Aphasia and language rehabilitation has been a topic of interest for decades. Neurologists, speech pathologists, and a cascade of other clinical professionals have sought to better understand, diagnose, and treat language deficits, particularly those that are a consequence of cerebrovascular accident; however, whether it is due to the limitations of technology or the human imagination, little research has been done until recently regarding structural rehabilitation of the brain. Noninvasive brain stimulation represents a modern solution to a problem that has plagued humanity for millennia: how can we rebuild and rehabilitate the functioning of the brain?

The two most common forms of noninvasive brain stimulation, transcranial direct current stimulation (tDCS) and transcranial magnetic stimulation (TMS) function by using electricity and magnetism, respectively, to either activate or inhibit specific regions of the brain.

Noninvasive Brain Stimulation OR TMS OR Noninvasive Brain Stimulation OR TMS OR tDCS AND Aphasia OR tDCS AND Language

We conducted an electronic search of the following electronic databases using predefined Boolean search terms, as outlined below:

<table>
<thead>
<tr>
<th>Databases Searched</th>
<th>Boolean Search Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pubmed</td>
<td>Noninvasive Brain Stimulation OR TMS OR tDCS AND Language</td>
</tr>
<tr>
<td>EBSCO</td>
<td>Noninvasive Brain Stimulation OR TMS OR tDCS AND Communication</td>
</tr>
<tr>
<td>Ovid</td>
<td>Noninvasive Brain Stimulation OR TMS OR tDCS AND Language</td>
</tr>
<tr>
<td>CINAHL</td>
<td>tDCS AND Aphasia</td>
</tr>
<tr>
<td>ProQuest</td>
<td>tDCS AND Language</td>
</tr>
</tbody>
</table>

Following an initial search of all aforementioned databases, each article was independently reviewed by two reviewers. Studies were initially screened based on their title and abstract review. Subsequently each study was screened via a full text review to identify studies of adequate relevance, and lastly, each study’s quality was appraised. Inter-rater reliability was at or above 85% for all steps of the review process, and discrepancies were resolved via consensus.

Quality Appraisal
All included studies were identified as being of good quality. This determination was based on their research methodology, rigor of statistical analysis, and overall clinical significance to our population of interest.

Strengths of Included Studies |
 Adequately controlled for confounding variables such as sequencing and time
 All stimulation was accompanied by evidence-based intervention methods
 Participants, assessors, and analysts were all blinded to experimental groups and outcomes

Weaknesses of Included Studies |
 While typical, sample sizes were relatively small
 Few studies accompanied their stimulation with functional imaging
 Persistent doubt regarding the ideal location of stimulation and anodal/cathodal array

Studies Collected Through Initial Search (n=578) |
 Studies Included After Title and Abstract Review (n=49)
 Studies Excluded After Title and Abstract Review (n=529)
 Studies Included After Full Text Review (n=18)
 Studies Excluded After Full Text Review (n=31)
 Studies of Highest Quality (n=15)

The selected studies represent a mix of TMS and tDCS stimulation. While the former is currently more ubiquitous and accepted, it is important not only to assess the efficacy of each treatment independently, but to determine whether one is preferable over the other. Despite the need for further research and the weaknesses of the studies already outlined, a number of conclusions can be drawn from the available research:

1. Both tDCS and TMS appear to have a significant impact on naming accuracy, fluency, and conversational ability when coupled with therapy.
2. tDCS appears to be more effective than TMS in rehabilitating language post-stroke, though there is significant variability in placement of anodes/cathodes.
3. Further research is necessary to determine the most effective placement of stimulation array, as well as most complementary intervention protocol.