Clinical Policy Title: Transcranial magnetic stimulation

Clinical Policy Number: 09.02.10

Effective Date: July 1, 2018
Initial Review Date: May 1, 2018
Most Recent Review Date: June 5, 2018
Next Review Date: June 2020

Related policies:
- CP# 09.02.06 Neurological and brain injury life skills and rehabilitation
- CP# 04.02.10 Electroconvulsive therapy
- CP# 09.02.01 Vagus nerve stimulation
- CP# 09.01.10 Somatosensory evoked potentials test
- CP# 12.01.06 Depression treatment during pregnancy
- CP# 10.02.05 Treatment-resistant depression
- CP# 03.03.08 Intravenous lidocaine infusion for neuropathic pain
- CP# 03.02.03 Acupuncture

Coverage policy

Select Health of South Carolina considers the use of transcranial magnetic stimulation for chronic pain to be investigational/experimental and, therefore, not medically necessary (O’Connell, 2018; Goudra, 2017).

Alternative covered services:

- Analgesic medications, including non-steroidal anti-inflammatory drugs.
- Physical therapy.
- Psychotherapy, especially cognitive behavioral therapy.

ABOUT THIS POLICY: Select Health of South Carolina has developed clinical policies to assist with making coverage determinations. Select Health of South Carolina’s clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of “medically necessary,” and the specific facts of the particular situation are considered by Select Health of South Carolina when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. Select Health of South Carolina’s clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. Select Health of South Carolina’s clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, Select Health of South Carolina will update its clinical policies as necessary. Select Health of South Carolina’s clinical policies are not guarantees of payment.
• Narcotics, especially in life-limiting conditions.
• Acupuncture, in some conditions.

Background

Acute pain is a normal reaction within the nervous system which often signals a possible injury or illness, often encouraging one’s immediate attention (National Institute of Neurological Disorders and Stroke, 2017). Chronic pain differs both because the cause may not be obvious and because of its persistence. Chronic pain may last long after the original source of the pain has been addressed. Chronic pain may be initially caused by an injury such as to a joint or to the back, or from a chronic condition, or the initial cause may be difficult or impossible to identify due to a lack of known history of injury or perceivable signs of harm to the body. Common chronic pain conditions include headache, low back pain, cancer, arthritis, damage to the peripheral nerves or to the nervous system, and psychogenic pain. More than one chronic pain condition may exist simultaneously. Chronic pain may be accompanied by anxiety or depression. Many chronic pain conditions are found in older adults. Chronic pain is a serious public health problem because of its effect on quality of life, its contributions to disability, and the challenges in treating it. Many medications have limitations, harmful side effects, and a potential for misuse.

Transcranial magnetic stimulation is a noninvasive method of brain stimulation. The technique involves placement of a small coil over the scalp and passing a rapidly alternating current through the coil wire which produces a magnetic field that passes unimpeded through the brain. Depending on stimulation parameters (frequency, intensity, pulse duration, stimulation site), repetitive transcranial magnetic stimulation to specific cortical regions can either increase or decrease the excitability of the affected brain structures. The procedure is usually carried out in an outpatient setting while a person is awake, and does not require anesthesia or analgesia. Transcranial magnetic stimulation has been investigated in the treatment of various disorders and is an accepted approach for treatment-resistant depression. Initial research suggests that transcranial magnetic stimulation may be effective in reducing pain perception in healthy adults and in patients with various types of pain conditions, such as neuropathic pain. Theoretically, it does not affect the source of the pain but the individual’s experience of the pain. An extended effect could be a reduction in an individual’s reliance on potentially harmful pain treatments.

Searches

Select Health of South Carolina searched PubMed and the databases of:
• UK National Health Services Centre for Reviews and Dissemination.
• Agency for Healthcare Research and Quality’s National Guideline Clearinghouse and other evidence-based practice centers.
• The Centers for Medicare & Medicaid Services (CMS).
We conducted searches on March 27, 2018. Search terms were: “transcranial magnetic stimulation,” “chronic pain,” “headache,” and “migraine.”

We included:

- **Systematic reviews**, which pool results from multiple studies to achieve larger sample sizes and greater precision of effect estimation than in smaller primary studies. Systematic reviews use predetermined transparent methods to minimize bias, effectively treating the review as a scientific endeavor, and are thus rated highest in evidence-grading hierarchies.

- **Guidelines based on systematic reviews.**

- **Economic analyses**, such as cost-effectiveness, and benefit or utility studies (but not simple cost studies), reporting both costs and outcomes — sometimes referred to as efficiency studies — which also rank near the top of evidence hierarchies.

**Findings**

Most research on transcranial magnetic stimulation for pain has examined efficacy, but not optimal device parameters or cortical targets, or the potential differences in response to transcranial magnetic stimulation between healthy persons and those with chronic pain. A Cochrane review (O’Connell, 2018) that included 42 studies of transcranial magnetic stimulation found very low-quality evidence for short-term effects on chronic pain and quality of life with single doses of high-frequency repetitive transcranial magnetic stimulation of the motor cortex. Multiple sources of bias may have limited the validity of the findings. There was no evidence for application to the dorsolateral prefrontal cortex as effective for reducing pain intensity in chronic pain. Confirming a previous review last updated in 2014, the authors stated that a need remains for larger, rigorously designed studies, including with longer treatment periods. Goudra (2017) finds that the treatment is efficacious, but concludes similarly to O’Connell, recommending further research with more standardized treatment length and frequency, to determine treatment parameters. Cruccu’s (2017) publication on the European Academy of Neurology guidelines on central neurostimulation therapy in chronic pain conditions found weak evidence for transcranial magnetic stimulation of the primary motor cortex in neuropathic pain and fibromyalgia, or of the dorsolateral prefrontal cortex, and arrived at the same conclusion. Lan (2017) found no effect of treatment on chronic migraine in four included studies, and a positive effect on migraine with aura in a single fifth study. However, longer follow-up time is needed. Shirahige (2017) found no evidence of efficacy for migraine.

Both documents listed below under Local Coverage Determinations disallow transcranial magnetic stimulation for any indication other than depression.

**Policy updates:**

None.
Summary of clinical evidence:

<table>
<thead>
<tr>
<th>Citation</th>
<th>Content, Methods, Recommendations</th>
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<tbody>
<tr>
<td>O’Connell (2018)</td>
<td><strong>Key points:</strong></td>
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</tbody>
</table>
| Non-invasive brain stimulation techniques for chronic pain | • Little to no efficacy was found. Multiple sources of bias appear to exist in the included studies.  
• Larger samples and more rigorous study designs that include longer treatment periods are necessary to make a full assessment. |
| Cruccu (2017)                    | **Key points:**                   |
| European Academy of Neurology guidelines on central neurostimulation therapy in chronic pain conditions | • Weak evidence was found for transcranial magnetic stimulation of the primary motor cortex in neuropathic pain and fibromyalgia, or of the dorsolateral prefrontal cortex  
• Further research with larger, more rigorous study design is necessary. |
| Goudra (2017)                    | **Key points:**                   |
| Repetitive transcranial magnetic stimulation in chronic pain: A meta-analysis | • Nine trials with 183 patients in each of the groups were included in the analysis. The decrease in pain scores with repetitive transcranial magnetic stimulation was 1.12 (95% confidence interval [CI], 1.46 – 0.78) (fixed effects, I = 0, p < 0.001) and in sham controls was 0.28 (95% CI, 0.49 – 0.07) (fixed effects, I = 0, p = 0.01).  
• The pooled mean drop in pain scores with therapy was higher by 0.79 (95% CI being 0.26 – 1.33) (fixed effects, I = 0, p < 0.01).  
• A source of bias was highly variable duration and frequency of treatment, but publication bias was unlikely (Egger’s test, X-intercept = 0.13, p = 0.75).  
• The authors conclude that the treatment is efficacious, but that the duration and frequency of repetitive transcranial magnetic stimulation therapy vary widely and require standardization. |

References

Professional society guidelines/other:


Peer-reviewed references:


**CMS National Coverage Determinations (NCDs):**

No NCDs identified as of the writing of this policy.

**Local Coverage Determinations (LCDs):**


**Commonly submitted codes**

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy. This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

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<th>Description</th>
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<td>subsequent delivery and management, per session</td>
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<td>90869</td>
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<td>subsequent motor threshold re-determination with delivery and management</td>
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<td>G0295</td>
<td>Electromagnetic therapy, to one or more areas, for wound care other than</td>
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