Medical Policy
Navigated Transcranial Magnetic Stimulation (nTMS)

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Policy Number: 596
BCBSA Reference Number: 2.01.90

Related Policies
- Magnetoencephalography and Magnetic Source Imaging, #137
- Sensory Evoked Potentials, #211

Policy
Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity
Medicare HMO BlueSM and Medicare PPO BlueSM Members

Navigated transcranial magnetic stimulation is INVESTIGATIONAL for all purposes, including but not limited to the preoperative evaluation of patients being considered for brain surgery, when localization of eloquent areas of the brain (eg, controlling verbal or motor function) is an important consideration in surgical planning.

Prior Authorization Information

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<th>Outpatient</th>
<th>Inpatient</th>
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<tr>
<td>Commercial Managed Care (HMO and POS)</td>
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CPT Codes / HCPCS Codes / ICD-9 Codes
The following codes are included below for informational purposes. Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member’s contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.
CPT Codes

<table>
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<th>CPT codes:</th>
<th>Code Description</th>
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<tr>
<td>0310T</td>
<td>Motor function mapping using noninvasive navigated transcranial magnetic stimulation (nTMS) for therapeutic treatment planning, upper and lower extremity.</td>
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Description
Navigated transcranial magnetic stimulation (nTMS) is a noninvasive imaging method for the evaluation of eloquent brain areas. Transcranial magnetic pulses are delivered to the patient as a navigation system calculates the strength, location, and direction of the stimulating magnetic field. The locations of these pulses are registered to a magnetic resonance imaging (MRI) image of the patient’s brain. Surface electromyography (EMG) electrodes are attached to various limb muscles of the patient. Moving the magnetic stimulation source to various parts of the brain causes the EMG electrodes to respond, indicating the part of the cortex involved in particular muscle movements. For evaluation of language areas, magnetic stimulation areas that disrupt specific speech tasks are thought to identify parts of the brain involved in speech function. nTMS can be considered a noninvasive alternative to direct cortical stimulation (DCS), in which electrodes are directly applied to the surface of the cortex during craniotomy.

Background
Surgical management of brain tumors involves resecting the brain tumor and preserving essential brain function. “Mapping” of brain functions, such as body movement and language, is considered to be most accurately achieved with DCS, an intraoperative procedure that increases operating time and requires a wide surgical opening. Even if not completely accurate compared to DCS, preoperative techniques that map brain functions may aid in planning the extent of resection and the operative approach. Although DCS is still usually performed to confirm the brain locations associated with specific functions, preoperative mapping techniques may provide useful information that improves patient outcomes.

The most commonly used tool for the noninvasive localization of brain functions is functional magnetic resonance imaging (fMRI). fMRI identifies regions of the brain where there are changes in localized cortical blood oxygenation, which correlates with neuronal activity associated with a specific motor or speech task being performed as the image is obtained. The accuracy and precision of fMRI is dependent on the patient’s ability to perform the isolated motor task, such as moving the single assigned muscle without moving others. This may be difficult in patients in whom brain tumors have caused partial or complete paresis. The reliability of fMRI in mapping language areas has been questioned. Guissani et al reviewed several studies comparing fMRI and DCS of language areas and found large variability in sensitivity and specificity of fMRI.(1) The discussion also points out a major conceptual point in how fMRI and DCS “map” language areas. fMRI findings reflect regional oxygenation changes which show that a particular region of the brain is involved in the capacity of interest, whereas DCS locates specific areas in which the activity of interest is disrupted. Regions of the brain involved in a certain activity may not necessarily be required for that activity and could theoretically be safely resected.

Summary
Overall, the literature on navigated transcranial magnetic stimulation (nTMS) is at a very preliminary stage of demonstrating effectiveness. Relatively small studies have demonstrated the distance between nTMS hotspots and direct cortical stimulation (DCS) hotspots for the same muscle. Although the average distance in most studies is 1 cm or less, this does not take into account the degree of error in this average distance, or whether there are missed hotspots. It is difficult to fully verify nTMS hotspots because only exposed cortical areas can be verified with DCS. Limited studies of nTMS to evaluate language areas show a very high rate of false positives, at least in one study. One study has attempted to demonstrate how clinical decision making has been changed as a result of nTMS results. This type of study does not provide strong evidence of the efficacy of nTMS. Based on the limited evidence available and the results of clinical vetting, nTMS is considered investigational for all indications.
Policy History

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Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:
- Medical Policy Terms of Use
- Managed Care Guidelines
- Indemnity/PPO Guidelines
- Clinical Exception Process
- Medical Technology Assessment Guidelines

References