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LED Infrared Helmet

Weber Medical

Contents LED Infrared Helmet

LED Infrared Helmet Recharge Your Brain!

Comes with foam pads in order to adjust size and increase wearing comfort

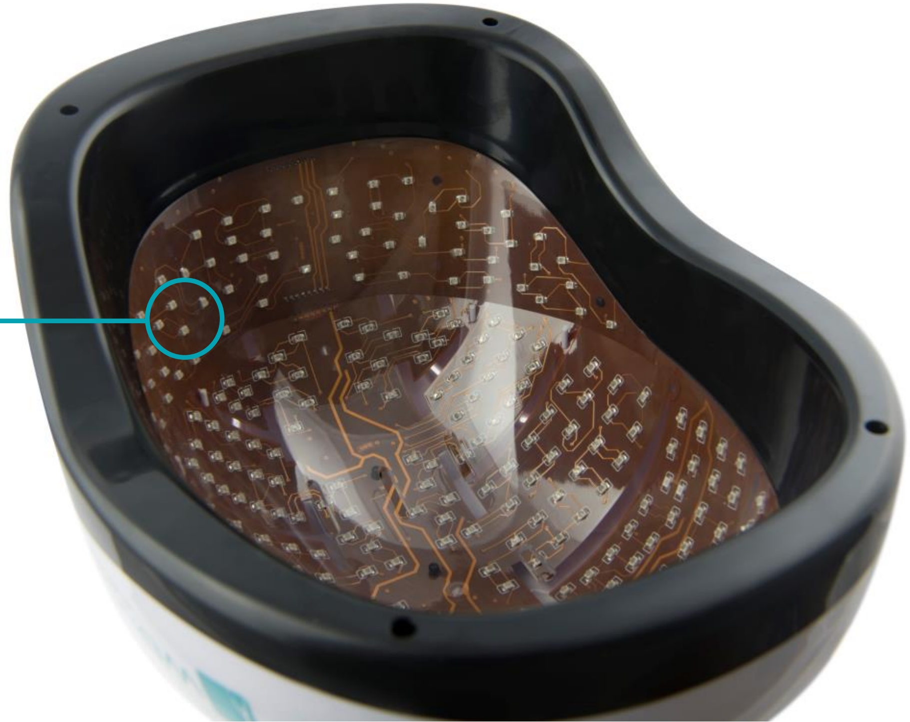
Technical Details

Number of diodes: 320

Wavelength: 810 nm

Power: 50 mW/diode

Total power: 16 W



LED Infrared Helmet Easy Handling

The helmet is as individual as you are!

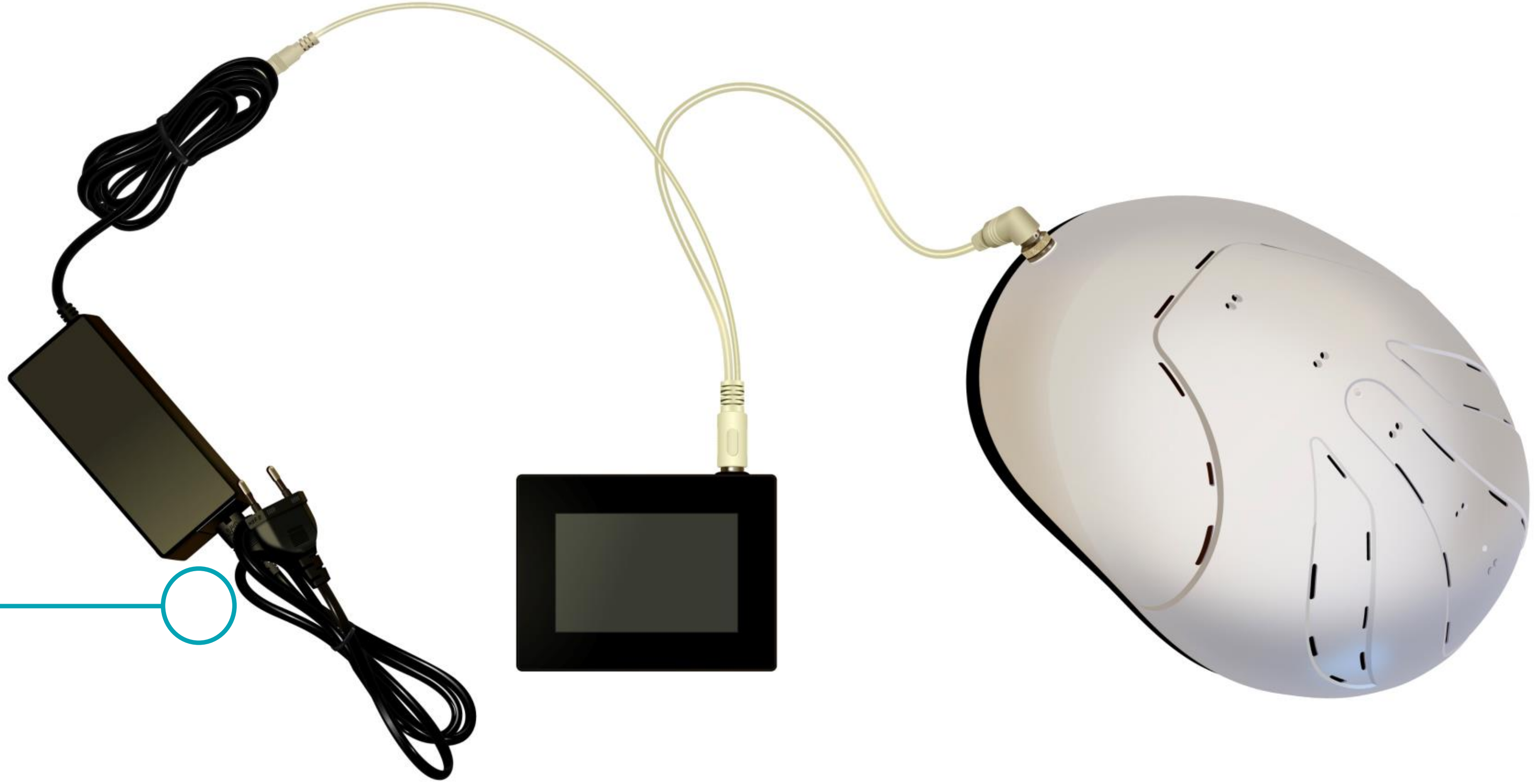
Treatment time: 1-30 minutes

Recommendation: 15-30 minutes (1-2x per day)

4 Intensity levels (25-50-75-100%)

Frequency from 1 Hz to 20,000 Hz

LED Infrared Helmet Simple Setup



Comes with an US adapter

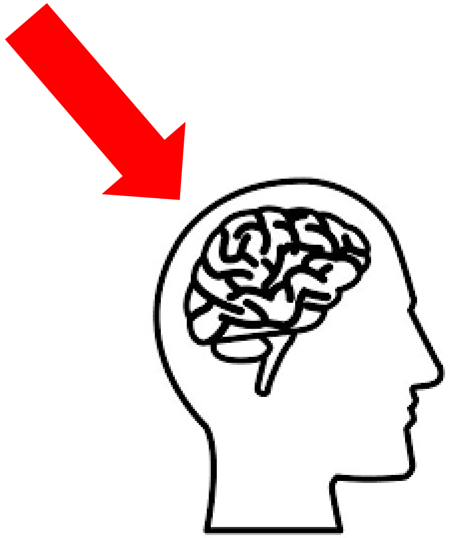
Transcranial Low-Level Laser Therapy Basics

Transcranial Low-Level Laser Therapy (TLLLT) is the direct irradiation of the human brain with highly focused infrared lasers.

Unlike other wavelengths, infrared light has the ability to penetrate bones and to bring light energy to the targeted brain areas.

Light energy is absorbed by different types of cells to trigger a broad range of intra-cellular effects.

LED therapy is non-invasive, painless and non-thermal.



Why infrared light?

The optimum wavelength for max. skull penetration is between 805 nm and 830 nm (infrared).

Studies show that the light reaches a depth of 4-5 cm past skull (or 3 cm into brain tissue)

Mechanisms How PBM affects cellular activity in the brain

Stimulation of the mitochondrial respiratory chain (cytochrome c oxidase) → Increases ATP production

Release of NO by photodissociation vasodilatory effects →

- Improves lymphatic flow = Increased cerebral blood flow
- Activation of beneficial cellular pathways

Brief increase in reactive oxygen species → Stimulates cytoprotective, anti-oxidant and anti-apoptotic effects in cells

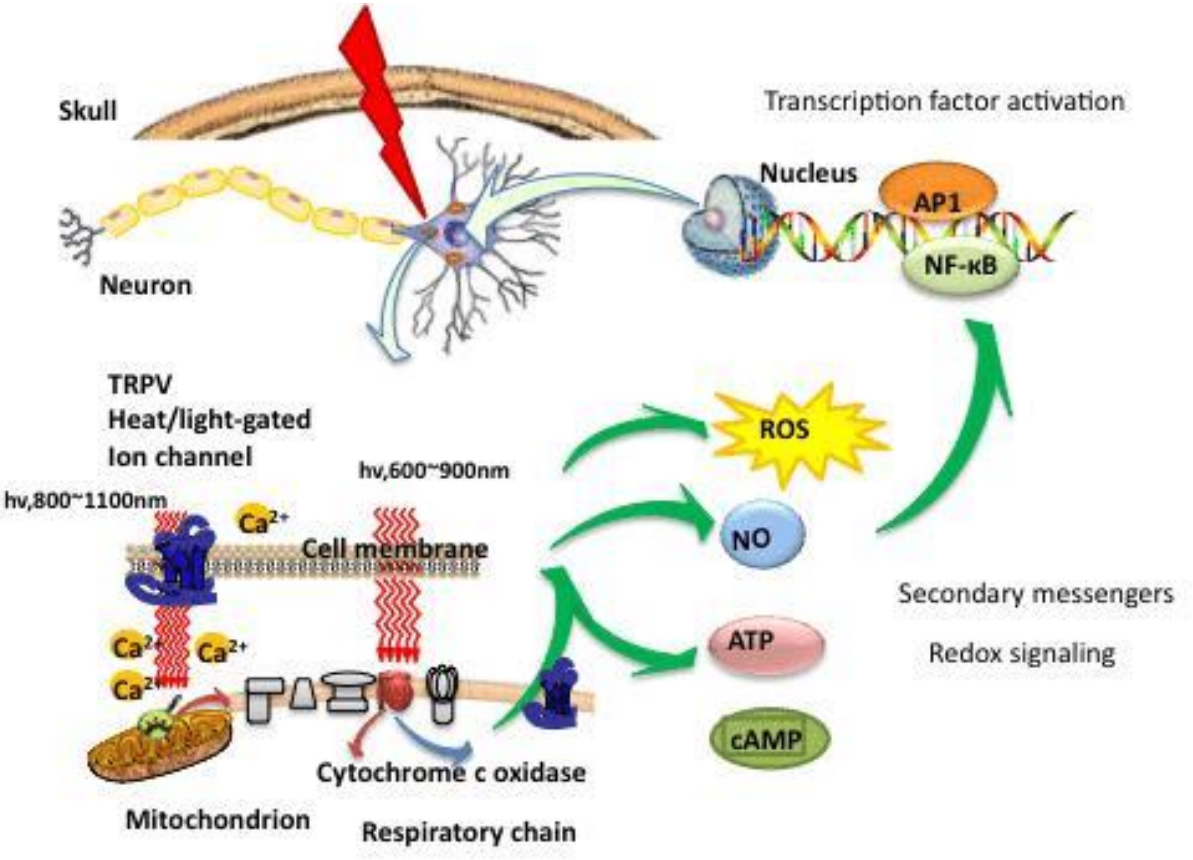
Improved oxygen availability and oxygen consumption

Activation of signaling pathways and transcription factors that cause long-lasting changes in protein expression

Mechanisms The important role of molecular photoreceptors

Molecular and intracellular mechanisms of transcranial low-level laser (light) or photobiomodulation

Michael R. Hamblin, Shining light on the head: Photobiomodulation for brain disorders, BBA Clinical (2016)



Cytochrome c oxidase and **heat-gated ion channels** are two of the most important molecular photoreceptors or chromophores inside neuronal cells. They absorb photons that penetrate into the brain.
The signaling pathways and activation of transcription factors lead to the eventual effects of PBM in the brain.

AP1 = activator protein 1

ATP = adenosine triphosphate

Ca2+ = calcium ions

cAMP = cyclic adenosine monophosphate

NF-kB = nuclear factor kappa B

NO = nitric oxide

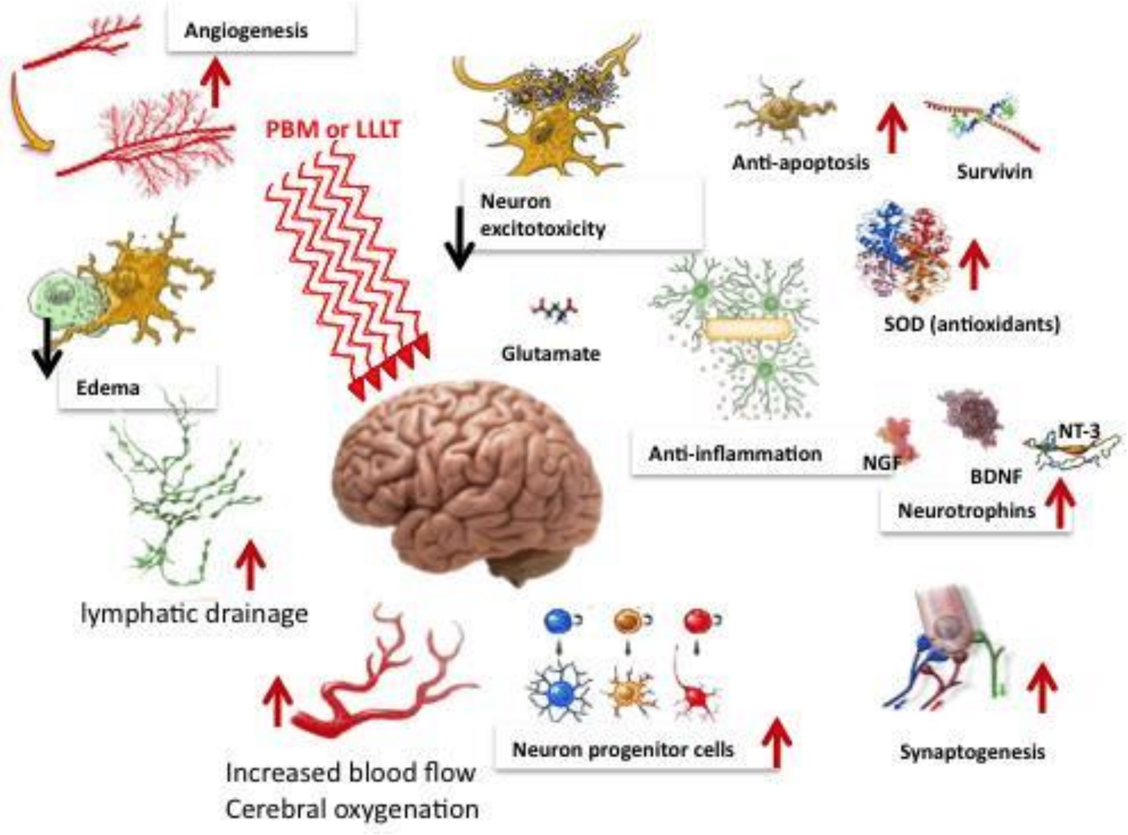
ROS = reactive oxygen species

TRPV = transient receptor potential vanilloid

Mechanisms How PBM benefits brain disorders

Tissue specific processes that occur after PBM and benefit a range of brain disorders

Michael R. Hamblin, Shining light on the head: Photobiomodulation for brain disorders, BBA Clinical (2016)



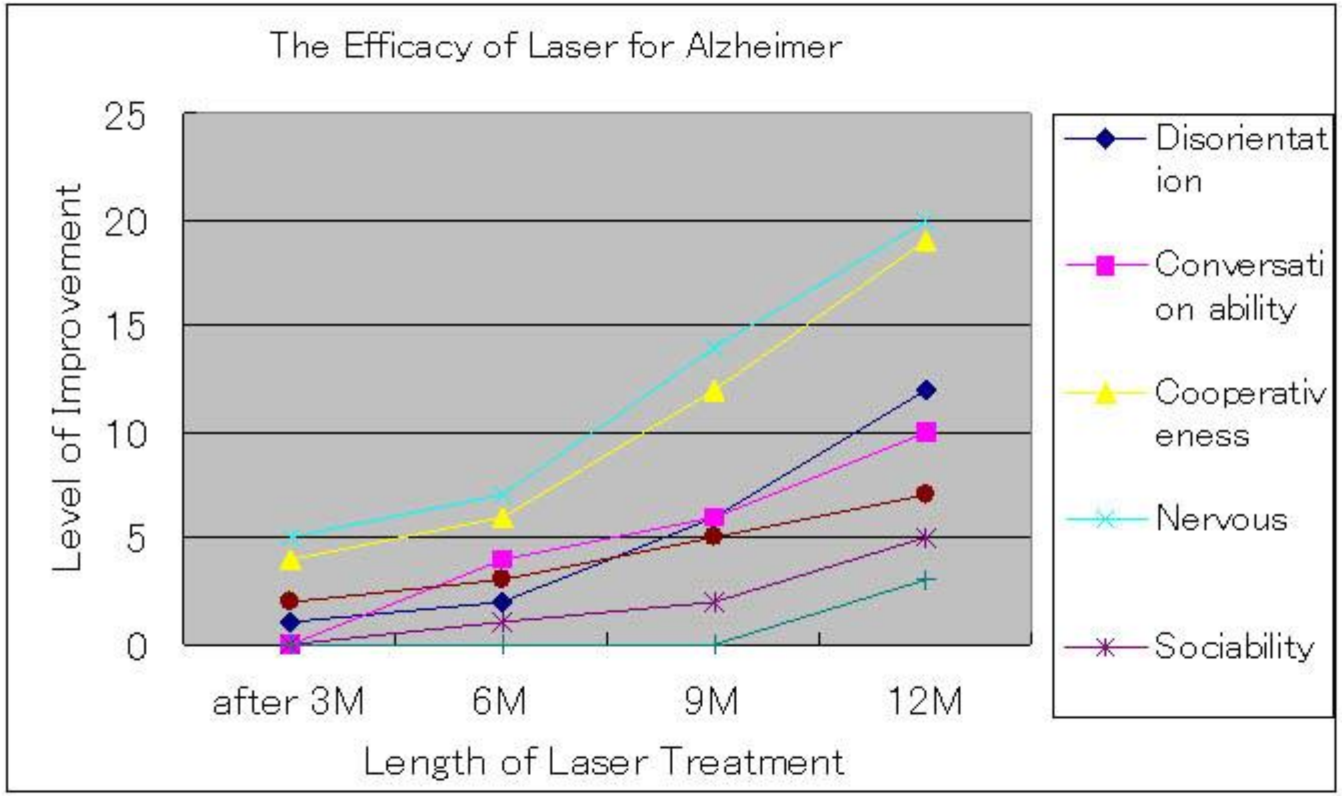
1. **Short-term stimulation**: ATP, blood flow, lymphatic flow, cerebral oxygenation, less edema
2. **Neuroprotection**: Upregulation of anti-apoptotic proteins, less excitotoxity, more antioxidants, less inflammation
3. **Processes that help the brain to repair itself**: Neurotrophins, neurogenesis and synaptogenesis

TLLLT for Alzheimer's Disease General Study Results

Zenba et al.: The Efficacy of 904 nm Laser Therapy for Alzheimer's Diseases

Results

- Decelerating progression of disease
- Positive behavior modification (see figure)
- Positive influence on patient's care



TLLLT for Alzheimer's Disease General Study Results

Photomedicine and Laser Surgery Volume X, Number X, 2011, Pp. 1–8 ª Mary Ann Liebert, Inc. DOI: 10.1089/pho.2011.3073

670nm Laser Light and EGCG Complementarily Reduce Amyloid-b Aggregates in Human Neuroblastoma Cells: Basis for Treatment of Alzheimer's Disease?

Andrei P. Sommer, Ph.D.,1 Jan Bieschke, Ph.D.,2 Ralf P. Friedrich, Ph.D.,2 Dan Zhu, M.Sc.,1
Erich E. Wanker, Ph.D.,2 Hans J. Fecht, Ph.D.,1,3 Derliz Mereles, M.D.,4 and Werner Hunstein, M.D.5

Abstract

Conclusion:

Irradiation with moderate levels of 670-nm light and EGCG supplementation complementarily reduces Aß-aggregates in SH-EP cells. Transcranial penetration of moderate levels of red to near-infrared (NIR) light has already been used in the treatment of patientswith acute stroke.

The blood–brain barrier (BBB) penetration of EGCG (Epigallocatechin gallate) has been demonstrated in animals. We hope that our approach will inspire a practical therapy for AD.

TLLLT for Alzheimer’s Disease General Study Results

Daniel M.Johnstone, CécileMoro, JonathanStone1, Alim-LouisBenabid, J.Mitrofanis:

Turning On Lights to Stop Neurodegeneration: The Potential of Near-Infrared-Light-Therapy in Alzheimer’s and Parkinson’s Disease

Department of Physiology, University of Sydney, Sydney.

Alzheimer’s and Parkinson’s disease are the two most common neurodegenerative disorders. They develop after a progressive death of many neurons in the brain. Although therapies are available to treat the signs and symptoms of both diseases, the progression of neuronal death remains relentless, and it has proved difficult to slow or stop. Hence, there is a need to develop neuroprotective or disease-modifying treatments that stabilize this degeneration. Red to infrared light therapy (l=600–1070nm), and in particular light in the near-infrared(NIr) range, is emerging as a safe and effective therapy that is capable of arresting neuronal death. Previous studies have used Nir to treat tissue stressed by hypoxia, toxic insult, genetic mutation and mitochondrial dysfunction with much success. Here we propose Nir therapy as a neuroprotective or disease- modifying treatment for Alzheimer’s and Parkinson’s patients.

TLLLT for Alzheimer's Disease General Study Results

Daniel M.Johnstone, CécileMoro, JonathanStone1, Alim-LouisBenabid, J.Mitrofanis:

TABLE 1 | Studies reporting on NIr treatment in Alzheimer's disease.

Findings with NIr application	Study	Model	Species
↑ Cell survival ↑ ATP content ↓ β-amyloid aggregates	Sommer et al., 2012	*In vitro* (neuroblastoma cells internalized with β-amyloid)	Human cells
↓ β-amyloid plaques ↓ Oxidative stress ↓ hyperphosphorylated tau	Purushothuman et al., 2014, 2015	APP/PS1, K3691 transgenics (chronic)	Mouse
↓ β-amyloid plaques ↓ Inflammation ↑ ATP content ↑ Mitochondrial function	DeTaboada et al., 2011	APP transgenic (chronic)	Mouse
↓ β-amyloid plaques ↓ Oxidative stress ↓ Hyperphosphorylated tau ↑ Heat shock proteins	Grillo et al., 2013	TASTPM transgenic (chronic)	Mouse
↑ Cognitive behavioral deficits	Michalikova et al., 2008 DeTaboada et al., 2011	CD1 transgenic (acute) APP transgenic (chronic)	Mouse

TLLLT for Parkinson's Disease General Study Results

Daniel M.Johnstone, CécileMoro, JonathanStone1, Alim-LouisBenabid, J.Mitrofanis:

TABLE 2 | Studies reporting on NIr treatment in Parkinson's disease.

Findings with NIr application	Study	Model	Species
↑ Cell survival (striatal and cortical cells) ↑ ATP content ↓ Oxidative stress	Liang et al., 2008; Ying et al., 2008	*In vitro* (rotenone, MPTP)	Rat cells
↑ Mitochondrial function ↓ Oxidative stress	Quirk et al., 2012b	*In vitro* (neuroblastoma cells overexpressing <-synuclein)	Human cells
↑ mitochondrial movement	Trimmer et al., 2009	*In vitro* (hybrid cells with mitochondrial DNA from Parkinson's disease patients)	Human cells
↑ Cell survival (TH^+ cells)	Shaw et al., 2010	MPTP (acute)	Mouse
↑ Cell survival (TH^+ cells)	Peoples et al., 2012	MPTP (chronic)	
↑ Cell survival (TH^+ cells)	Purushothuman et al., 2013	K369I transgenic (chronic)	
↑ Cell survival (TH^+ cells)	Moro et al., 2013, 2014; Johnstone et al., 2014b	MPTP (acute)	
↑ Cell survival (TH^+ cells)	El Massri et al., 2015	MPTP (acute, sub-chronic)	
↑ Cell survival (TH^+ cells)	Reinhart et al., 2015b	MPTP (acute)	
↑ Cell survival (TH^+ cells)	Reinhart et al., 2015a	6OHDA hemi-parkinsonian	Rat
↑ Cell survival (TH^+ and Nissl-stained cells)	Darlot et al., 2015	MPTP (sub-acute)	Monkey
↓ Oxidative stress ↓ Hyperphosphorylated tau	Purushothuman et al., 2013	K369I transgenic (chronic)	Mouse
↑ Flight ↑ Complex IV-dependent respiration ↓ Mutant mitochondria defects	Vos et al., 2013	pink1 mutant	Flies
↓ Abnormal basal ganglia activity (Fos immunoreactivity)	Shaw et al., 2012	MPTP (acute)	Mouse
↑ Locomotive behavior	Whelan et al., 2008	MPTP (acute)	Mouse
	Desmet et al., 2009	MPTP (acute)	
	Quirk et al., 2012b	A53T(<-synuclein transgenic)	
	Moro et al., 2013; Reinhart et al., 2015b	MPTP (acute)	
↓ Apomorphine-induced rotations	Reinhart et al., 2015a	6OHDA hemi-parkinsonian	Rat
↑ Locomotive behavior, clinical signs	Darlot et al., 2015	MPTP (sub-acute)	Monkey
↓ Clinical signs	Zhao et al., 2003; Maloney et al., 2010; Burchman, 2011 Quietmind Foundation trial (http://www.youtube.com/watch?v=9X-hjgay7pg)	Parkinson's patients	Human

TLLLT for Parkinson's Disease General Study Results

Case study: 10 weeks of Transcranial LLLT on a Parkinson's patient

YouTube https://www.youtube.com/watch?v=9X-hjgay7pg

TLLLT for Traumatic Brain Injuries General Study Results

Margaret A. Naeser, Ph.D., L.Ac., Anita Saltmarche, R.N., M.H.Sc., Maxine H. Krengel, Ph.D., Michael R. Hamblin, Ph.D. and Jeffrey A. Knight, Ph.D.

Improved Cognitive Function After Transcranial, Light-Emitting Diode Treatments in Chronic, Traumatic Brain Injury: Two Case Reports

The authors describe two case studies using TILT for patients suffering from TBI. TILT was applied to the forehead twice a week. A 500 mW continuous wave LED source (mixture of 660 nm red and 830 nm NIR LEDs) with a power density of 22.2 mW/cm2 (area of 22.48 cm2), was applied to the forehead for a typical duration of 10 minutes (13.3 J/cm2). In the first case study the patient reported that she could concentrate on tasks for a longer period of time (the time able to work at a computer increased from 30 minutes to 3 hours). She had a better ability to remember what she read, decreased sensitivity when receiving haircuts in the spots where LLLT was applied, and improved mathematical skills after undergoing LLLT. The second patient had statistically significant improvements compared to prior neuropsychological tests after 9 months of treatment. The patient had a 2 standard deviation (SD) increase on tests of inhibition and inhibition accuracy (9^{th} percentile to 63rd percentile on the Stroop test for executive function and a 1 SD increase on the Wechsler Memory scale test for the logical memory test (83rd percentile to 99th percentile).

TLLLT for Traumatic Brain Injuries General Study Results

Margaret A. Naeser, Ph.D.

Significant improvements on cognitive performance post- transcranial, red/near-infrared LED treatments in chronic, mild TBI: Open-protocol study

This pilot, open-protocol study examined whether scalp application of red and near-infrared (NIR) light-emitting diodes (LED) could improve cognition in patients with chronic, mild traumatic brain injury (mTBI). Application of red/NIR light improves mitochondrial function (especially in hypoxic/compromised cells) promoting increased ATP important for cellular metabolism. Nitric oxide is released locally, increasing regional cerebral blood flow. LED therapy is non-invasive, painless, and non-thermal (FDA-cleared, non-significant risk device). Eleven chronic, mTBI participants (26-62 Yr, 6M) with non-penetrating head injury and persistent cognitive dysfunction were treated for 18 outpatient sessions (MWF, 6 Wks), starting at 10 Mo to 8 Yr post- mTBI (MVA or sports-related; and one participant, IED blast injury). Four had a history of multiple concussions. Each LED cluster head (2.1" diameter, 500mW, 22.2mW/cm2) was applied for 10 min to each of 11 scalp placements (13 J/cm2). LEDs were placed on the midline from front-to-back hairline; and bilaterally on frontal, parietal, and temporal areas. Neuropsychological testing was performed pre- LED, and at 1 Wk, 1 and 2 Mo post- the 18th treatment. A significant linear trend was observed for the effect of LED treatment over time for Stroop test for Executive Function, Trial 3 inhibition ($p=.004$); Stroop, Trial 4 inhibition switching ($p=.003$); California Verbal Learning Test (CVLT)-II, Total Trials 1-5 ($p=.003$); and CVLT-II, Long Delay Free Recall ($p=.006$). Participants reported improved sleep, and fewer PTSD symptoms, if present. Participants and family reported better ability to perform social, interpersonal and occupational functions. These open-protocol data suggest placebo controlled studies are warranted.

TLLLT for Stroke General Study Results

Margaret A. Naeser, PhD et al. Yair Lampl, Justin A. Zivin, Marc Fisher, Robert Lew, Lennart Welin, Bjorn Dahlof, Peter Borenstein, Bjorn Andersson, Julio Perez, Cesar Caparo, Sanja Ilic and Uri Oron

Infrared laser therapy for ischemic stroke: a new treatment strategy: results of the NeuroThera Effectiveness and Safety Trial-1 (NEST-1).

Lampl Y[1], Zivin JA, Fisher M, Lew R, Welin L, Dahlof B, Borenstein P, Andersson B, Perez J, Caparo C, Ilic S, Oron U.

⊕ **Author information**

Abstract

BACKGROUND AND PURPOSE: The NeuroThera Effectiveness and Safety Trial-1 (NEST-1) study evaluated the safety and preliminary effectiveness of the NeuroThera Laser System in the ability to improve 90-day outcomes in ischemic stroke patients treated within 24 hours from stroke onset. The NeuroThera Laser System therapeutic approach involves use of infrared laser technology and has shown significant and sustained beneficial effects in animal models of ischemic stroke.

RESULTS: Mean time to treatment was >16 hours (median time to treatment 18 hours for active and 17 hours for control). Time to treatment ranged from 2 to 24 hours. More patients (70%) in the active treatment group had successful outcomes than did controls (51%), as measured prospectively on the bNIH (P=0.035 stratified by severity and time to treatment; P=0.048 stratified only by severity). Similarly, more patients (59%) had successful outcomes than did controls (44%) as measured at 90 days as a binary mRS score of 0 to 2 (P=0.034 stratified by severity and time to treatment; P=0.043 stratified only by severity). Also, more patients in the active treatment group had successful outcomes than controls as measured by the change in mean NIHSS score from baseline to 90 days (P=0.021 stratified by time to treatment) and the full mRS ("shift in Rankin") score (P=0.020 stratified by severity and time to treatment; P=0.026 stratified only by severity). The prevalence odds ratio for bNIH was 1.40 (95% CI, 1.01 to 1.93) and for binary mRS was 1.38 (95% CI, 1.03 to 1.83), controlling for baseline severity. Similar results held for the Barthel Index and Glasgow Outcome Scale. Mortality rates and serious adverse events (SAEs) did not differ significantly (8.9% and 25.3% for active 9.8% and 36.6% for control, respectively, for mortality and SAEs).

CONCLUSIONS: The NEST-1 study indicates that infrared laser therapy has shown initial safety and effectiveness for the treatment of ischemic stroke in humans when initiated within 24 hours of stroke onset. A larger confirmatory trial to demonstrate safety and effectiveness is warranted.

TLLLT for Stroke General Study Results

Michael R Hamblin: Photobiomodulation for Traumatic Brain Injury and Stroke

"Neurothera Effectiveness and Safety Trials" (NEST I – II)

NEST I:

- 810 nm laser applied to the shaved head within 24 hours of 120 patients between the ages of 40 to 85 years suffering an ischemic stroke.
- TILT significantly improved outcome in human stroke patients, when applied at ~18 hours post-stroke, over the entire surface of the head regardless of stroke.

NEST II:

- 810 nm laser applied to 660 patients, aged 40 to 90, who were randomly assigned to one of two groups (331 to LLLT, 327 to sham)
- Beneficial results (p<.04) were found for the moderate and moderate-severe (but not for the severe) stroke patients, who received the real laser protocol.

Findings:

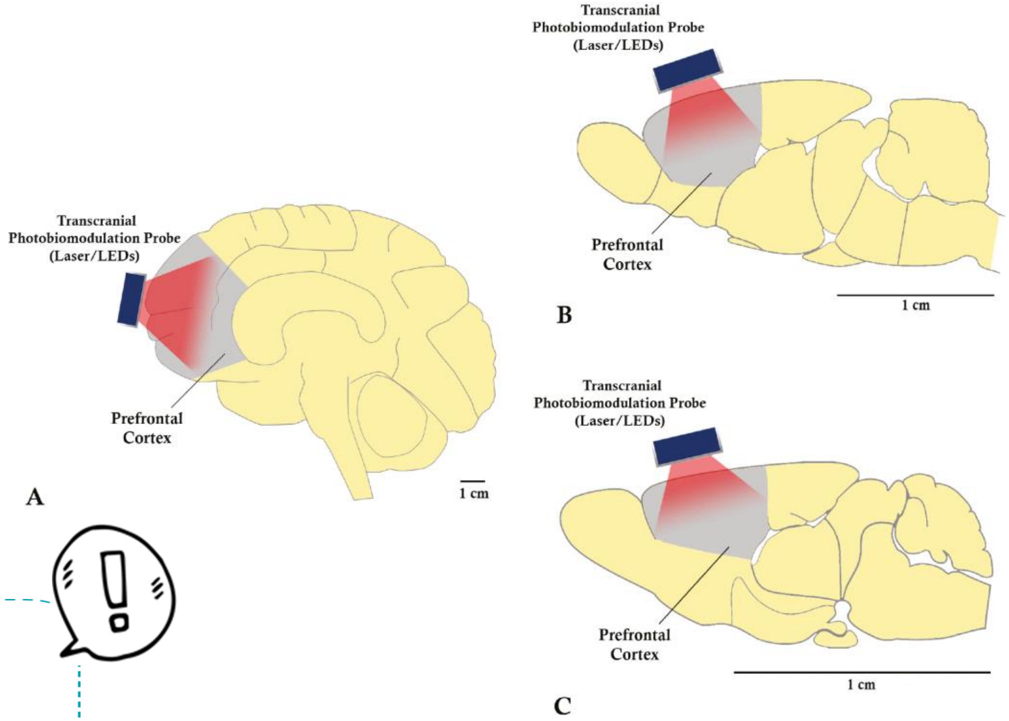
- TLLLT applied ~18 hours post-stroke can significantly attenuate the long-term effects
- Overall severity of the individual stroke should be taken into consideration
- Neuroprotection must be administered as soon as possible after a stroke
- The optimum brain areas to be treated in acute stroke remain to be determined

TLLLT for Depression General Study Results

Farzad Salehpour und Seyed Hossein Rasta: The potential of transcranial photobiomodulation therapy for treatment of major depressive disorder

Background: Studies have revealed a relation between abnormalities in prefrontal cortex (PFC) metabolism and MDD.

- The exposure of PFC region using transcranial PBM therapy has potential antidepressant-like effects in MDD patients as it increases cerebral energy production via mitochondrial oxidative phosphorylation and enhances frontal cortex oxygen consumption.
- In addition, TLLLT led to a significant increase in the left middle cerebral artery (up to 30%) and basilar artery (up to 25%) blood flow velocity.



TLLLT may result in significant amelioration of the symptoms and may serve as a potential treatment regimen for MDD patients.

TLLLT for Depression Study Overview

All Available Clinical Research Studies And Case Reports That Utilized Transcranial Photobiomodulation, With Wavelengths In The Red And/Or Near-Infrared Range, For Treatment Of Depression

Paper	Subjects	Design	Device	Number Of Treatments	Area Irradiated	Wavelength	Pulsed Or Continuous	Irradiance	Fluence	Results
Cassano et al (2018)[84] Transcranial Photobiomodulation for the treatment of Major Depressive Disorder. The ELATED-2 Pilot Trial	13 MDD completers	Randomized, double-blind, sham controlled, pilot trial	Omnilux New U, light emitting diode (LED) by Photomedex, Inc., Montgomeryville, PA	Twice a week for 8 weeks; sessions 25–30 mins	Dorsolateral prefrontal cortex, bilateral	823 nm	Continuous	36.2mW/cm^2	Up to 65.2J/cm^2	NIR increased mean change in Ham-D scores
Cassano et al (2015)[79] Near-Infrared Transcranial Radiation for Major Depressive Disorder: Proof of Concept Study	4 MDD completers	Pilot, open, proof of concept, prospective, double-blind, randomized study, crossover design	NeuroThera, continuously emitting GaAlAs- laser, manufactured by PhotoThera Inc.	Twice a week for three weeks, 4 sites, 2 mins per site	Prefrontal cortex	808 ± 10nm	Continuous	700mW/cm^2	84J/cm^2	50% Remission of MDD at weeks 6–7 ($HAMD_{17}$ ≤7)
Caldieraro et al (2018)[86] Long-Term Near-Infrared Photobiomodulation for Anxious Depression Complicated by Takotsubo Cardiomyopathy	1 MDD with anxious distress	Case report	i-PBM: Vielight light-emitting diode t-PBM: Omnilux New U light emitting diode device (Photomedex Inc)	i-PBM: titrated up to twice daily, 25 mins per nostril t-PBM (F3/F4): twice per week for 25 mins t-PBM (Fpz): titrated up to 30 mins daily	i-PBM: Proposed systemic effect t-PBM: EEG sites F4, F3, or both on same day; later switched to Fpz	i-PBM: 810 nm t-PBM: 830nm	i-PBM: 10-Hz, Pulsed t-PBM: Continuous	i-PBM: peak 14.2mW/cm^2 t-PBM: 33.2mW/cm^2	i-PBM: average 10.65J/cm^2 t-PBM (F3/F4): 49.8J/cm^2 t-PBM (Fpz): 59.8J/cm^2	Daily t-PBM treatments at Fpz site reduced MDD symptoms
Henderson and Morries (2017)[81] Multi-Watt near-infrared Phototherapy for the Treatment of comorbid Depression: an Open-label single-arm study	39 TBI patients who completed depression questionnaires	Open-label single arm, proof-of-concept study	Class IV Lasers: LT1000 (LiteCure, Newark, DE, USA), Diowave 810 (Diowave, Riviera Beach, FL, USA), or Aspen Laser (Denver, CO, USA)	8–34 treatments, 30 mins per session	Overlying forehead and temporal regions bilaterally	810/980nm	Continuous, sweeping	8–15W	55–81J/cm^2	92% were responders (decrease of QIDS score ≥ 50% from baseline), 82% were remitters (QIDS ≤ 5)
Disner et al (2016)[82] Transcranial laser stimulation as neuroenhancement for attention bias modification in adults with elevated depression symptoms	51 adults with elevated symptoms of depression	Randomized, sham-controlled proof-of-principle study	CG-5000 high density laser (Cell Gen Therapeutics, Dallas, TX, USA)	Two sessions, 8 mins per session	Left or right forehead	1064nm	Continuous	250mW/cm^2	60J/cm^2	Right t-PBM yielded greater improvement in participants whose attention was responsive to attention bias modification

TLLLT for Depression Study Overview

All Available Clinical Research Studies And Case Reports That Utilized Transcranial Photobiomodulation, With Wavelengths In The Red And/Or Near-Infrared Range, For Treatment Of Depression

Henderson and Morries (2015)[85] SPECT Perfusion Imaging Demonstrates Improvement of Traumatic Brain Injury With Transcranial Near-infrared Laser Phototherapy	1 TBI	Case Report	Class IV laser (Diowave 810, West Palm Beach, FL, USA)	20 treatments over the course of 4 months	Unknown	810nm	Unknown	Unknown	55 to 81J/cm^2	Improved mood (self-report), SPECT: Significant change in left and right frontal cortices, as well as left and right temporal cortices.
Morries et al (2015)[80] Treatments for traumatic brain injury with emphasis on transcranial near-infrared laser phototherapy	10 TBI who completed depression questionnaires	Retrospective Case Series	Class IV lasers: LT1000 (LiteCure, Newark, DE, USA) or Diowave 810 (Diowave, Riviera Beach, FL, USA)	10–20 treatments, 16–30 mins per session	Bilateral frontal, bilateral frontal + left temporal, bilateral frontal + bilateral temporal	810/980nm, one pt 810nm only	10-Hz Pulsed, scanning	Unknown	55 to 81J/cm^2	BDI and QIDS-SR scores decreased from moderately depressed range to non-depressed range
Schiffer et al (2009)[77] Psychological benefits 2 and 4 weeks after a single treatment with near infrared light to the forehead: a pilot study of 10 patients with major depression and anxiety	10 MDD	Pilot Study	(LED) array (Marubeni America Corp, Santa Clara, CA)	One session consisting of Four 4-min treatments	Left forehead at F3 (over dorsolateral prefrontal cortex), Right forehead at F4	810nm	Unknown	250mW/cm^2	60J/cm^2 per site	At 2-weeks post treatment, 4 out of 10 were responders (>50% reduction in HAM-D), and 4 out of 10 were in remission (HAM-D <8)
Naeser et al (2014)[78] Significant Improvements in Cognitive Performance Post-Transcranial, Red/Near-Infrared Light-Emitting Diode Treatments in Chronic, Mild Traumatic Brain Injury: Open-Protocol Study	11 mild TBI who completed BDI	Pilot, Open-Protocol Study; Case series	LED Console Units (MedX Health, Model 1100, Toronto), three LED cluster heads per unit	18 sessions over 6 weeks, 20 mins per session	11 scalp placements: midline from front-to-back hairline, and bilaterally on frontal, parietal, and temporal regions	633/870nm	Continuous	22.2mW/cm^2 per cluster head	13J/cm^2 per cluster head placement	Trend towards significance for BDI scores 1 week post treatment

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6878920/table/T0002/

Clinical Observations LED Helmet

Volkmar Kreisel, MD

Patient Data from Volkmar Kreisel, MD (Bietigheim-Bissingen, Germany)

Medical Specialist in Laser Medicine, Acupuncture and Anesthesiology

Parkinson's syndrome

Scope:	4 Patients, Diagnosis made between 2018 and 2014
Symptoms:	Tremor, bradykinesia, muscular rigidity, concentration disorders, slowdown of cognitive functions, 2 patients suffered from freezing
Previous therapy:	Levodopa, dopamine agonists, physiotherapy
LED Helmet Protocol:	2-3 treatments/week, gradual increase of the radiation time from 18 to 30 min and the energy dose from level 1 to 4 within 3 weeks, then 2-3 treatments/week for 30 minutes each on intensity level 4
Effects of LED Helmet:	After an average of 8-10 treatments patients reported a "freshness in their heads" (Quote of 3 patients, independently of each other, improved concentration and vigilance, physical condition improved slightly, no tremor or muscular rigidity, freezing remained unchanged
Outlook:	Continuous therapy is recommended for all patients

Clinical Observations LED Helmet

Volkmar Kreisel, MD

Patient Data from Volkmar Kreisel, MD (Bietigheim-Bissingen, Germany)

Medical Specialist in Laser Medicine, Acupuncture and Anesthesiology

Alzheimer's disease

Scope:	1 Patient, Diagnosis 02/2019
Symptoms:	Increasing difficulty to concentrate and find words, temporal orientation was partly disturbed
Previous therapy:	Concentration exercises, physiotherapy, detoxification through alternative practitioners
LED Helmet Protocol:	2 treatments/week, gradual increase of the radiation time from 18 to 30 min and the energy dose from level 2 to 4 within 2 weeks, therapy may be continued from home
Effects of LED Helmet:	Strikingly better concentration and orientation
Outlook:	Since the effect has only lasted a few hours so far, regular treatment is recommended

Clinical Observations LED Helmet

Volkmar Kreisel, MD

Patient Data from Volkmar Kreisel, MD (Bietigheim-Bissingen, Germany)

Medical Specialist in Laser Medicine, Acupuncture and Anesthesiology

Cerebellar ataxia due to Lyme disease infection in 2012

Scope:	1 Patient, Diagnosis in 2012
Symptoms:	Gait disorders, patient usually sits in a wheelchair, fine motor problems, dysphasia, difficulty concentrating, dizziness
Previous therapy:	Physiotherapy, speech therapy, currently no medical therapy available
LED Helmet Protocol:	Initially 3 treatments/week, gradual increase of the radiation time from 24 to 30 min and the energy dose from level 2 to 4 within 2 weeks, since then 2 treatments/week for 3 months, therapy may be continued from home
Effects of LED Helmet:	After 12 treatments slight improvement in symptoms, vigilance and concentration improved, dysphasia somewhat improved, so far, no improvement of fine motor skills.
Outlook:	Since symptoms increase again after treatment breaks of 1-2 weeks, regular treatment is recommended

Clinical Observations LED Helmet

Volkmar Kreisel, MD

Patient Data from Volkmar Kreisel, MD (Bietigheim-Bissingen, Germany)

Medical Specialist in Laser Medicine, Acupuncture and Anesthesiology

Herpes Zoster

Scope:	1 Patient, Diagnosis 10/2019
Symptoms:	Burning and painful dermatitis left frontoparietal, hyperesthesia
Previous therapy:	Initially acyclovir, then pregabalin and lidocaine ointment locally > pain improved within 4 weeks, but the skin continued to be irritated and painful, sensitivity to touch
LED Helmet Protocol:	Treatment started 12/2019, 2 treatments/week, gradual increase of the radiation time from 6 to 24 min and the energy dose from level 1 to 2 within 2 weeks, then reduction to 1 treatment/week.
Effects of LED Helmet:	First improvement after 4 treatments, reduction of pain, fading of dermatitis, decrease in hyperesthesia, gradual reduction of pregabalin
Outlook:	In 01/2020 the therapy was completed successfully

Clinical Observations LED Helmet

James Laporta, MD

Brain Wave Measurement performed by James Laporta, MD (Cape Town, South Africa)

Integrative Medical Practitioner

Introduction to brainwaves:

- **Alpha** (9 to 14 Hz): Represents non-arousal, slow and high in amplitude. State of resting, reflecting, meditating
- **Beta** (12 to 33 Hz): Represents arousal and intense neuronal activity
- **Theta** (5 to 8 Hz): Even greater amplitude and slower frequency. Very beneficial wave form:

  Restorative theta waves are found mostly in sleep or deep meditation.

  Theta wave activity in the hippocampal area is responsible for memory recollection and shows a state of "readiness" to process incoming signals. Higher theta waves equals better memory recall and contextualization.

  Theta rhythm in the pre-frontal cortex is shown to enhance insight and ability to exert cognitive control over behavioral response and internal bias. This has also been shown to release addictive behavior patterns and "free the mind" to make better choices.

  We have seen an upregulated travelling theta wave activity during infrared LED activation and for up to an hour after LED helmet has been removed.
- **Delta** (1-3 Hz): Greatest amplitude. Found in deep sleep, optimal level between 30 and 40; at higher levels in waking state is associated with brain disturbance or injury, a carrier wave for stress patterns.

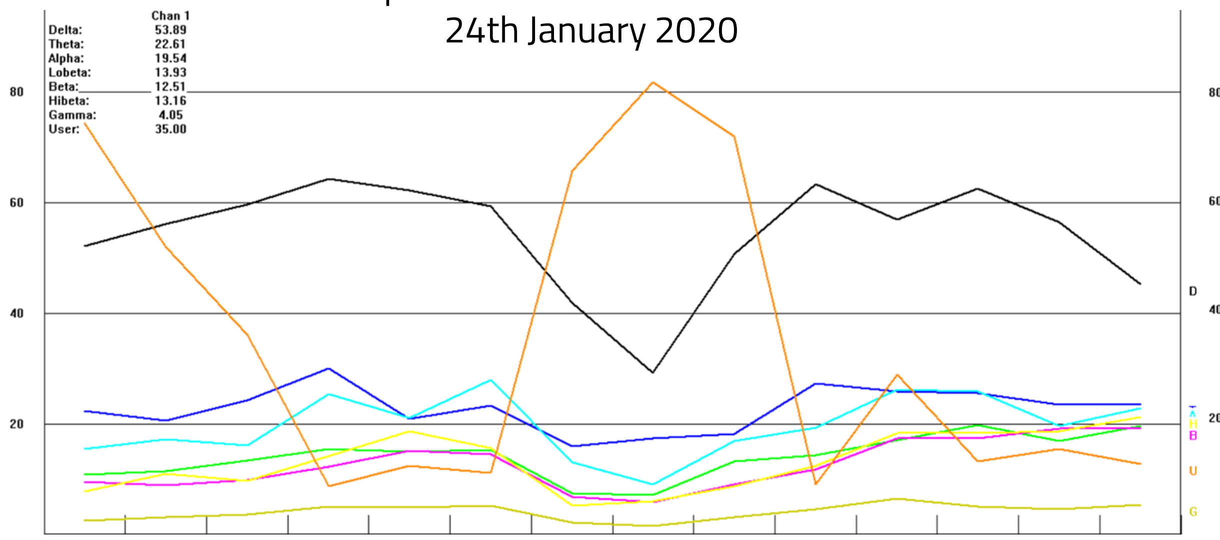
Clinical Observations LED Helmet

James Laporta, MD

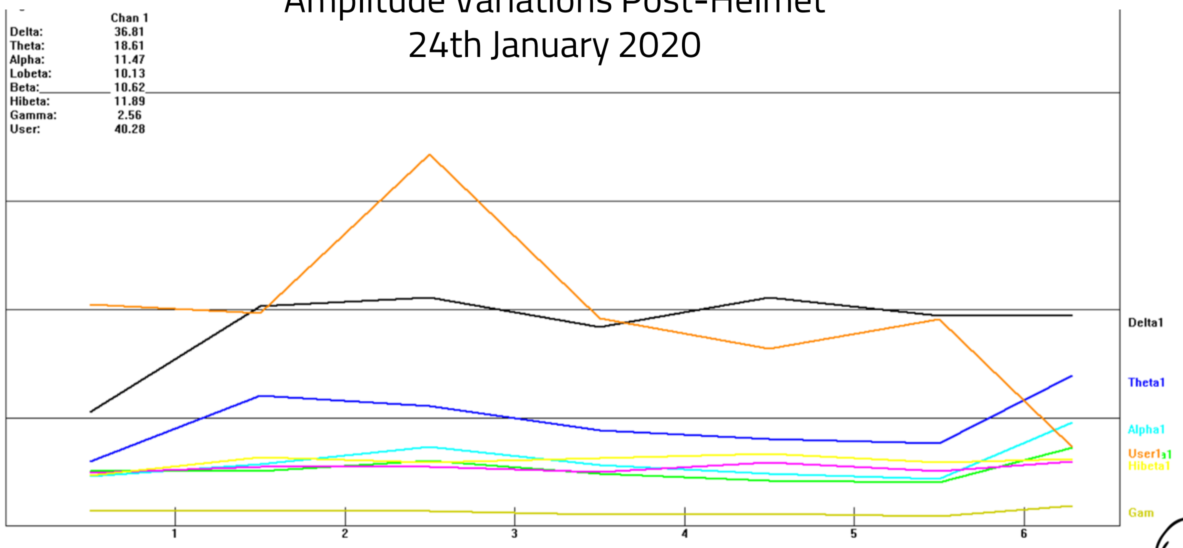
Brain Wave Measurement performed by James Laporta, MD (Cape Town, South Africa)

Integrative Medical Practitioner

Amplitude Variations Pre-Helmet
24th January 2020



Amplitude Variations Post-Helmet
24th January 2020



- Waves are smooth and less erratic, with better Theta ratio.
- Dominant Theta waves: The brain is ready to respond to new ideas and challenges. Increased regenerative capacity.
- Reduced Delta waves: less disturbance within brain (53.89 to 36.81).
- Beta and Alpha waves are balanced indicating reduced stress levels and optimal performance.

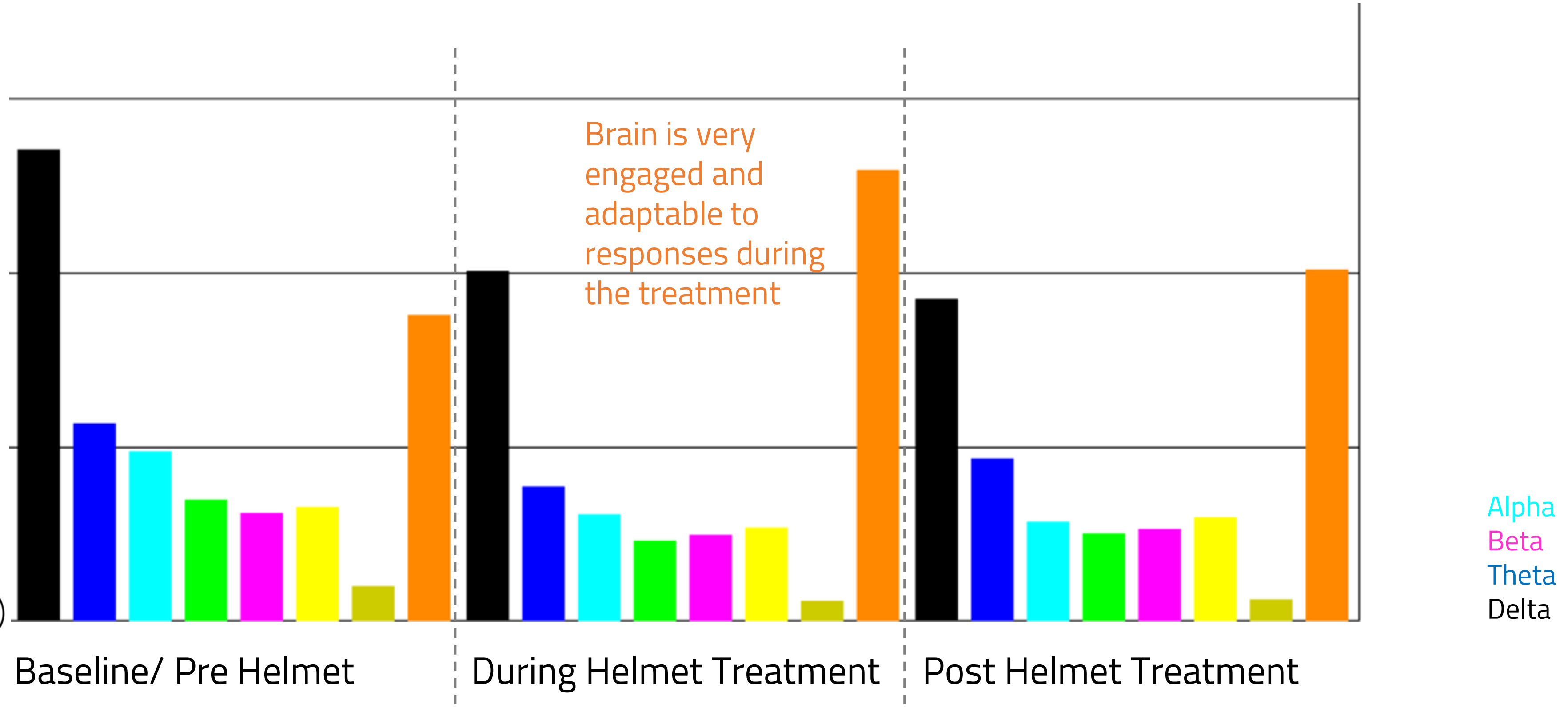
Clinical Observations LED Helmet

James Laporta, MD

Brain Wave Measurement performed by James Laporta, MD (Cape Town, South Africa)

Integrative Medical Practitioner

- Black Delta waves in the brain stem have come down consistently.
- A drop of 0.5 is considered a clinically significant response to any treatment intervention
- Delta waves have dropped by over 15.00: Extremely rare to see this kind of effect.
- Helmet reduces stress and increases brain adaptability to changing stimulus



Clinical Observations LED Helmet

James Laporta, MD

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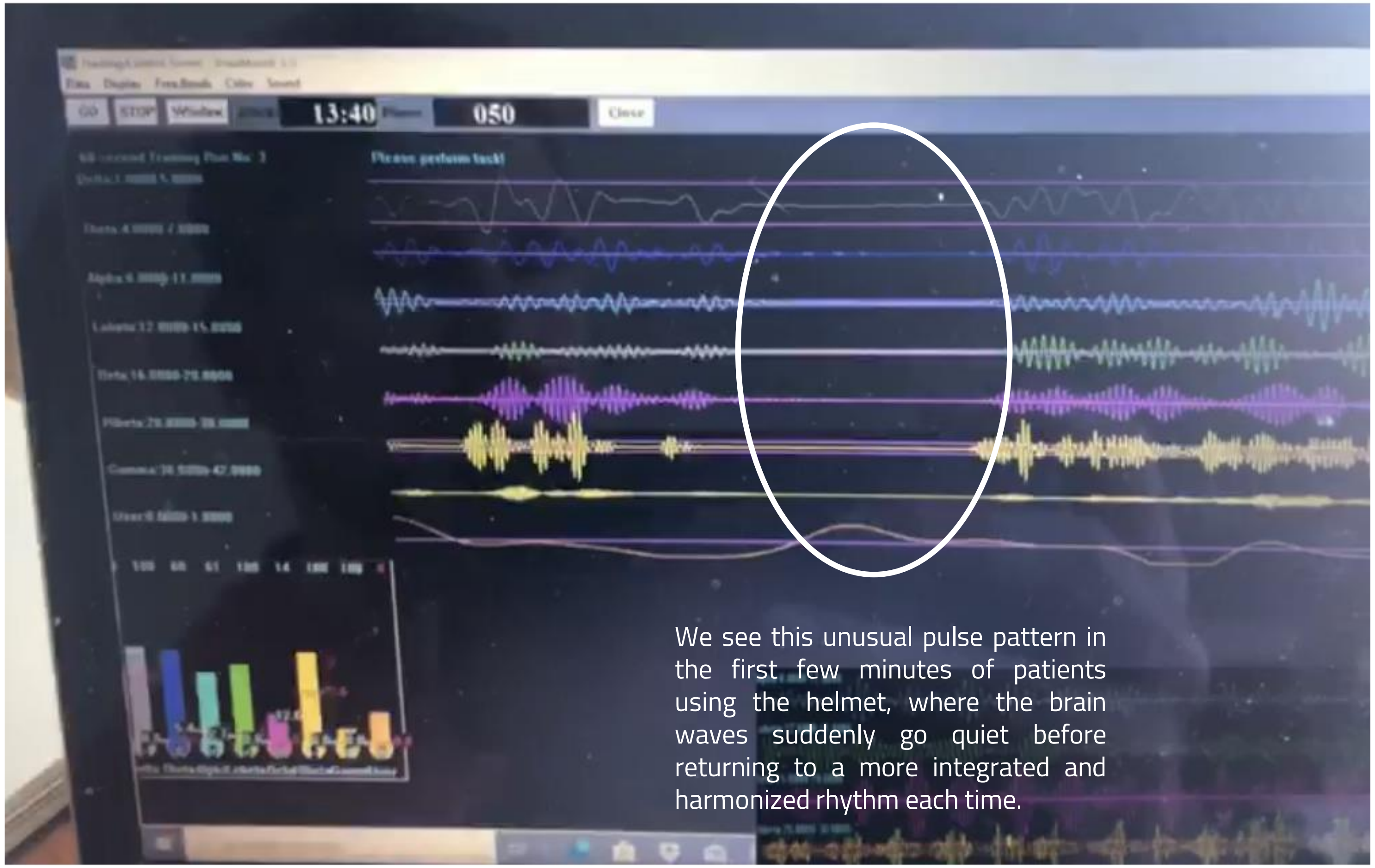
Integrative Medical Practitioner



We see this unusual pulse pattern in the first few minutes of patients using the helmet, where the brain waves suddenly go quiet before returning to a more integrated and harmonized rhythm each time.

The recording of the brain waves during the helmet session revealed a fascinating pulsatile rhythm with moments of completely still brain wave activity and relatively high interposed theta wave activity.
The brain is ready to respond to new ideas and challenges and it has developed an increased integrative capacity. The brain is seen to be regulating itself and adapting.

Clinical Observations LED Helmet

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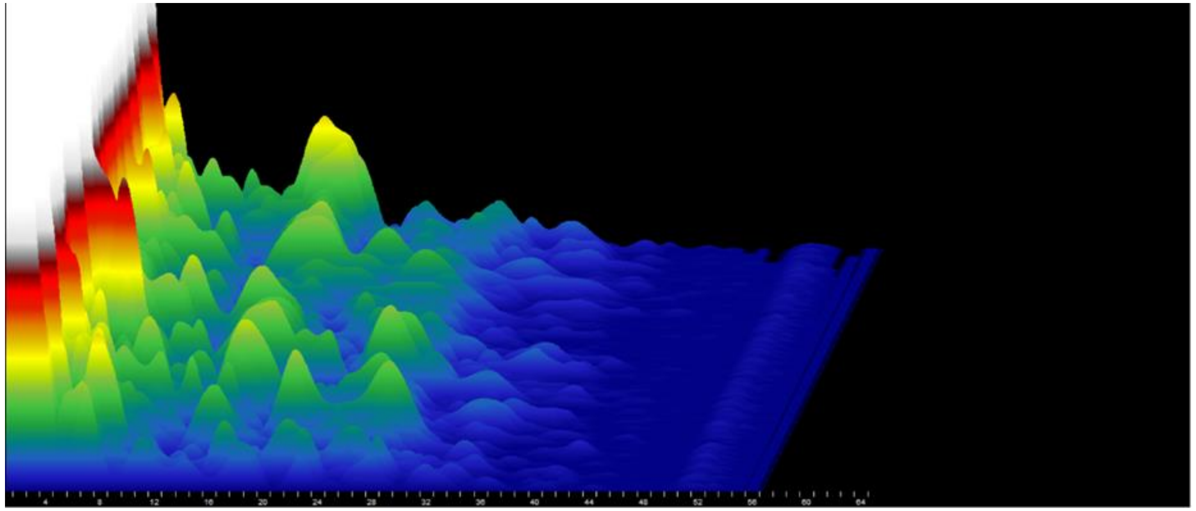


The graphic shows rhythmical pulses through each type of brain waves during LED helmet. The entire brain wave spectrum is being stimulated. At the beginning (left side of screen) the brain is overactive, commonly seen with stress.

After the brain waves have been stimulated by the helmet, they are harmonized and have been augmented into an ideal state.

Clinical Observations LED Helmet

Michael Ellenburg, ND, MPH, LAc

Patient Data from Michael Ellenburg, ND, MPH, LAc (Anchorage, USA)

Naturopathic Doctor and Licensed Acupuncturist

Stroke

Patient:	C.B. 93-year-old, female
Symptoms:	Right sided CVA on 12/17/19. Patient able to walk with assistance on weak side using wheelchair as needed. Speech and sight not effected.
Therapy:	Patient did a combination of hyperbaric oxygen therapy (HBOT) followed by treatment with Weber Helmet. A total of ten treatments were done with both. HBOT was performed for 60 minutes at 1.3 ATA for 10 consecutive days.
LED Helmet Protocol:	Helmet was worn after HBOT for 30min at continuous frequency.
Effects:	After 10-day treatment patient was able to stand on her own and walk short distances unsupported.

Clinical Observations LED Helmet

Patient Data from Michael Ellenburg, ND, MPH, LAc (Anchorage, USA)

Naturopathic Doctor and Licensed Acupuncturist

Mild Cognitive Impairment (MCI)

Patient:	B.S. 70-year-old, male
Symptoms:	Mild Cognitive Impairment (MCI) began approximately 2 years ago. Patient unable to recall current month of year. Patient was still able to drive and ride a bike.
Therapy:	10-day treatment initiated with Weber Helmet and infrared laser pads to abdomen (red and infrared LEDs at 24 watts.)
LED Helmet Protocol:	The helmet was applied for 30 minutes at continuous frequency.
Effects:	At end of 10-day treatment patient able to recall current day and month and was able to continue with work as an attorney.

Shining Light on the Head

Presentation on Transcranial Laser Therapy

By Michael Ellenburg, ND, MPH, LAc (Anchorage, USA)
Naturopathic Doctor and Licensed Acupuncturist

YouTube https://www.youtube.com/watch?v=mNB7s3uusZg&t=3520s

Additional Clinical Observations LED Helmet

Submitted by Garrett Wdowin (Corona Del Mar, USA) and Maureena Bivins (Santa Fe, USA)

Garrett Wdowin: NMD, ABAAHP, FAARM, Naturopathic medical doctor with a specialization in anti-aging and regenerative medicine

*"With the helmet I've had a person report that he is sleeping better with less nighttime urination.
Another who used to get daily headaches and if she uses the helmet, no more headaches.
I can feel it help me focus."*

Maureena Bivins: PhD, LAc

"In using the helmet, I am experiencing improved mood (stabilized), less mental fatigue, improved body-wide circulation, less facial pain (trigeminal neuralgia), and less occipital tension. About 15 minutes into the treatment, I feel my feet and toes warming and that warmth from improved circulation lasts most of the day."

Published Study on LED Helmet

Prof, PhD, MSc, MDsc Gerhard Litscher

Brain Photobiomodulation—Preliminary Results from Regional Cerebral Oximetry and Thermal Imaging)

Brain photobiomodulation (PBM) with red to near-infrared (NIR) light emitting diodes (LED) could be an innovative therapy for a variety of neurological and psychological disorders [1]. Red/NIR light can stimulate mitochondrial respiratory chain complex IV (cytochrome c oxidase) and increase ATP (adenosintriphosphate) synthesis [1–3]. In addition, light absorption by ion channels leads to the release of Ca2+ and to the activation of transcription factors and gene expression [1]. Brain PBM therapy could improve the metabolic capacity of neurons and is able to stimulate anti-inflammatory, anti-apoptotic and antioxidant responses as well as neurogenesis and synaptogenesis [1]. Findings suggest that PBM may enhance, for example, the frontal brain functions of older adults in a safe and cost-effective manner [4].

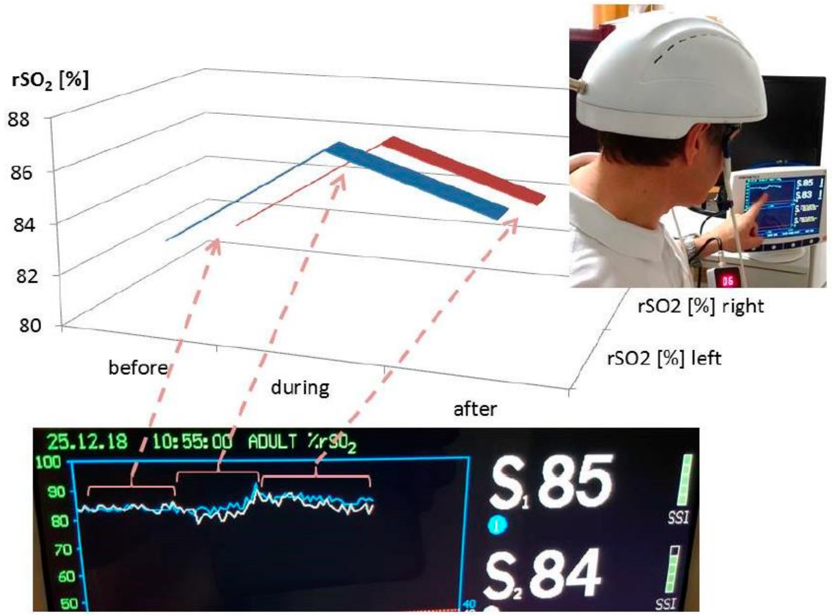
This article introduces a new piece of LED equipment (Figure 1) for brain photobiomodulation including preliminary results from near infrared spectroscopic measurements and thermal imaging.

Published Study on LED Helmet

Prof, PhD, MSc, MDsc Gerhard Litscher

Brain Photobiomodulation—Preliminary Results from Regional Cerebral Oximetry and Thermal Imaging)

The measurements of the changes in regional cerebral oxygen saturation (rSO_2) were performed using an INVOS 5100C Oximeter (Somanetics Corp., Troy, MI, USA) instrument. Near infrared spectroscopy is a noninvasive method for measuring rSO_2 through the intact skull that has been applied successfully in basic medical research and clinical indications for many years [6]. Near-infrared light (730 and 805 nm) is emitted through the skin, and after passing different kinds of tissue (skin and bone), the returned light is detected at two distances from the light source (3 and 4 cm). Based upon this principle, the spectral absorption of blood in deeper structures (2–4 cm) can be determined and defined as the rSO_2 [5,12]. The sensors were applied in the frontal area on the right and left sides of the brains of the healthy volunteer (see Figure 1). To minimize external light influence, the head in this area was covered with an elastic band during the recording and stimulation procedure. After a resting time of 20 minutes, the LED stimulation was switched on. The results of the three sections (before (20 min), during (15 min), and after (20 min) stimulation) are indicated in Figure 3. Note the significant increase in rSO_2 (left and right side) during and even after transcranial LED stimulation. The changes of the temperature are shown in Figure 4.



Note the increase in the regional cerebral oxygen saturation during and after stimulation on the left and right side.

Published Study on LED Helmet

Prof, PhD, MSc, MDsc Gerhard Litscher

Brain Photobiomodulation—Preliminary Results from Regional Cerebral Oximetry and Thermal Imaging)

Note the increase in temperature on the helmet (upper row; a before, b during, and c after stimulation) on the forehead (middle row; d–f) and on the chin (lower row; g–i).

Transcranial PBM appears promising to treat different mental diseases. Pitzschke et al. [13] also measured light propagation in different areas of Parkinson's disease (PD)-relevant deep brain tissue during transcranial and transsphenoidal illumination (at 671 and 808 nm) of a cadaver head and modeled optical parameters of human brain tissue using Monte-Carlo simulations. This study demonstrates that it is possible to also illuminate deep brain tissues transcranially and transsphenoidally. This opens therapeutic options for sufferers of PD or other cerebral diseases necessitating light therapy [13].

Weber Medical GmbH

One of the world's leading companies in medical laser technology

Main location in Lauenförde, Germany

- Established in 2003 after many years of research and development in the field of medical lasers
- Received financial aid from the German government and the European Union in 2004 for the development of the world's first multichannel laser systems for invasive laser therapy: CE approval for different laser machines since 2005

- Focus on evidence-based medicine: Cooperation with several research institutions
- 12 years of clinical experience with data from more than 1,500 clinics worldwide
- Weber Medical operates treatment and training centers in Germany and Thailand
- With the aim of building a worldwide distribution, research and education network the company founded the International Society for Medical Laser Applications (ISLA e.V.) in 2006
- Weber Medical is undertaking constant research and development in cooperation with different universities worldwide to ensure high standards and a continuous development of the products

Michael Weber, MD Pioneer of Modern Laser Therapy

- Dr. Michael Weber is a medical practitioner in Germany since more than 30 years
- Holds MD diploma and is certified bio chemist
- Leads three medical centers for general and internal medicine, pain management and cancer treatment
- Works in research with many national and international institutions and universities
- President of the International Society for Medical Laser Applications
- Editor in chief of the International Journal for Medical Laser Applications and coeditor of several other medical journals
- Developed the patented Weberneedle® medical laser devices which were financially supported by the German government and the European Union

Scientific Partnerships International Research Networks

GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

ISLA Research Group
International Society for Medical Laser Applications

Philipps Universität Marburg

NAALT
North American Association for PhotobiomoduLation Therapy

ISLA
International Society for Medical Laser Applications

Medizinische Universität Graz

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UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

MAYO CLINIC

ONDO STATE UNIVERSITY OF MEDICAL SCIENCES
Learning For Community Service

FACULTY OF MEDICINE
KHON KAEN UNIVERSITY
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