Non-invasive transcranial brain stimulation combined with speech language therapy versus non-invasive transcranial brain stimulation only for people with acquired neurogenic communication disorders enhances Neurorehabilitation

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Authors Research Design
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Al-Janabi et al., (2014) Examine the effects of MIT and rTMS on language function for people with aphasia.

Case Study
- N=2
- 49 and 65 year old
- Between 18 and 20 months post left frontal-stroke
d- Moderate to severe non-fluent Broca’s aphasia

Purpose
- Phrase Repetition
- Verbal Fluency Task
- Automatic Speech Task
- Naming/Reading Task

Dependent Variable
- P1: Phrase Repetition
- rTMS > baseline, p = 0.02 (delayed)
- Sham rTMS vs. baseline, p=0.50
- 0.77
- Follow-up vs. baseline, p = 0.91
- Verbal Fluency Task
- rTMS vs. baseline, p = 0.09
- Automatic Speech Task
- rTMS increased 14% to 18%
- Naming/Reading Task
- rTMS reduced 80% to 70%

Results
- P1: Phrase Repetition
- rTMS vs. baseline, p = 0.43
- Sham rTMS vs. baseline, p = 0.23

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Cotelli et al., (2011) Examines the effects of anodal tDCS and rTMS on language tasks for people with aphasia.

Case Study
- N=3
- 41, 45, and 71 year old
- Between 1 and 4.5 years post stroke
- Chronic aphasia

Purpose
- Picture Naming
- Response Time

Dependent Variable
- P1: Naming Correct comparison to baseline

Results
- P1: Percentage Correct

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Naeser et al., (2011) Examines the effects of supression of right pars triangularis (PT) and right pars opercularis (POp) on expressive language abilities for people with aphasia.

Case Study
- N=8
- Ranging in age from 44 to 76 years old
- Between 1.5 and 30 years post cerebrovascular accident
- Chronic non-fluent aphasia

Purpose
- Picture Naming
- Response Time

Dependent Variable
- P1: Naming Correct comparison to baseline

Results
- P1: Percentage Correct

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Vines, Norton, & Schlaug (2011) Examines the effects of anodal ICDs and MIT on speech recovery for people with aphasia.

Randomized Control Trial
- N=6
- Ranging in age from 30-81 years old
- At least 1 year post-onset of ischemic stroke
- Moderate to severe non-fluent Broca’s aphasia

Purpose
- Sum duration of fluency measured as percentage of change (proportional change) from before the first three stimulation sessions to after the last of three stimulation sessions

Dependent Variable
- P1: MIT > sham, p = 0.02, effect size as Cohen’s d = 1.98
- A paired-samples t-test comparing pre-anodal performance to pre-sham performance did not yield a significant result p = 0.077

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Case Scenario
Heather is a first year graduate student. She hopes to work with adults with neurogenic communication disorders after she graduates. During her Neurogenic Communication Disorder course, she thought aphasia couldn’t be fixed, but rather only merely improved upon. She thought that intervention approaches were limited to Semantic Feature Analysis, anoma training, and Motoric Intonation Therapy. However, when searching for research articles, she came across a new approach called non-invasive transcranial brain stimulation. She wondered if this approach may demonstrate improvements for her clients she hopes to have one day.

PICO Question
Does non-invasive transcranial brain stimulation combined with speech therapy (I), focusing on either words or phrases, as opposed to only rTMS (C), enhance expressive verbal performance (as measured with picture naming, automatic speech, and response time) (O) in people with acquired neurogenic communication disorders (P).

External evidence: Research shows that non-invasive brain stimulation can be combined with speech therapy techniques to augment expressive speech skills used to enhance speech recovery. Although researchers agree that more research is still needed to determine the potential effectiveness of non-invasive transcranial brain stimulation. FINISH Research questions that need to be considered include: excitatory vs inhibition stimulation, localization of brain stimulation, most effective time period (post-onset) to apply stimulation, duration of stimulation, and the extent of the carry-over after stimulation has ceased.

Internal evidence to clinical practice: These articles have shown that non-invasive transcranial brain stimulation can be effective with both MIT and anoma training.

Evidence internal to client: The client wishes regain expressive communication skills as close to premorbid functionality as possible. The desire is to be able to carry on a conversation with family members.

What treatment am I going implement: Since UNR has a Department of Psychology where the Cognitive and Brain Sciences Group is currently using ICDs and investigating the possibility of rTMS, I choose to use non-invasive transcranial brain stimulation in combination with a speech therapy technique to enhance the recovery of verbal speech.

Method
Search terms: non-invasive brain stimulation, transcranial brain stimulation enhances speech, MIT therapy, speech therapy and non-invasive brain stimulation, and non-invasive brain and speech.


Appraisal: Eight research articles were appraised and evaluated for validity and clinical significance.