-analysis.

Aim:
To assess the overall efficacy of neuromuscular electrical stimulation (NMES) in dysphagia rehabilitation compared to traditional therapy.

Primary outcome:
•Functional Oral Intake scale (FOIS),
•Swallow Functional Scoring System (SFSS),
•American Speech-Language-Hearing Association National Outcome Measurement system (ASHA NOMS), and
•M.D. Anderson Dysphagia Inventory (MDADI).

search:
1996-2011.

N of studies included:
N=7 studies with a total of 291 patients.</td>
<td>Inclusion criteria:
•Clinical trials including RCTs and quasi experimental trial comparing NMES vs. traditional therapy for adult patients with dysphagia of any etiology.
•The transcutaneous electrodes placed on the neck.
•Outcome is a measurable dependent variable.

Exclusion criteria:
•Non-concurrent clinical controlled trial.
NMES electrodes not placed on the anterior neck.
•Studies involving children.

Data extracted by 2 or more reviewers?
Yes.

Addressed publication bias?
No.

Evaluation of study quality:
Yes.</td>
<td>Tested for homogeneity?
Yes.

Analysis method:
Both the fixed- and random-effect measures were used.

Sensitivity analysis:
Yes.</td>
<td>
•4 of the 7 trials were quasi-randomized.
•3 trials compared NMES combined with traditional therapy (TT) vs. TT alone.
•The TT sessions were 30 minutes or one hour at a frequency of 5 sessions/ week for 3 weeks.
•NMES was applied for 1 hour /day in 6 studies and 30 min. in one trial. NMES treatment sessions varied between 13 to 18 sessions. For stroke patients.
•In 4 studies the duration of dysphagia from onset was >20 days, 3 months, and 6 months.
•Variable scales were used for outcomes including: FOIS, SFSS, ASHA NOMS, and MDADI.

Pooled results for swallowing scores
<table>
<tr><th></th><th>NMES
N subjects</th><th>Traditional therapy
N subjects</th><th>Standard mean difference (SMD)</th></tr>
<tr><td colspan="4">All etiologies (7 studies)</td></tr>
<tr><td>All studies</td><td>175</td><td>116</td><td>0.77 (0.13,1.41)</td></tr>
<tr><td>Sensitivity analysis 1*</td><td>112</td><td>80</td><td>0.50 (0.20,0.80)</td></tr>
<tr><td>Sensitivity analysis 2 **</td><td>102</td><td>70</td><td>0.46 (0.15,0.77)</td></tr>
<tr><td colspan="4">Stroke (4 studies)</td></tr>
<tr><td>Al 4 studies</td><td>103</td><td>72</td><td>0.78 (-0.22, 1.78)</td></tr>
<tr><td colspan="4">Non-stroke : Cancer and Parkinson’s disease (3 studies)</td></tr>
<tr><td></td><td>72</td><td>44</td><td>0.74 (0.17,1.30)</td></tr>
</table>
*Excluding Freed study that had more superior outcomes
** Excluding studies with obvious methodological flaws

No complications were reported.
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<td>The meta-analysis included 7 small to very small trials, 4 of which were quasi-randomized. Four of the seven studies included had high risk of bias, and the rest had their limitations. The meta-analysis had generally valid design and analysis, but its results have to be interpreted with caution as any MA is only as good as the studies it includes.</td>
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