Photobiomodulation

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CSO, 201, 2022

Areas of Treatment

Deliver infrared light in the brain to increase ATP in the mitochondria, increases cerebral blood flow and nitric oxide post ischemia and anoxia

Treatments with laser or LED’s for Parkinson’s, Alzheimer's. and TBI increasing gamma waves

Red light pulsed at 40HZ for Parkinson’s and Alzheimer’s with Lumitron

Water may be powerful pathway as structured water has peak absorption in the infrared at 3000 nm, which has deep penetration

There are 50 known photoreceptors molecules in water, hemoglobin, and melanin

Delta Laser with multi radiance stimulation of infrared, magnetic field, LED colors and ultrasound

Advances in understanding of PBM mechanisms of action at a molecular and cellular level, are beginning to provide a scientific rationale for its use for multiple diseases.

One of the most general benefits of PBM that has recently emerged, is its anti-inflammatory effects. The local reduction of edema, and reductions in markers of oxidative stress and pro-inflammatory cytokines are well established.

There also appears to be a systemic effect whereby light delivered to the body, can positively benefit distant tissues and organs.

Therapeutic Effects of Photobiomodulation

These include

- tissue healing,
- reduce pain, swelling, inflammation,
- regenerate nerve and stem cells
- protection of tissues from poisons,
- protect from retinal damage due to high-intensity light or hyperoxia,
- ameliorate symptoms of traumatic brain injury
- protect or revitalize mitochondria

When applied correctly, PBM has an almost complete lack of reported adverse effects. The remarkable range of medical benefits provided by PBM, has led some to suggest that it may be “too good to be true”.

Mechanisms of Low Level Light Therapy

Photoneuromodulation of cytochrome oxidase as a photo acceptor and key enzyme for cellular bioenergetics in the retina and brain

Photoactive porphyrins increase ATP in the mitochondria, redox states, and nitric oxide which acts as signaling molecule for the ANS and vasculature

Modulation of reactive oxygen species, induction of transcription factors increasing cell proliferation levels of cytokines, inflammatory mediators, tissue oxygenation, and increased in cell metabolism

Mechanisms of cerebral edema in traumatic brain injury

- Cerebral edema may account for up to half of the mortality in all victims of TBI [1], and in younger victims of TBI, up to half of all mortality and morbidity [2].
- Edema is harmful because it causes cell swelling that alters cellular metabolite concentration, cellular physiology, biochemistry and function.
- When the swelling involves not only the cells themselves but also the surrounding tissue, causing a rapid increase in intracranial pressure (ICP), that can compress blood vessels, reduce tissue blood flow, reduce oxygenation and can eventually pressure tissue gradients (herniations) that can crush vital brain centers involved in respiration and cardiac function.

Light, Cytochrome C Oxidase, and Nitric Oxide.

Quirk, B. Whelan, H. (2020) *Photobiomodulation, Photomedicine, and Laser Surgery*: 38 (9) 527–530.

- After many decades of study, the underlying mechanisms of photobiomodulation (PBM) remain elusive. Although the most attractive hypotheses revolve around the role of cytochrome c oxidase (CCO) and cellular energetics, no reliable demonstration of any PBM-related light-induced mechanistic effect on CCO has been reported. Oxygen bound to the heme a3 site of CCO was photolabile using light of 532 nm.
-

Nitric oxide (NO) is a powerful regulator of circulation.

Nitric oxide (NO), a free radical gas that is a powerful regulator of circulation (it is an endogenous vasodilator) and a neurotransmitter (it helps in the processing of nerve signals as they cross synapses).

The Nobel Prize was awarded to three Americans in 1998 for their work on discovering NO and clarifying its role in health. Their most important contributions lay in describing the effect of NO on the circulation. The blood flow and nerve responses are rapid. Small increases in NO lead to both vasodilation and to better sensory perception. NO metabolism is necessary for normal circulation (venous, arterial, and lymph flows) and for the ability to sense pain, temperature, and pressure.

NO is involved diverse range of cellular functions

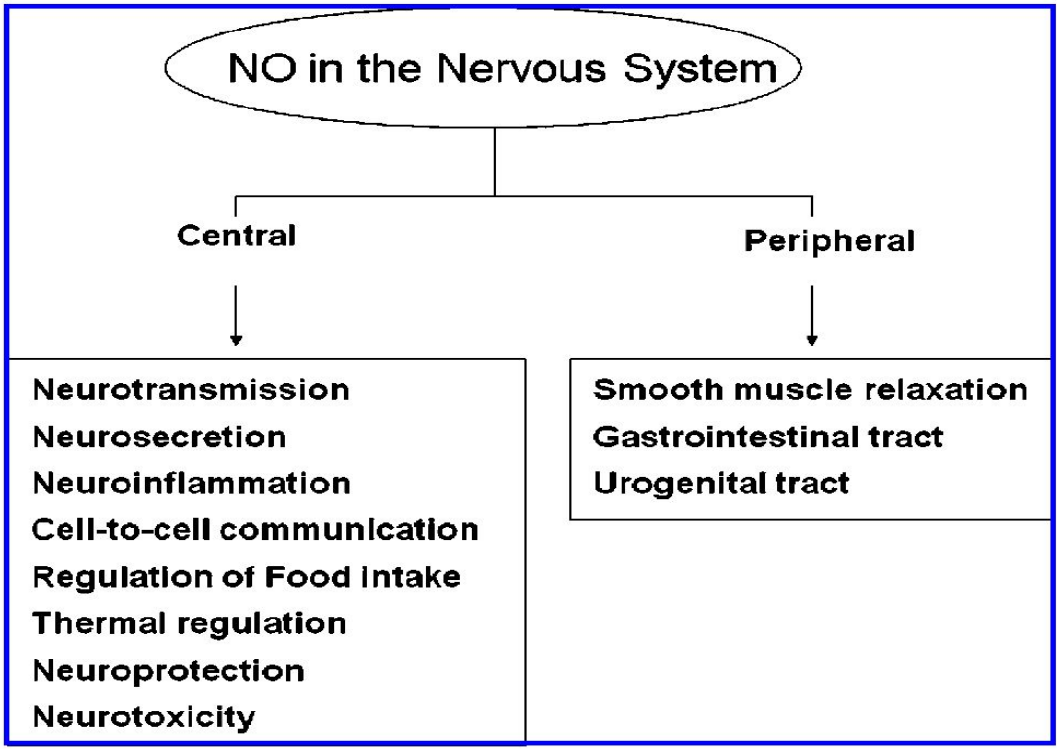
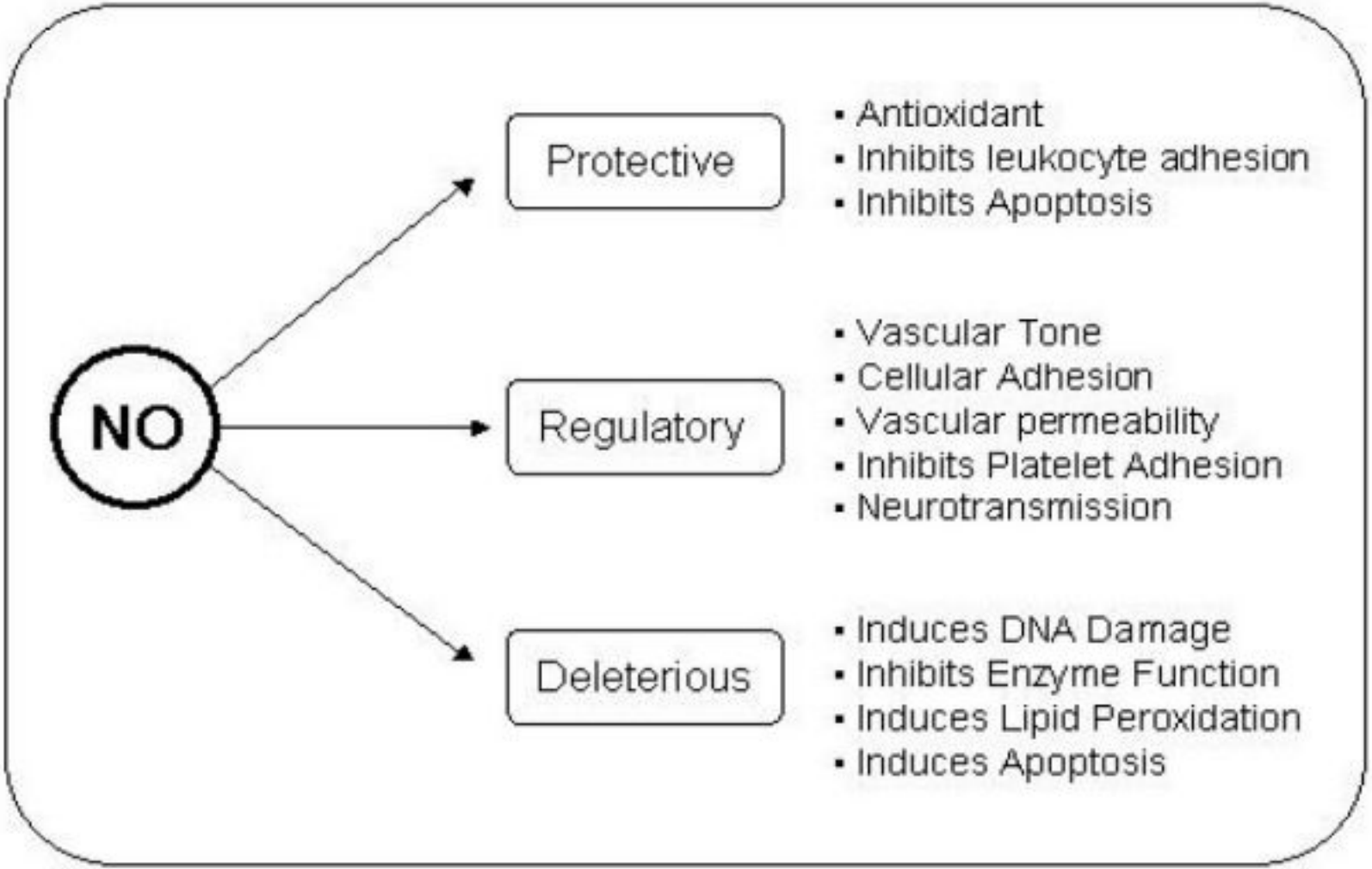


FIG. 2. Some of the main effects of nitric oxide (NO) in the central and peripheral nervous system.


NO
Protective
Regulatory
Deleterious
▪ Antioxidant
▪ Inhibits leukocyte adhesion
▪ Inhibits Apoptosis
▪ Vascular Tone
▪ Cellular Adhesion
▪ Vascular permeability
▪ Inhibits Platelet Adhesion
▪ Neurotransmission
▪ Induces DNA Damage
▪ Inhibits Enzyme Function
▪ Induces Lipid Peroxidation
▪ Induces Apoptosis

Red Blood Cells

- Previously, red blood cells (RBCs) were considered exclusively as transporters of oxygen and nutrients to the tissues.
- More recent experimental evidence indicates that RBCs are important inter-organ communication systems with additional functions, including participation in control of systemic nitric oxide metabolism, redox regulation, blood rheology, and viscosity.

Tertiary effects of LLLT

Tertiary effects in CNS, PNS, and immune function through increases lymphatics,cell proliferation-migration and new protein synthesis

Light also activates signaling pathways to the DNA ,culminating in biological changes in the cells including increases in neuroprotection.

Activation of transcription factor leading to anti-apoptotic, antioxidant, cellular proliferation

Cerebral Blood Flow

The vasculature in the brain is an actively regulated organ which, on the one hand, is influenced by global changes of systemic parameters (systemic blood pressure, blood gases, and blood pH).

On the other hand, is capable of locally directing the blood to the regions of demand with high spatial and temporal resolution.

Together with pericytes and astrocytes, as part of the neurovascular unit, cerebral vascular endothelium forms the tight blood-brain barrier and has an important immuno-regulatory function.

Studios show that CBF significantly can be increased with low level light therapy

PBM, Inflammation and Stem Cell Therapy

Chronic diseases of the modern age involving systemic inflammation such as type II diabetes, obesity, Alzheimer's disease, cardiovascular disease and endothelial dysfunction are again worth investigating in the context of PBM.

The versatile benefits of PBM on the brain and the central nervous system, encourages further study of its ability to reduce neuroinflammation.

There may be some overlap between the ability of PBM to activate and mobilize stem cells and progenitor cells, and its anti-inflammatory action, considering that one of the main benefits of exogenous stem cell therapy has been found to be its anti-inflammatory effect.

TBI and Low Level Light Therapy

Multiple studies show effectiveness of Laser treatments for:

Stroke: embolic.atherothrombotic, ischemic,TBI, brain degeneration

Central nervous disease: parkinson's , alzheimer's

Spinal Cord injuries

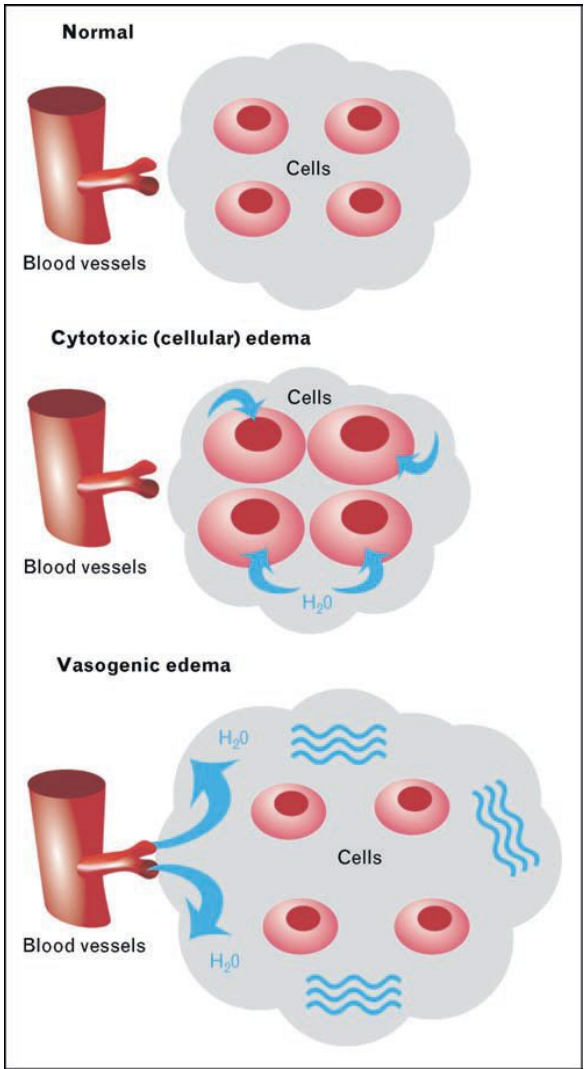
Peripheral nerve damage

Neuroprotection of other brain areas

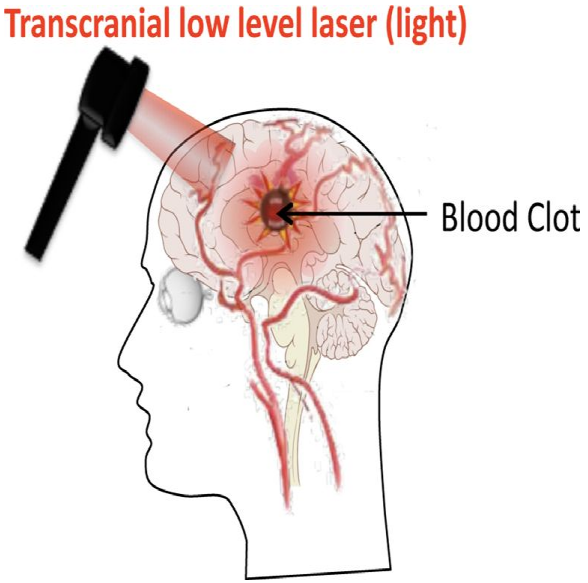
Evidence that transcranial LLLT is a beneficial treatment for acute TBI is rapidly accumulating.

- The large number of published studies that transcranial LLLT is effective for acute stroke suggested that the same approach would also be effective for acute TBI which shares many of the pathophysiological features found in ischemic stroke.
- The benefits of transcranial LLLT appear to be based on many different biological mechanisms.
- Neuroprotection or the ability of the laser to prevent the spread of brain cell death that occurs in the hours and days after a brain lesion is formed, is shown by the smaller size of the lesion area in LLLT treated mice.
- Anti-inflammatory, anti-edema and pro-angiogenic effects of LLLT may also have roles to play in the beneficial effects.
- Perhaps the most exciting possible beneficial mechanism is that LLLT may stimulate neurogenesis or increase the ability of the brain to repair itself.
- Not only may new brain cells be formed after LLLT but the existing brain cells may be encouraged to form new synaptic connections in the process known as synaptogenesis or synaptic plasticity.
- If these processes can be reliably shown to occur after transcranial LLLT it opens the door to the treatment being applied to neurodegenerative diseases such as Alzheimer’s and many diverse psychiatric disorders.

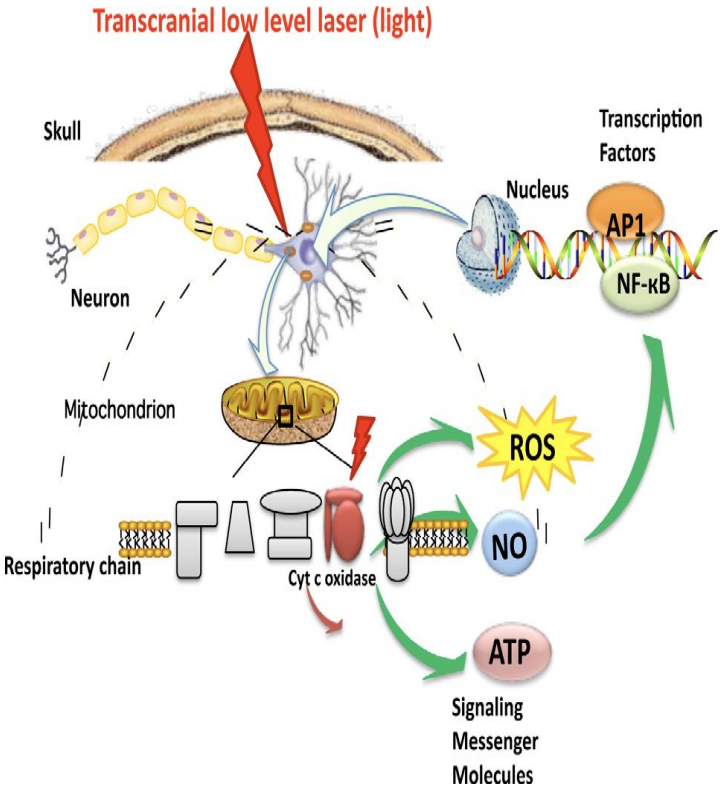
Cerebral edema with brain swelling remains the most significant predictor of outcome.



Cool Laser such as the Delta Laser



LLLT into Brain



Ocular Conditions Treated by Photobiomodulation

Chronic open angle glaucoma including restoration of retail ganglion cells

Optic nerve atrophy and optic nerve disorders including infant prematurity

Myopia reversal, acuity improvement in amblyopia

Macular degeneration , both wet and dry

Paresis of extraocular muscles,cranial nerve compromises, binocular dysfunction

Corneal diseases such Herpes and dry eyes

Summary of Actions

Restoration of conductivity in the optic nerve fibers

Improve microcirculation with hemodynamic corrections

Regulation of the autonomic nervous system

Neuro protection oc ocular tissues and nerves

Synergistic with vision therapy and other energetic therapies such as microcurrent , ultrasound , and cranial sacral therapy

Multi-Radiance Application

- Medical TX Head

Treatment : coMra Therapy

- Delta laser (10W) pulsed at 5cps,50cps, and 1000 cps
- Geometric presentation of red-yellow , violet/ blue –green LED’s in clockwise rotation
- Pulsed Infrared at 905 nm.
- Pulsed Magnetic Fields to enhance light stimulation
- Ultrasound to increase enzymes

Delta Laser

- Optic neuropathy protocol 5 minutes each eye post surgical cerebral bleed
- Application on Delta 5 minutes on the tumor site at 50Hz. (no ultrasound)
- 6 Sessions: esotropia reduced from 40D to 9 at far and 14 at near with diplopia only intermittent
- 6 sessions esotropia gone vertical greatly reduced , Tx DC

Nerve palsy Following a Stroke

- 6 sessions of Delta at the hemorrhage site of a 62 year old male following a heart attack and cerebral bleed
- 24 diopters right esotropia, with diplopia ,was fused and eso reduced to 4 diopters
- This followed 3 months of steroids and patching by ophthalmology with no change in the esotropia

Audio Visual Entrainment

Entrains frequencies for following effects: Brian wave entrainment, hypnotic induction, Autonomic nervous system calming, increased heart rate variability, increase cerebral blood flow, increased neurotransmitter activity

Especially helpful for sleep problems, ADD, ADHD, and brain injuries

Restores brain wave rhythms

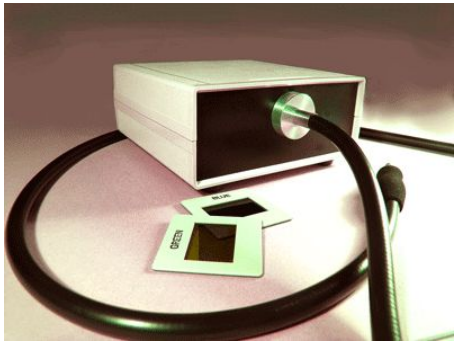
Examples : ADHD give SMR/Beta mix- increase left brain to improve attention and relax right and brain to reduce hyperactivity and distractibility- L13.5/R18,

Beta/Theta to increase right and reduce left analytical brain-L18/R6


mindalive
CES
VOL
INT
david
delight pro
made in
canada

Photon Stimulator

- **This model is designed to allow you to apply light to acupuncture points, and micro systems.**



Macular Degeneration

- Ivanic treatment protocol : red 40 seconds trans-illuminated macula from temporal conjunctiva
- Wallace found acuity immediately improved from 1 to 4 lines of acuity in 6 patients
- For example: 20/800 to 20/200, 20/100 to 2o/60. These improvements have lasted up to one month when treatment has been repeated. Currently holding for 4 months.

Dry Eyes

- Irradiation along lid margins for 40 seconds to reduce inflammation of MOG
- All patients report subjective improvement in comfort
- Tear breakup time increases up to 50%
- MOG expression immediately increased
- Long term relief has now been repeated now for 4 months with increasing efficacy.

Focal Syntonics

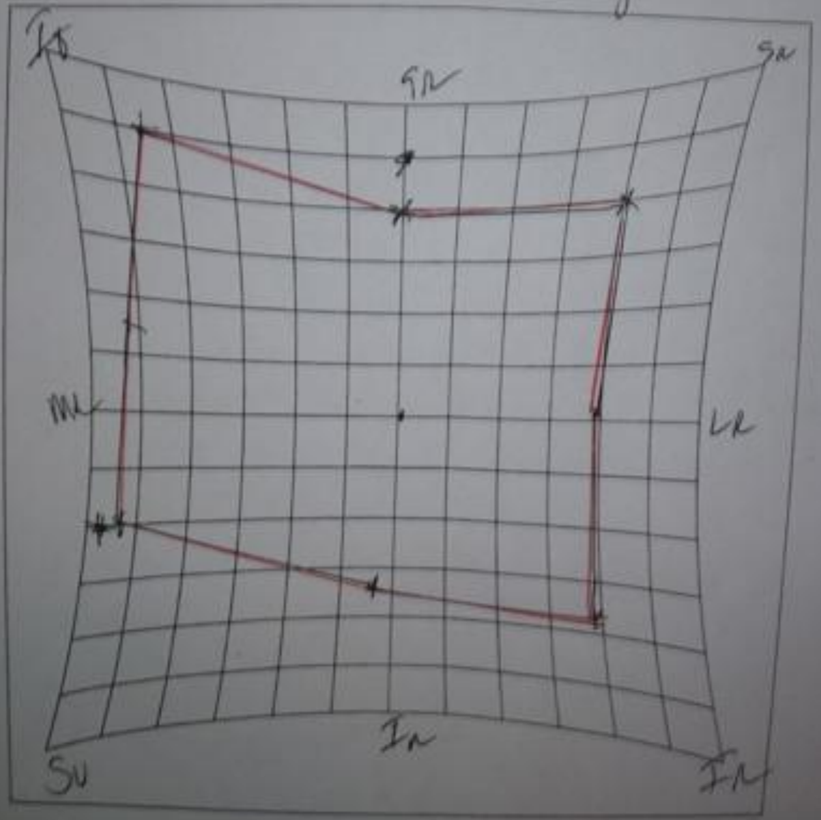
- Application of Syntonic colors at the insertion point in each extraocular muscle and to influence each cranial nerve.
- This also results in shifting the cranial bones, dura mater from the occipital bones to the base of the spine.
- Postural shifts and restoration on balance is frequently seen

Patient Name: Lynn Gaub

Date: 2-9-12

Test Administrator: ____________________

field vs
[illegible] OD



Right SO and Left SR

Results

- Changes in phorias and range of movement in the EOM’s
- Alteration of balance and posture
- Changes in binocular ranges of motion and fusion
- Visual Field expansions with decreased blind spots related to Dural torque
- Changes in the cranial bones including jaw and alignment of teeth

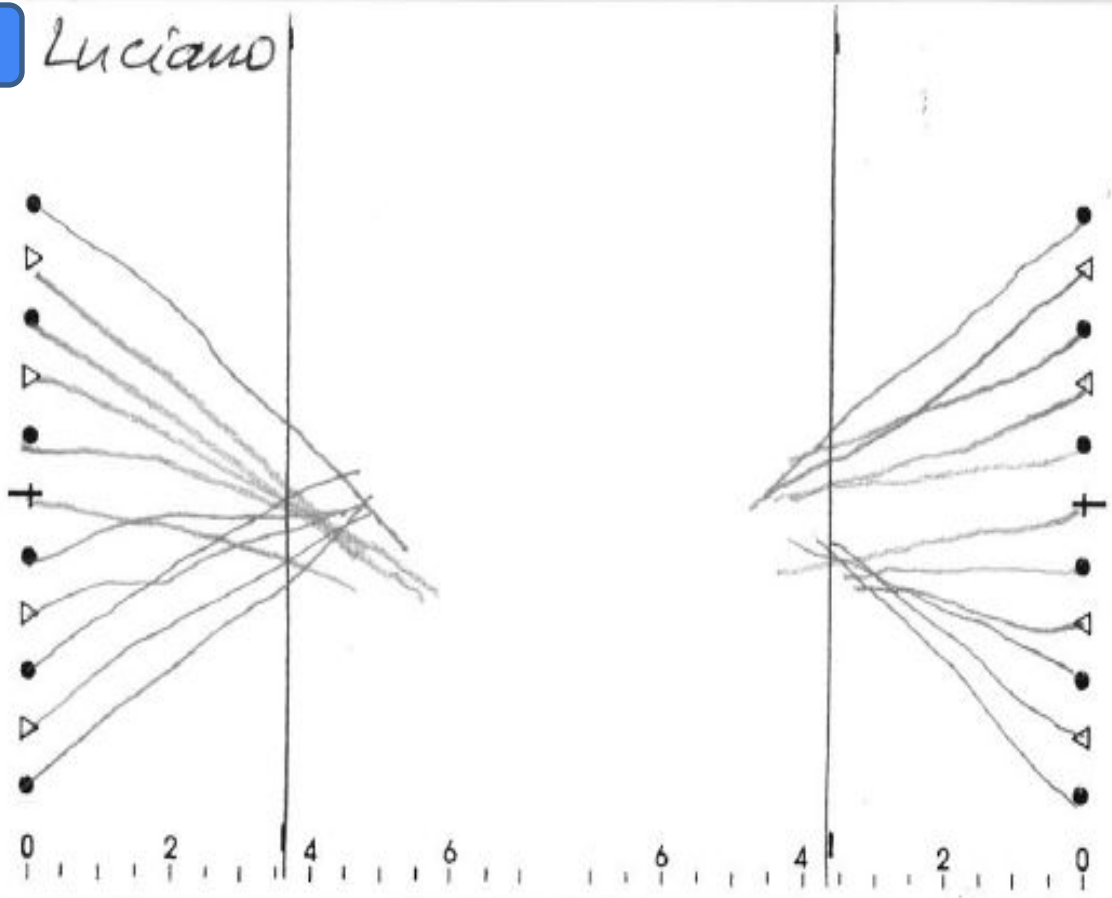
Luciano

- Hx of 4 concussions during football games/practices
- 6 visits with Rx including Dynamic Integrative Vision Therapy (Syntonics, SVI, EOM stim, dynamic balance),
- Syntonic Rx: Upsilon-omega /Mu-Upsilon , focal syntonics on EOM
- Difficulties with reading and reading comprehension
- H/A with photophobia
- Blurred vision at near with alpha-omega 3
- Findings: esophoria at near with significant accommodative dysfunction.
- Contracted visual fields with large blind spots

NAME [redacted] Luciano

DATE 3/24/17

VAN ORDEN STAR



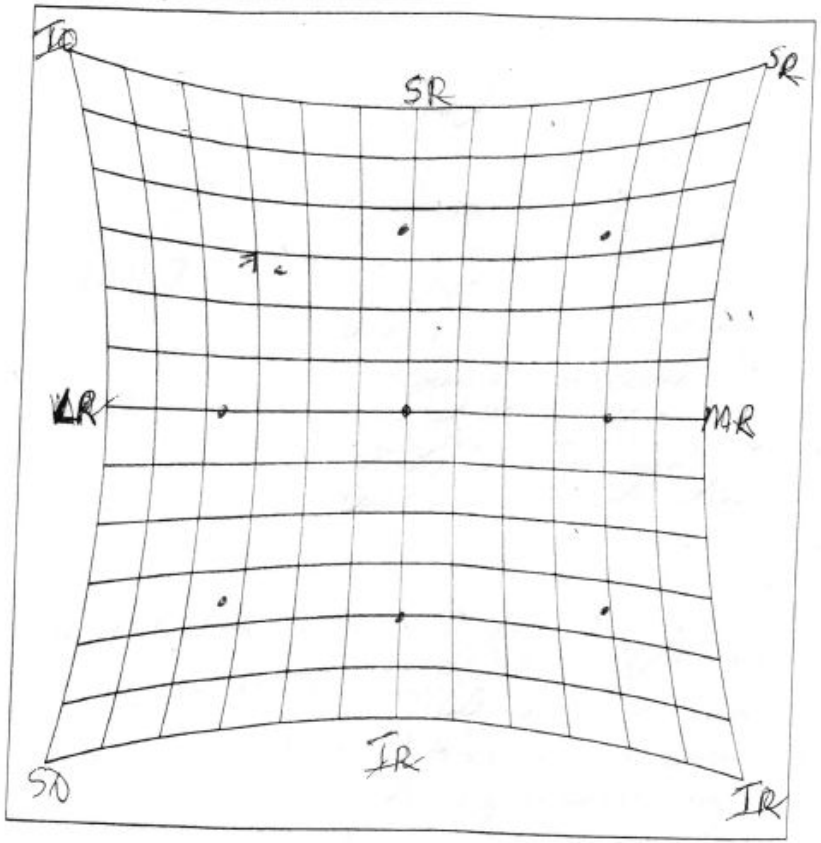
Hess Screen Score Sheet

Patient Name: [redacted] Luciano

Date: 3/24/17

Test Administrator: _____

Field of OS (green on OD)



Rev 1.0 0805

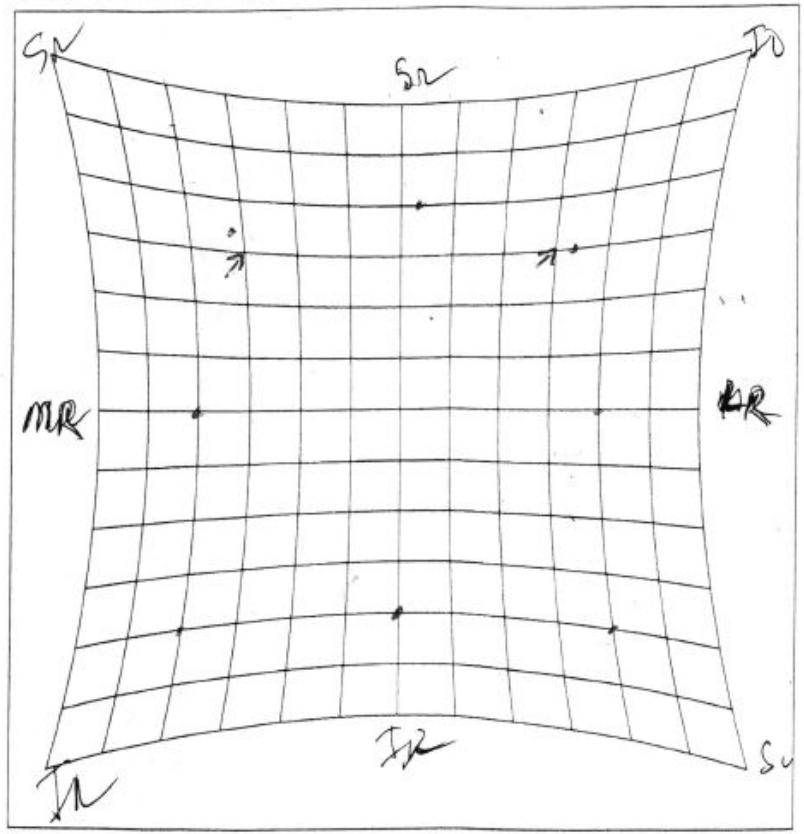
Hess Screen Score Sheet

Patient Name: Luciano [redacted]

Date: 3/24/17

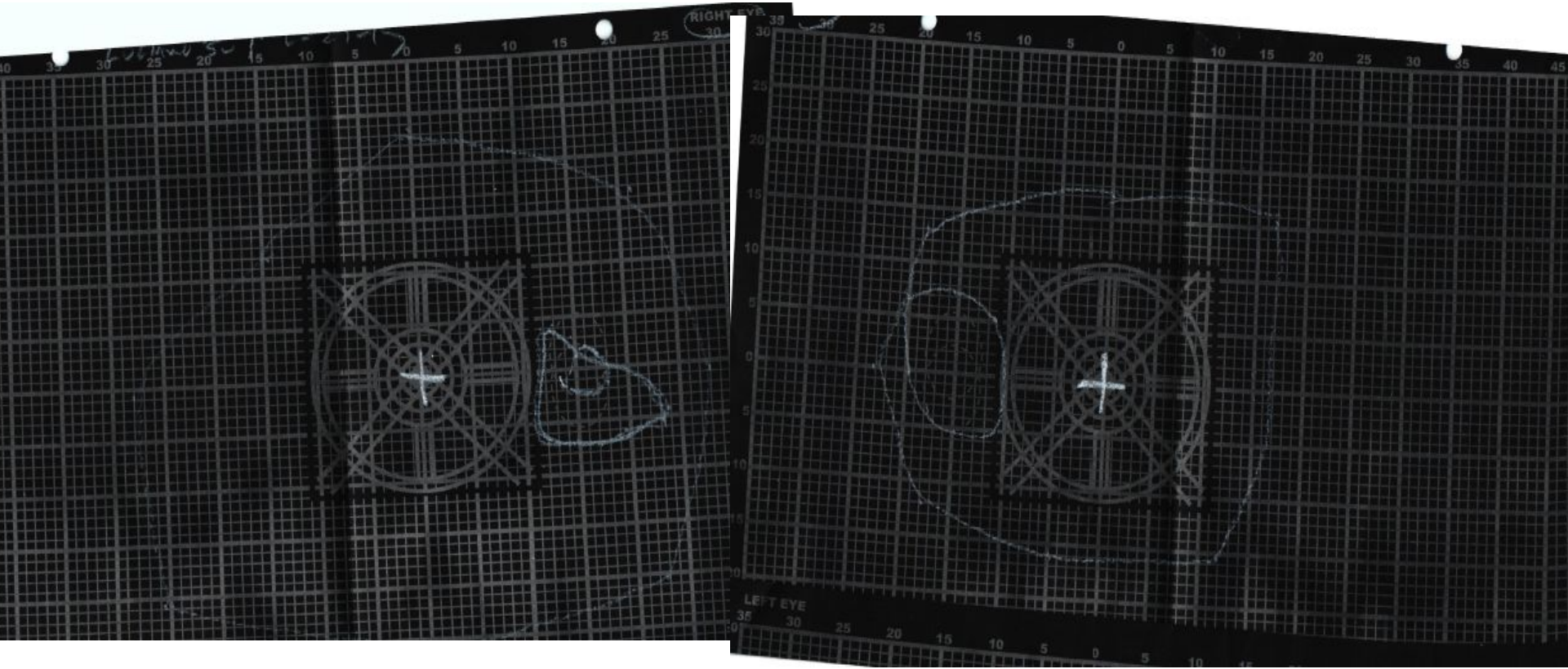
Test Administrator: _____

field of (green on OS



Rev 1.0 0805

Right eye 2/27/17 Left eye



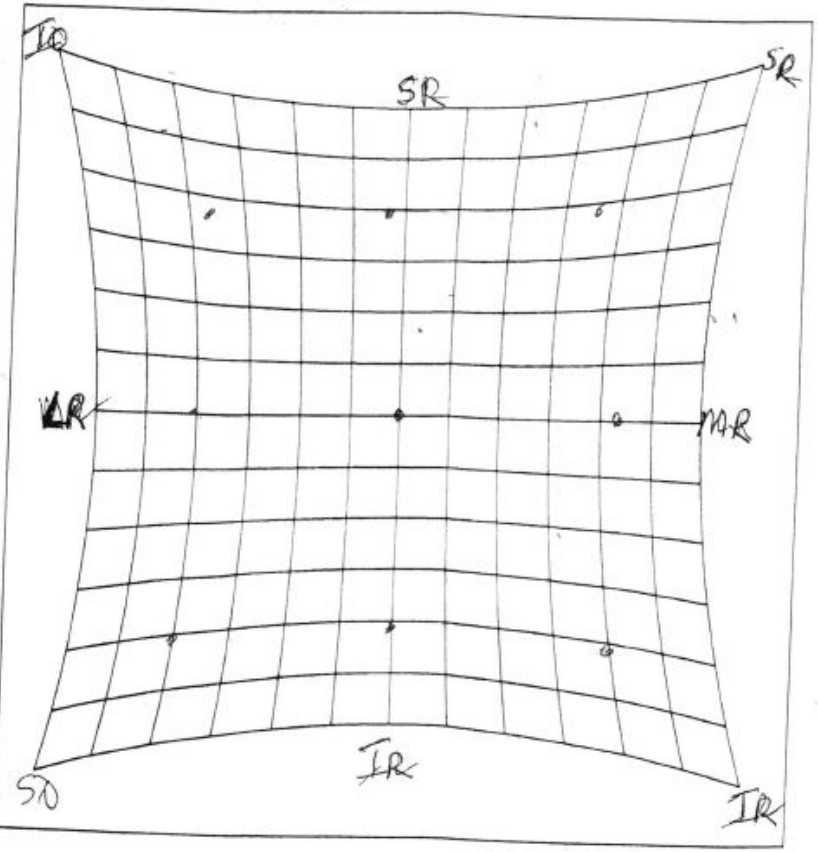
Hess Screen Score Sheet

Patient Name: [redacted] Luciano

Date: 5/5/17

Test Administrator: _____

Field of OS (green on OD)



Rev 1.0 0805

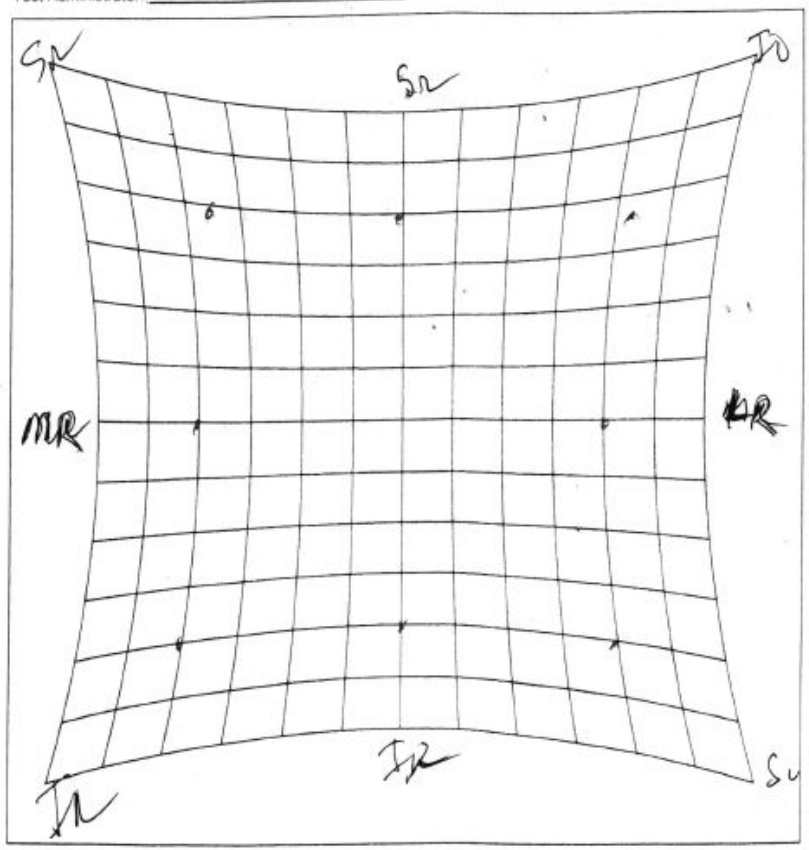
Hess Screen Score Sheet

Patient Name: [redacted] Luciano

Date: 5/5/17

Test Administrator: _____

field of (green on OS



Rev 1.0 0805

[redacted]

Luciano 5/5/17

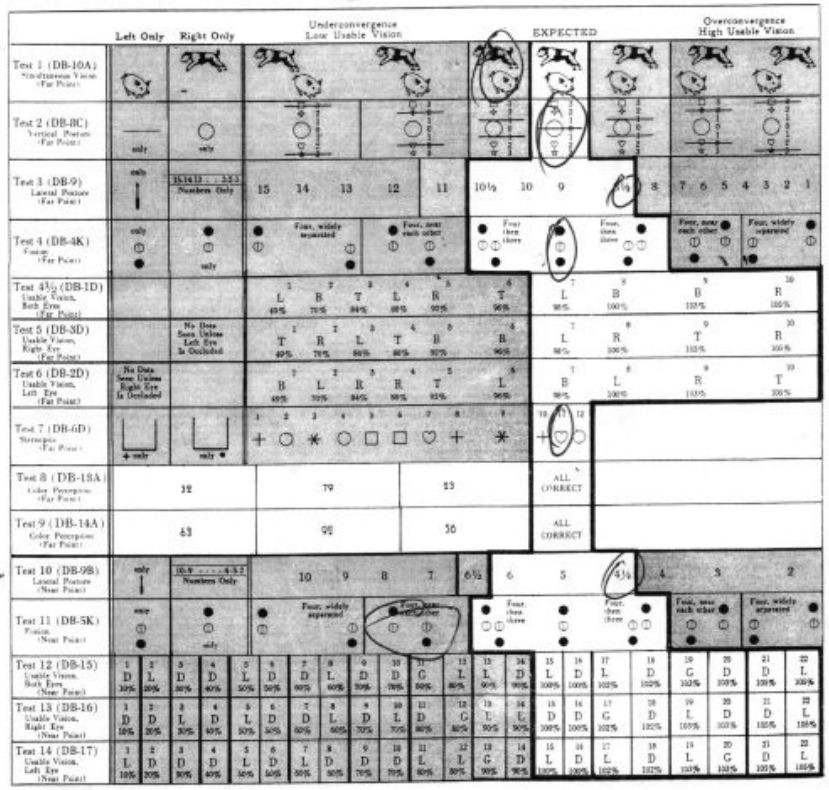
VO 2

BINOCULAR BEHAVIOR PATTERN

KEYSTONE VIEW

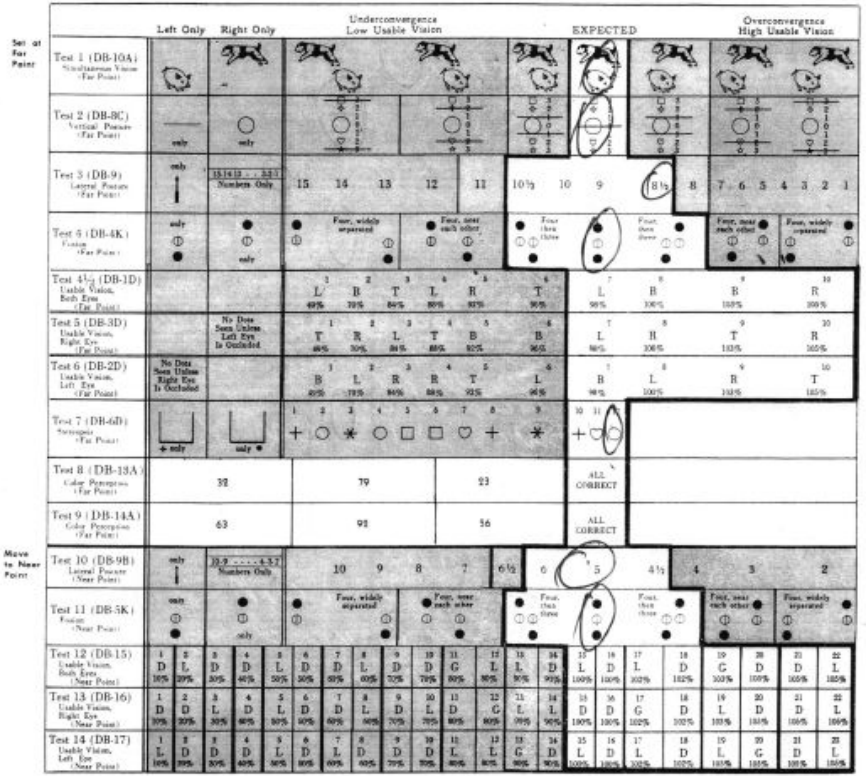
COPYRIGHTED

Name [redacted] Wearing Glasses: Yes_____ No X



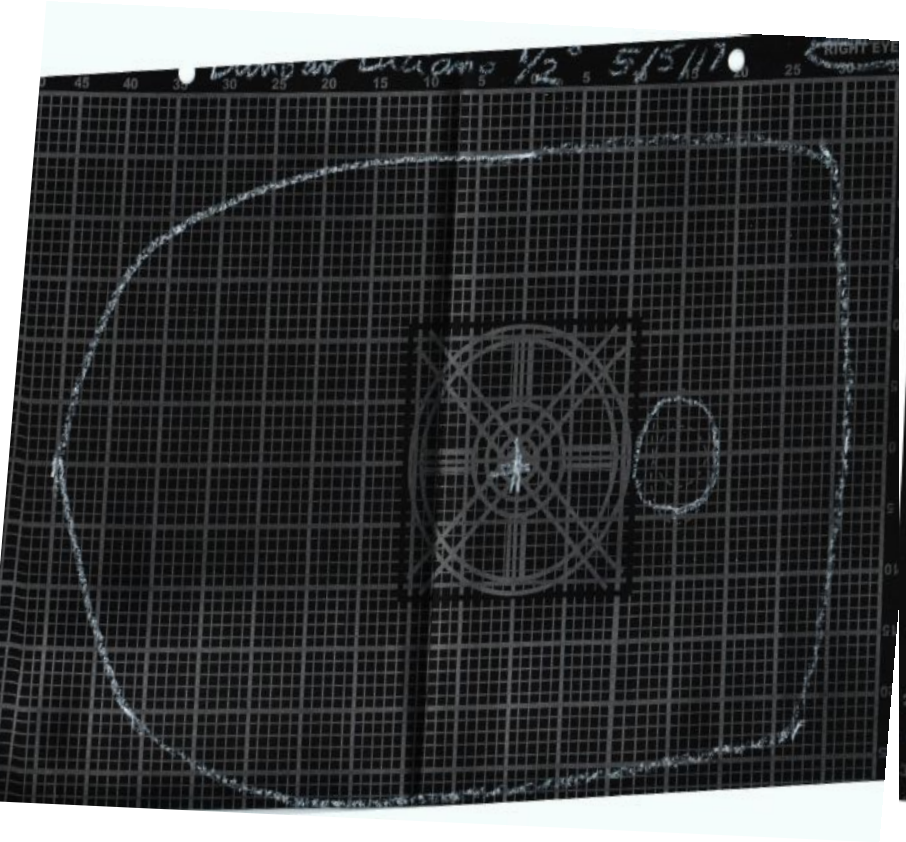
NOTES:

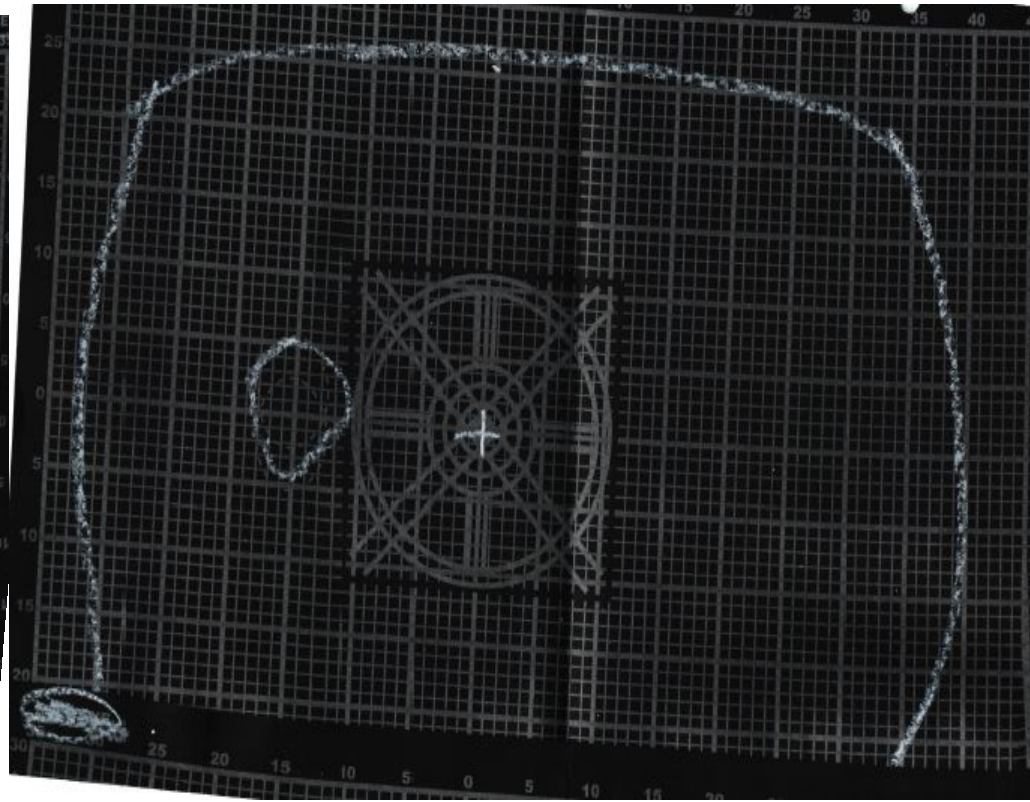
Name [redacted] Wearing Glasses: Yes_____ No_____



NOTES:

Right eye 05/15/17 Left eye





Luciano

- Reduced H/A to min, alpha omega #1
- Able to see and read road signs
- Improved reading comprehension with school work
- Binocular coordination and fusion are normal for far and near
- Accommodative function restored to normal