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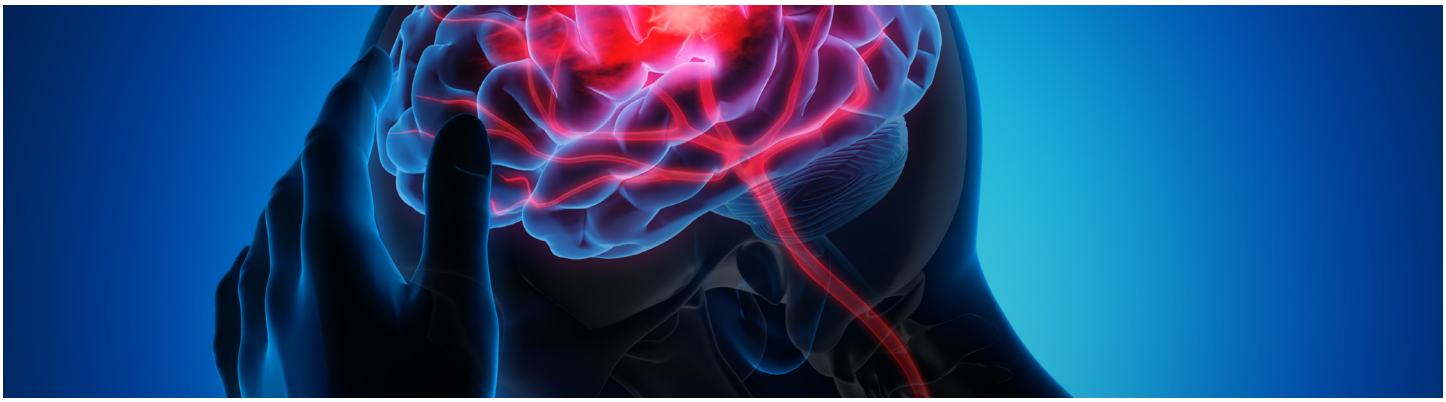
Comparing Neuromodulations Devices

Non-pharmaceutical option for acute headache pain management

People with migraine often seek out alternative and complementary medicine options, but until recently, these options have been limited. Neuromodulation devices are a new class of treatment with a favorable side effect profile and clinical data supporting their use and potential efficacy.



Because the devices are considered durable medical equipment, they require a prescription that can be sent either electronically or by fax. The devices will be shipped to patients upon receipt of the order and confirmation of payment. These devices are not covered by most insurance plans. However, each company has a program to make the device somewhat more affordable and accessible to patients.

Here's how neuromodulation devices compare:

Neuromodulation Devices for Acute Headache Management				
	E-TNS[2]	**nVNS[1], [3]**	**sTMS[1], [5]**	**REN[4]**
About	An external trigeminal nerve stimulator (Cefaly)	A noninvasive vagal nerve stimulator (Gammacore)	A single-pulse transcranial magnetic stimulator (sTMS mini)	A remote electrical neuromodulator (Nerivio)
How the Device Works	On the acute setting, the device stimulates the trigeminal nerve, producing a sedative effect on the nervous system that may relieve headache pain.	The device activates the vagus nerve with mild electrical stimulation, which is thought to modulate pain signals involved in migraine attacks.	The device induces a current to the brain's cortex, disrupting cortical spreading depression (one of the steps in the migraine pathway) and thalamocortical connections.	The device stimulates sensory fibers in the upper arm, which then reach the brainstem and activates a pathway that ultimately inhibits incoming pain messaging.

Neuromodulation Devices for Acute Headache Management				
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How Patients Use the Device	The E-TNS device is attached to an electrode that is applied to the forehead just above the eyebrows via temporary adhesive.	The nVNS device is turned on and positioned on the neck near the vagus nerve with varying intensity[3].	The sTMS device is positioned behind the head, cradling the skull, and a therapeutic pulse is delivered with the push of the button(s)	The REN device is applied to the upper arm and then controlled by an application on a personal phone. With the application, patients can adjust the stimulation intensity as needed and automatically track usage into a migraine diary.
Side Effects	• Irritation at the application site • Fatigue during and after treatment	• Redness at the application site • Facial twitching • Nasopharyngitis	• Lightheadedness • Tingling • Tinnitus	• Redness at the application site • A sensation of warmth or tingling • Arm numbness or muscle spasm on the arm where the device is applied
Use During Pregnancy*	E-TNS is thought to be safe during pregnancy, but there has not been adequate data from clinical trials to support definitive use.	*n*VNS has also been used in patients for other indications without any evidence of harm to the fetus.	There has been a post-marketing study of the sTMS device that included three pregnant women, and all three reported benefit without any complications.	*No information available*
Contraindications	E-TNS should not be used if a patient had any brain or facial trauma within the last three months, a cardiac pacemaker or defibrillator, or implanted or metallic devices in the head.	nVNS should not be used in patients with active implantable devices, metallic stents or screws at or near the neck. It cannot be used if using another device simultaneously. It is contraindicated in patients with active carotid or other atherosclerotic disease, cervical vagotomy, clinically significant hypertension, hypotension, bradycardia, tachycardia, seizure disorder, prolonged QT, cardiac arrhythmia, abnormal baseline EKG, abnormal cervical anatomy or brain tumor.	sTMS should not be used in patients with aneurysm clips or coils, cochlear implants, cerebrospinal fluid shunts, metal implants in the skull, neck, shoulder, arm or hands, metallic heart valves, radioactive seeds or facial tattoos with metallic ink.	REN cannot be used in individuals with a history of congestive heart failure, cardiac or cerebrovascular disease, uncontrolled epilepsy, implanted medical devices or metallic implants.

*While they have not been specifically studied during pregnancy, these devices could potentially be safe therapies.

References:

1. Singh, R., Ailani, J., & Robbins, M. Neuromodulation for Acute and Preventative Therapy of Migraine and Cluster Headache. Headache. 2019;59:33-49.
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For more information on migraine and other headache disorders, visit **AHS' resources hub**. If you are interested in women's health and migraine management, be sure to sign up for our brand new presentation on **A Woman's Migraine Journey**.

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