Study objective and summary result
This study tested the hypothesis that deep-repetitive transcranial magnetic stimulation (rTMS) of the anterior cingulate cortex (ACC) or the posterior superior insula (PSI) can provide analgesia in cases of central neuropathic pain (CNP) after stroke or spinal cord injury (SCI), but it found that such stimulation does not alleviate CNP.

What is known and what this paper adds
CNP after stroke or SCI is difficult to treat. Some studies have suggested that stimulation of the ACC or insula can alleviate neuropathic pain, but this study shows that rTMS of the ACC or PSI does not alleviate CNP after stroke or SCI.

Participants and setting
This study analyzed data for 100 patients with CNP secondary to stroke or SCI (45% female; mean age, 55.02 ± 12.13 years). This study was conducted through a University of São Paulo hospital between March 2013 and August 2016. These participants had no ACC or right PSI lesions.

Design, size, and duration
This double-blind trial used electronic randomization to allocate the participants into groups receiving deep rTMS to the ACC (ACC-dTMS), deep rTMS to the PSI (PSI-dTMS), sham rTMS to the ACC, or sham rTMS to the PSI in a ratio of 2:2:1:1, respectively. The participants received daily stimulation for 5 days and then weekly stimulation until week 12. The participants reported their pain intensities on an 11-point rating scale at baseline, during the treatment period, and after the final stimulation session.

Primary outcome measures
The primary outcome was between-group comparisons of reported pain intensities after the final stimulation session.

Main results and the role of chance
Ninety-eight participants completed the trial. The treatment groups reported similar pain intensities at the end of the study. Despite the negative results for clinical pain relief, ACC stimulation caused significant anxiety-suppressant effects, while PSI-dTMS triggered significant changes in sensory thresholds in the painful area.

Harms
Pain after simulation was the most prevalent adverse event.

Bias, confounding, and other reasons for caution
The participants varied in their CNP etiologies.

Generalizability to other populations
This study’s single-center nature may limit the generalizability of the results.

Study funding/potential competing interests
This study was funded by Brainsway and the University of São Paulo. Some authors report receiving scholarships from the Brazilian government. Go to Neurology.org/N for full disclosures.

Trial registration number
NCT01932905 on ClinicalTrials.gov.
Insular and anterior cingulate cortex deep stimulation for central neuropathic pain: Disassembling the percept of pain
Neurology 2019;92.e2165-e2175 Published Online before print April 5, 2019
DOI 10.1212/WNL.0000000000007396

This information is current as of April 5, 2019

Updated Information & Services
including high resolution figures, can be found at:
http://n.neurology.org/content/92/18/e2165.full

References
This article cites 47 articles, 8 of which you can access for free at:
http://n.neurology.org/content/92/18/e2165.full#ref-list-1

Citations
This article has been cited by 2 HighWire-hosted articles:
http://n.neurology.org/content/92/18/e2165.full##otherarticles

Subspecialty Collections
This article, along with others on similar topics, appears in the following collection(s):
All CBMRT/Null Hypothesis
http://n.neurology.org/cgi/collection/all_cbmrt_null_hypothesis
Central pain
http://n.neurology.org/cgi/collection/central_pain
Neuropathic pain
http://n.neurology.org/cgi/collection/neuropathic_pain
TMS
http://n.neurology.org/cgi/collection/tms

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
http://www.neurology.org/about/about_the_journal#permissions

Reprints
Information about ordering reprints can be found online:
http://n.neurology.org/subscribers/advertise

Neurology® is the official journal of the American Academy of Neurology. Published continuously since 1951, it is now a weekly with 48 issues per year. Copyright © 2019 American Academy of Neurology. All rights reserved. Print ISSN: 0028-3878. Online ISSN: 1526-632X.