NEMOS®

t-VNS® for treatment of drug-resistant epilepsy
Drug-resistant epilepsy

Drug-resistant epilepsy is characterized by continued occurrence of seizures, despite appropriate treatment with anticonvulsive drugs.\(^1\) It affects more than 30\% of patients with epilepsy.\(^2\) Few treatment options are currently available for these patients. Apart from surgery and deep brain stimulation, the principal option is invasive vagus nerve stimulation (VNS).\(^3\)

Transcutaneous vagus nerve stimulation – a new treatment option

Invasive VNS has been successfully used for over ten years to treat patients with drug-resistant epilepsy. This involves a surgical procedure in which an electrode is wrapped around the cervical branch of the vagus nerve and a pulse generator is implanted subcutaneously below the clavicle.\(^4,5\)

Transcutaneous vagus nerve stimulation (t-VNS\(^\circledR\)) is a gentle and patient-friendly option for treating drug-resistant epilepsy.

t-VNS\(^\circledR\) uses the fact that the auricular branch of the vagus nerve (ABVN) supplies the skin of the concha of the human ear.\(^6\) This allows for transcutaneous electrical stimulation of the nerve fibers in this area.

The intensity, pulse duration and frequency of the t-VNS\(^\circledR\) stimulation have been optimized to induce signals in the thick, myelinated \(A_\beta\) fibres of the ABVN, as with VNS. Like those of the cervical branch of the vagus nerve, these project directly to the nucleus of the solitary tract (NTS) in the brainstem.\(^7,8\) The NTS is the starting point to activate a complex cerebral network, corresponding closely to that targeted by invasive VNS, and associated with the anticonvulsive effect.\(^6,5,9\)
t-VNS® for treatment of drug-resistant epilepsy uses the transcutaneous vagus nerve stimulator NEMOS®.

NEMOS® consists of a stimulation unit and a dedicated ear electrode, which patients wear like an earphone. Patients treat themselves with NEMOS® in sessions lasting at least an hour, in 3 or 4 sessions a day, for a total of 4 to 5 hours. They adjust the current until they feel a slight tingling sensation at the stimulation site (Aβ fiber activation).

Basically, patients can carry on with their usual everyday activities during the stimulation session, so this form of anticonvulsive therapy is easy to integrate into the patient’s daily routine.
Patients carry out the t-VNS® treatment autonomously and order NEMOS® directly from cerbomed after their doctor provides consultation and a prescription. There is no need of hospitalization. The routine monitoring of treatment is also accomplished on an outpatient procedure.

The costs of the treatment with NEMOS® are currently not covered by health insurance companies. For information on the price, financing options, and our returns policy, please visit our website at www.cerbomed.com or call +49 9131 9202 76 76.

The anticonvulsive effects of transcutaneous vagus nerve stimulation have been demonstrated in various experiments. This includes animal experiments where seizures were induced by administering drugs, while recording epidural EEG. This revealed similar anticonvulsive effects of invasive and transcutaneous stimulation of the vagus nerve.10

Case Series: reduction in seizure frequency in drug-resistant epilepsy.

In a prospective case series, conducted with the Erlangen Epilepsy Centre (Germany), seven patients who had suffered from drug-resistant epilepsy for many years used t-VNS® for nine months. Stimulation was carried out for three hours a day, in sessions of at least an hour each. The primary endpoint of the study was the number of documented seizures. After nine months, a reduction in seizure frequency was found in 5 out of 7 patients. On the basis of investigations carried out so far, the authors of the study assessed t-VNS® as safe and tolerable for long-term use. It may therefore offer an alternative treatment for patients with epilepsy that is refractory to other forms of therapy.11

Like most pharmaceutical and neuromodulatory treatments for drug-resistant epilepsy, t-VNS® is not an acute therapy. For patients who respond to therapy with t-VNS®, the anticonvulsive effect may occur with a latency of some weeks to a few months.
Why NEMOS®?

► No surgical risks

t-VNS® therapy with NEMOS® provides targeted stimulation of the vagus nerve, without the risks of a surgical intervention.

► Minor side effects

t-VNS® with NEMOS® is a therapeutic alternative with minor side effects. An analysis of data from over 220 patients and volunteers, who participated in studies of t-VNS®, showed potential side effects that include itching, dysesthesia, and local pain at the stimulation site. These side effects usually disappear soon after removing the electrode.¹²

► Compliance control

With NEMOS®, stimulation and treatment data are automatically logged. The doctor can assess treatment quality and patient compliance objectively, to supervise and further optimize the therapy.

► Patient controlled therapy

Patients treat themselves with t-VNS® in their familiar environment. The menu-driven operation of the device is so simple that NEMOS® can easily be integrated into the daily routine.
LITERATURE


12. Vigilance data cerbomed GmbH

The transcutaneous vagus nerve stimulator NEMOS® is CE-certified for treatment of epilepsy.

NEMOS® is not approved for use in the U.S.

Indications, contraindications, warnings, and directions for use of NEMOS® can be found in the manual supplied with each device.