

# EBS Therapy:

## A non-invasive stimulation method for patients with visual field loss

*EBS Therapy is a non-invasive, low-risk stimulation method for the treatment of visual field loss. The optic nerve stimulation (ONS) aims at improving the patient's vision by the use of low-dose electrical current pulses that are adjusted to the individual needs of the patient.*

### Fields of application

- Glaucoma
- Ischemic optic neuropathy (ION)
- Other optic neuropathies
- Stroke

### Mode of action

The electrical stimulation has a two-fold effect:

- Neuroprotection: prevents further degeneration of retinal ganglion cells
- Neuroregeneration: supports the regeneration of nerve fibers and neuronal functions



### System components

The system consists of an electrical stimulator and a high-precision EEG amplifier. Patented control electronics enables the communication between the two components of the Patient Unit. The patient wears special goggles and an EEG cap that connect him with the Patient Unit. The therapist monitors the treatment via the Supervisor Unit and adjusts the electrical current pulses according to the EEG data to fit the individual needs of the patient.

### Therapy process

The treatment consists of ten sessions, which take place on ten consecutive working days. One session takes about 70–90 minutes including preparation.

### Costs and coverage

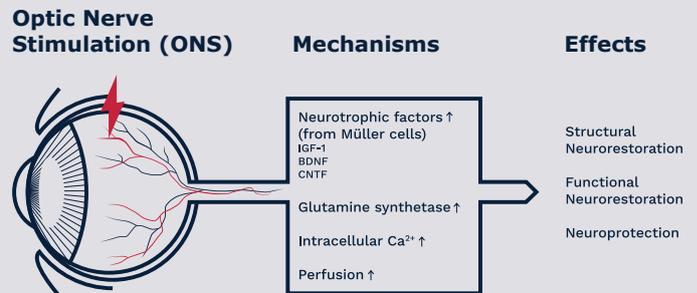
EBS Therapy is an innovative and, for certain indications, the only treatment method designed to improve the vision of patients with visual field loss. At this early stage, patients are not entitled to coverage of the treatment costs of approximately 4,000 Euros; coverage options are decided by the health insurance providers on a case-by-case basis.

## Scientific background

Experimental models of optic neuropathies demonstrate axonal degeneration and loss of retinal ganglion cells after transection or crush of optic nerves in rodents. Preclinical studies have shown the following effects of electrical optic nerve stimulation (ONS) in animal models:

- Markedly increased the number of surviving axotomized retinal ganglion cells for one week after optic nerve transection<sup>1</sup>
- For 12 days promoted both axonal regeneration and survival of axotomized retinal ganglion cells after optic nerve crush<sup>2</sup>
- Upregulated retinal insulin-like growth factor 1 levels
- Increased blood circulation in the retina<sup>3</sup>
- Immediately increased visual evoked potential amplitude impaired by optic nerve crush, with the augmentation often preserved after one week<sup>4</sup>

Thus, the preclinical data document three main effects of ONS: **structural neurorestoration**, **functional neurorestoration**, and **neuroprotection**.



## Clinically proven effectiveness



The clinical effectiveness and safety of ONS in the treatment of optic neuropathies has been addressed in three randomized controlled trials (RCT) in 162 patients.<sup>5-7</sup> The most recent study included 98 patients with optic neuropathy and residual vision. The patients were allocated to active ONS (n=51) and sham ONS (n=47). ONS treatments consisted of repetitive daily sessions for 10 days. High-resolution perimetry was performed before, immediately after ONS, and two months later. Patients within the active ONS groups showed a significantly improved visual field compared to the sham ONS group.

The double-blind RCT verifies that neuromodulatory treatment with ONS is effective in improving visual functions in patients with optic neuropathies. ONS uses phosphenes as individual biomarker in order to ensure appropriate stimulus intensities. While preclinical data in animal models primarily address acute effects, the present trial documents long-term therapeutic efficacy of ONS.

## About EBS Technologies

EBS Technologies GmbH, based in Hennigsdorf, close to Berlin, Germany, develops software and hardware for medical stimulation therapies. The company holds several patents in the EU and the USA, and has successfully completed a clinical trial of EBS Therapy. The EBS Therapy system is approved for the treatment of visual field loss in accordance with EU regulations as a medical device with a CE label. For more information on EBS Technologies, please visit: [www.ebstech.eu](http://www.ebstech.eu)  
More information on EBS Therapy for patients is available under [www.ebs-therapy.com](http://www.ebs-therapy.com)

### Literature

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