One-year follow-up data after electrical optic nerve stimulation (ONS) in progressive glaucoma: improvement of visual field possible

A long-term study regarding the Eyetronic® Therapy by Carl Erb, MD, PhD & Colleagues*

Problem

Some glaucoma patients continue to suffer from progressive visual field loss, despite therapeutic lowering of the intraocular pressure[1–7]. For this group of patients innovative therapies for neuroprotection, such as electrical optic nerve stimulation (ONS), are indicated. Their safety and efficacy have been proven in preclinical studies and clinical data[8–9]. A recent study collected the long-term perimetry results after ONS.

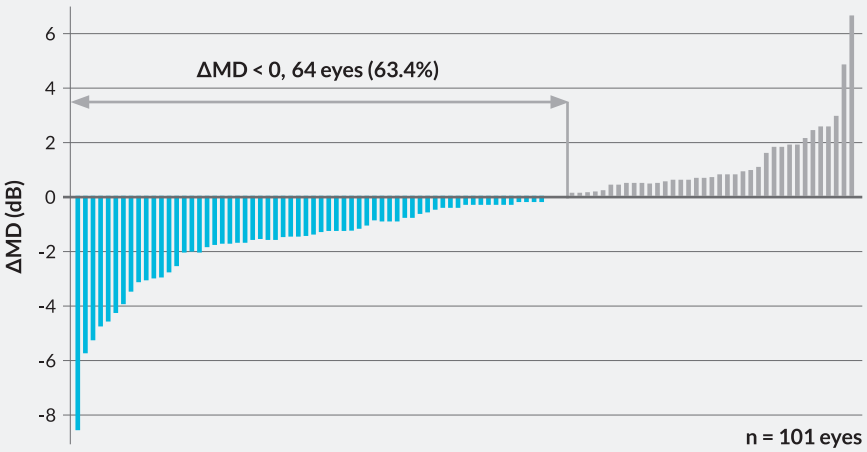
Methodology

70 glaucoma patients aged between 45 and 86 years, who showed a progressive visual field loss despite therapeutic lowering of the intraocular pressure ≤ 18 mmHg, were treated with ONS. The optic nerve was stimulated transcutaneously, with electrical stimulation on both sides until phosphenes were perceived (max. 1.2 mA; 5–34 Hz). Immediately before ONS therapy and about one year after ONS therapy, a standard white/white threshold perimetry of the central visual field was performed (Octopus 300, 30°). Mean defect (MD) was defined as primary outcome parameter.

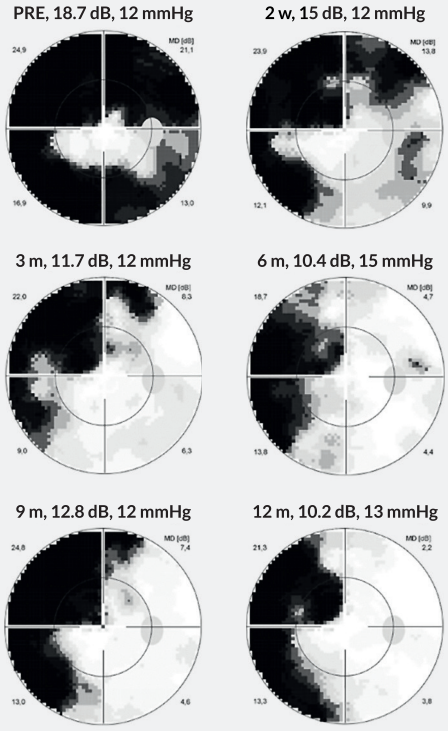
Results

Follow-up perimetry was conducted in 70 patients in 101 eyes 362 ± 45 days (mean ± STD) after ONS therapy. 64 eyes of 49 patients showed no further disease progression or even an improvement after one year.

Changes of mean defect (ΔMD) after optic nerve stimulation (ONS) with Eyetronic®



Visual fields of a patient, right eye, NTG**



In about 63% of treated eyes the progression of the visual field loss could be stopped or even an improvement of the visual field could be observed at the one-year follow-up. The ONS therapy can therefore be a good option to treat visual field loss in glaucomatous progression.

References

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* Source:
Erb C, Eckert S, Gindorf P, Köhler M, Köhler T, Neuhann L, Neuhann T, Salzmann N, Schmickler S, Ellrich J (2022) Electrical neurostimulation in glaucoma with progressive vision loss. Bioelectronic Medicine 8, 6.

** NTG = Normal Tension Glaucoma

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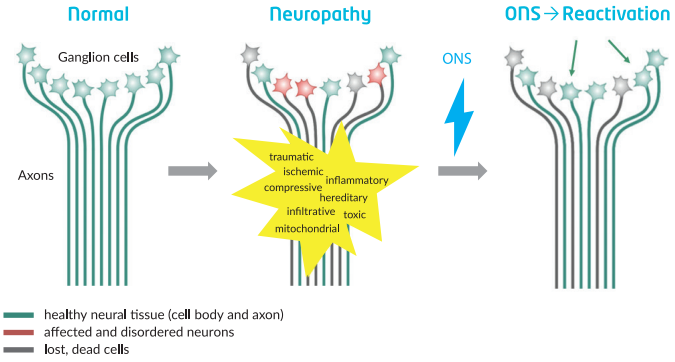
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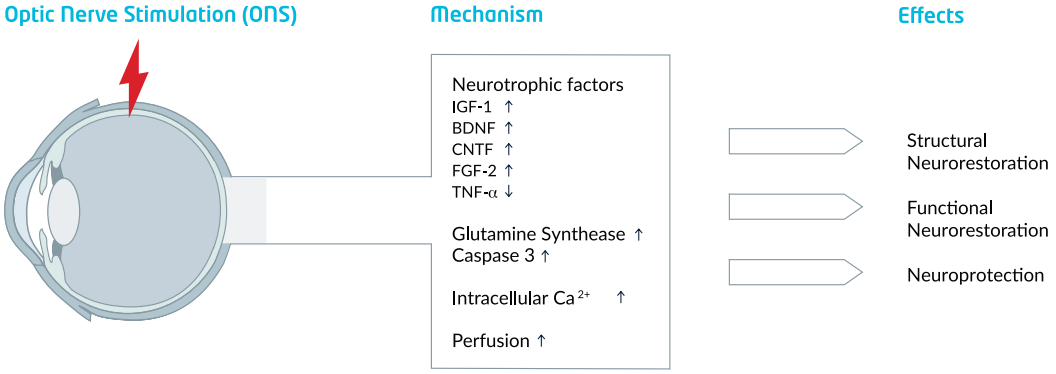
Eyetronic® Therapy – a non-invasive, low-risk and patient-individualized stimulation method for visual field loss

Optic nerve stimulation (ONS) aims to improve glaucoma patients' vision by using low-dose alternating current pulses. The therapy is almost painless and has been proven in clinical studies.[1+2]

Mode of action

The therapy is based on the knowledge that tissue is not always completely destroyed when the optic nerve is damaged. Many cells survive, but are malfunctioning. The innovative optic nerve stimulation (ONS) has a two-fold effect: First, the so-called neuroprotection prevents further degeneration of retinal ganglion cells. This protective effect also forms the basis for the second effect, the so-called neurorestoration. By means of targeted rhythmic current stimuli the metabolism of the nerve cells is stimulated, which protects them from further degeneration and supports the recovery of their neuronal function.





System

The system consists of an electrical stimulator combined with a high-precision EEG amplifier, referred to as Patient Unit. Control electronics enable the communication between the two components of the Patient Unit. The patient wears special goggles and an EEG cap, which are connected to the Patient Unit. The therapist monitors the treatment via a Supervisor Unit and adjusts the treatment according to individual patient needs, based on the perception of phosphenes.

Cost coverage

The therapy is the only treatment method designed to improve the vision in patients with visual field loss for certain indications, but is not yet reimbursed. Coverage may be obtained on a case-by-case basis by submitting individual funding requests to health insurance providers.

Therapy procedure

The treatment consists of ten sessions, which take place on ten consecutive business days. One session takes about 60 minutes including preparation.



The Eyetronic® System is CE marked and available in selected European markets.
The Eyetronic® Therapy and the Eyetronic® System are not yet available in the United States of America.

References
[1] Erb C, Eckert S, Gindorf P, Köhler M, Köhler T, Neuhann L, Neuhann T, Salzmann N, Schmickler S, Ellrich J (2022) Electrical neurostimulation in glaucoma with progressive vision loss. Bioelectronic Medicine 8, 6.
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