

The Theory and Practice of Syntonic Phototherapy: A Review

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ABSTRACT:

The article provides an introduction and basic overview on the theory and practice of Syntonic Optometry. Syntonics is derived from “syntony,” which means to “bring into balance”. It is believed that specific light frequencies entering the eye can balance the autonomic and endocrine systems. These systems serve as the neuro-physiological foundation to visual motor function. The pathways of ocular light stimulation will be reviewed, as well as current scientific models of how light effects physiology. Examples will be provided of other professions using phototherapy. The basic diagnostic and therapeutic protocols of syntonic optometric therapy will be discussed.

The application of colored light for healing dates back to the earliest times of recorded history, including Egyptian and Mayan civilizations. The modern use of color therapy can be found in the works of Edwin Babbitt M.D., Carl Loeb, M.D., and Dinshah Gadiali's Specta-Chrome system. These pioneers in the late 1800's and early 1900's used colored light shown directly on the body to treat hundreds of physical and psychological conditions. Optometric use of color began with the field of chrome orthoptics developed by William Henning in the 1920's. His instrument exposed patients to colored light along with lenses and prisms to train a myriad of functional

vision problems. He achieved excellent results as can be seen in the books he published.¹

The breakthrough research in the ocular application of specific frequencies of light was conducted by Harry Reilly Spitler, M.D. DOS, who published his seminal work, *The Syntonic Principle*, in 1941. Spitler was the first to detail the biology of the non optic tract showing ocular light stimulation results in changing the physiology of the thalamus, hypothalamus and pituitary gland. Syntonics, derived from the word “syntony”, means to bring into balance, specifically the autonomic and endocrine systems which serve as the major support neurologically to vision. Spitler concluded that imbalances in the nervous and hormonal systems caused many bodily, mental/emotional, and visual ailments. Spitler detailed how specific light frequencies effect cell biology, inherent electrical systems in the eye and brain, eye physiology, ocular functions, and emotional centers. This also includes light frequencies have the ability to affect EEG patterns. It is believed that certain color frequencies can build or discharge electrical potentials between cell walls and between organs such as the brain and liver. This also includes electrical ionization in both the brain and retina. Emotional balance is impacted by light's effect on the heart rate variability and the hormones affecting emotions.²

Spitler elaborated the retinal-hypothalamic pathways and proposed that certain frequencies of light could balance inherent regulatory centers in the brain and correct vision problems at their source. Treatment protocols have been created to treat deficits in ocular motilities, accommodation, visual discrimination, binocular function, information processing, and visual field defects. The syntonic model suggests that low energy/long wave-length (red) visible light stimulates the sympathetic nervous system, middle frequencies like green light balances physiology, and high energy/short wave light (blue) activates the parasympathetic nervous system. Spitler did a study of 3067 individuals treated with syntonics and

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found 2791(90%) responded positively.² Those who use syntonics believe that this model of treatment has stood the test of time. The College of Syntonic Optometry, which he established in 1933, recently had their 77th annual conference in 2009.

The physiological model presented by Spitler was ahead of its time. It was later fully documented by Fritz Hollwich, M.D. in his text: *The Influence of Ocular Light Perception on Metabolism on Man and Animal* in 1979. Hollwich did studies that found severe disease states in those who were deprived of ocular light exposure. The disorders studied demonstrated abnormalities in body temperature, kidney, thyroid and metabolic function. Also found were abnormal sexual, adrenal and pituitary function, as well as abnormal blood counts.³ The non visual pathways in the optic tract serve to stimulate the hypothalamus, pineal, pituitary, pituitary-adrenal axis and promote balance in various physiological systems. The neurological pathways are only part of how light frequencies affect us.

Another major system affected by light is the blood. Our eyes pass and pool a very high amount of the body blood volume. It is the only area of the body where the vascular system is directly exposed to light. Syntonic color treatment can irradiate a large volume of our blood in a typical 20 minute time period. Blood functions are partly autonomous, serving to transmit agents to and from the cells and organs. This may also include energy and information. The vascular system serves as a major carrier of light sensitive chemicals. The classic example is the use of blue light to treat neonatal jaundice. Bilirubin, is a yellow chemical that accumulates in the tissues that readily absorbs light at 450 nanometers. It is broken down and eliminated after exposure to blue light.⁴ The blood contains photo acceptor molecules that absorb visible light radiation and then regulate various biochemical activities. Tina Karu, a Russian biophysicist, has conducted much of the leading research in this area. Among many of her findings she has demonstrated that coherent and non coherent colored light can directly enhance cellular metabolism via the respiratory chain, cellular signaling, ATP production through direct responses in the mitochondria, RNA and DNA synthesis, and mobilization of phagocytes for waste removal.⁵ The field of biological utilization of lasers is very great. Current research and various aspects of using light as therapy can be reviewed in the *Journal of Biophotonics* and on the web at <http://www.worldlaserassociation.com>. Many of the biochemical changes induced

by light continue without further light activation. Especially important is the photo stimulation of nitric oxide.

Nitric oxide (NO), as a blood constituent, works to control body stress reactions. NO, which is stored in the hemoglobin, is set free with light stimulation and serves to relax blood vessel walls. The hypothalamus and pituitary gland have receptor sites for NO. Therefore NO may have a biochemical signaling affect which serves to regulate autonomic nervous functions. Nitric oxide appears to modulate secretions of pituitary stress hormones such as prolactin, luteinizing hormone, vasopressin and growth hormone. Underproduction of NO contributes to hypertension, arthero-sclerosis, diabetes, ischemic heart disease, and tumor growth. Over production is associated with hypotension, excessive vasodilatation, and glaucoma. NO is often associated with several neurodegenerative and neurovascular diseases such as Parkinson's, Alzheimer's, multiple sclerosis, fibromyalgia, and chronic fatigue syndrome.⁶ The NO-hemoglobin binding and the release of NO by irradiation may be one of many photonic chemical reactions mediated by light.

In his ground-breaking research, William Douglas, M.D. found that irradiating blood with ultraviolet light had profound effects on the immune and energy systems of the body. He found that drawing 1.5 ml of blood, irradiating it for 10 seconds and then injecting it back into the body would inactivate toxins, kill bacteria, increase oxygen content and cell function. This treatment also would decrease blood sugar, activate vasodilatation, parasympathetic hormones. Additional actions include dilation of the bronchioles, and decreasing calcification of the pineal gland. There was also an increase of biophotons in the blood when disease was present.⁷ How could such a low exposure to such a small quantity of blood have these broad effects?

There is an emerging theory that postulates that besides electromagnetic energy, there are information fields that serve to organize and regulate biological activities. Ervin Lazlo, a physics and system analyst believes information is the 5th force governing our planet along with gravity, electromagnetic, and strong and weak atomic forces. His theory draws from quantum physics, neurobiology, and astrophysics. This information field is spectral, and holographic in nature and connects all parts of the organism with the environment.⁸

In the fields of quantum biology and integrative biophysics a new paradigm is emerging that in part theorizes that light and electromagnetic fields are the energy and information organizers of all organic activity. A cell may have a hundred thousand reactions occurring per second. How does the body coordinate all these biological events to create the symphony of parts which make us whole? This is beyond the scope of traditional biochemical models. It has been shown that when blood is exposed to light and color, it changes its crystalline structure becoming less or more organized depending on the coherence and quality of the irradiation. Water itself has a charge density plasma that creates direct currents that are self organizing, internally generated, and very sensitive to the environment's electromagnetic fields. The charge density changes its positive and negative charges with anabolic and catabolic actions in the body. This may be another communication system that relies on local and non local energy such as light from the environment.⁹ It may be that the crystalline structure itself serves to guide energy and information via the blood to all cells and organs.¹⁰ Disruption of the colloidal structure of blood can be a sign of disease.

Biophysics has demonstrated that our biological systems respond to electromagnetic stimulation in a global or nonlocal nature. Bruce Lipton has conducted research to show that each cell has cilia that responds to electromagnetic stimulation which in turn changes amino acid synthesis in a manner that alters both our RNA and DNA. This creates an electromagnetic terrain governing physical and emotional health and disease.¹¹ The sensitivity of DNA to environmental stimuli has given birth to a new field of science that embraces the plasticity of genetic evolution called epigenetics.¹² James Oschman in his book *The Scientific Basis of Energy Medicine*, has shown the existence of a liquid crystal matrix consisting of collagen, peri-vascular, and connective tissue that communicates electromagnetic energy throughout the body at superconductive speed. He theorizes that our hormone and cell physiology are regulated by this communication system. This process uses light as a major component both to connect with our environment and for intercellular communication.¹³ Within the cells our DNA radiates light both in the ultraviolet range and as single photons, called biophotons. Much of the initial research on biophotons was done in Germany by Fritz Popp. He found that our cells continually radiate photons with excessive radiation being a sign of disease. He currently

is studying the relationship of the number of photons emitted relative to certain conditions and the change that occurs with various treatments. He also believes that the cells use these biophotons for intercellular communication.¹⁴ It is through this communication that information can travel at the speed of light to coordinate and regulate the millions of biochemical intercellular reactions. Within the cells, research has found that they communicate using infrared light to organize biological activity. The cell centrioles contain a sophisticated eye which processes infrared light to measure spatial and temporal information. The infrared light is created from the mitochondria. This cellular vision implies an intrinsic intelligence which uses light for intercellular communication. This may be how larger cell populations organize for a common function.¹⁵ Marco Bishof has been a thought leader in integrative biophysics for many years. His manuscripts and lectures detail the coordination of the organism's biological function via biophotonic communication. Photons traveling through the body's bioplasma create morphogenic fields that organize electromagnetic and biochemical events.¹⁶ This biophotonic communication system links and synchronizes biological function. One area of particular significance is the ability of colored light to resonate with various enzymes in the body. Enzymes are necessary for all biochemical reactions. Enzymes not only act as catalysts but also store energy in their helix shaped protein chains. This energy allows a single molecule of enzyme to break down 5 million molecules a minute in certain cellular reactions. When enzymes drive chemical reactions, they create a three dimensional structure within which the reactions take place.¹⁷ The geometry of these structures may be crucial for information and energy transfer and serve as wave guides for electromagnetic energies. Ultimately these fields are linked to all energy and matter via light. Quantum physics theorizes that all matter is created from virtual photons that exist in empty space. Virtual photons exist as a wave form or potential energy and collapse into matter as particles at a vacuum point called the zero point field. The zero point field may be the interface of all energy and matter. Light is therefore the building block for all matter in our world. David Boehm, the famous physicist, often said, that "*all matter is frozen light*".¹⁸ It is clear that the power and mechanism of using color and light in healing involves neurological and biochemical pathways.

Over the last 25 years the College of Syntonic Optometry has invited many of the premiere thought leaders in the field of light therapy and energy medicine to present at the annual conference. The convergence of these scientists has created a knowledge base to better understand the scientific basis for this work. A review of some of these scientists may introduce the reader to their studies and to the emergence of a new paradigm in health and healing. Optometry was very involved in energy medicine in the 1920's. In the book, *Ocular Physical Therapy for Optometry*, Jack Kurtz details the use of electro-medicine, galvanism, massage, nutrition, diathermy, and light therapy to treat a wide range of visual conditions.⁹ These modalities fell out of use after the rise of pharmaceuticals and the legal actions to restrict their use by the American Medical Association. The resurgence of energy modalities corresponds with the rise in quantum biology and biophysics and the practice of alternative and complementary medicine. It is many of these practitioners and scientists who have added to the knowledge basis of phototherapy.

Light Therapy in Other Professions

Presently there are many healing professions that utilize light and color. Low-power lasers are used by physiotherapists for acute and chronic musculoskeletal injuries, by dentists to treat inflamed oral tissues, and by dermatologists for pain, ulcers, burns and dermatitis. Rheumatologists use cool lasers for pain and inflammation. Within the field of sports medicine lasers are used to treat pain, edema, to restore mobility, and for wound healing. Color is applied to various points in the body corresponding to acupuncture and muscle trigger points.²⁰ The most well known applications are in the field of psychiatry where light is used to treat seasonal affective disorder. National Institute of Health studies by Rosenthal, Lewy, Brainard and Reiter have found that light can act as a drug to treat chrono biological disorders.²¹ It has been well documented that light regulates circadian and hormonal rhythms in the body.²² A field of acupuncture has been created called color puncture, where needles have been replaced by small beams of different colors on the acupuncture points. It is common to hear from such practitioners that using color is more effective than using needles. Other acupuncture practitioners such as Nishant Matthews, creator of Samassati Color Therapy, uses color off the body points to treat a wide range of physical and

emotional conditions.²³ Steven Vasques, the creator of Brief Strobic Psychotherapy, uses the viewing of pulsed color while doing talk therapy for a broad range of psychiatric conditions. The use of color into the eyes has accelerated and deepened his results.²⁴ Sarah Cobb has developed a system called Acculight which applies colored light into and around the eyes to treat various vision problems.²⁵ David Sievers, creator of the company Mind Alive, has invented a series of neuro-entrainment devices that use pulsing sound and light to entrain EEG patterns for the treatment of such conditions as ADD, PMS, SAD, PTSS with success.²⁶ Karl Ryberg has invented and applied the use of monochromatic light within a ganzfeld dome to irradiate the whole body for the treatment of physical and emotional disorders.²⁷ Pierre VanObberghen, created a psycho-physical testing system for color therapy, the Colorscope, based on emotional and biological research.²⁸ A German physician, Alexander Wunsch, treats patients with the "Spectro-Chrome Method," where he irradiates parts of the body with color to treat hundreds of illnesses.²⁹ The use of color is becoming more accepted in many healing professions even without having the historical precedent of Syntonics.

Syntonics and Optometry

Research in optometric use of Syntonic phototherapy has been sparse over the years. Partly this has been due to the fact that the College has been governed by practitioners in private practice who lack the time and expertise to conduct double blind studies. Colleges of optometry may not have been interested in doing research due to the lack of scientific research establishing the mechanisms involved when using light therapy. In 1993, Robert Michael Kaplan published *Changes in Form Fields in Reading Disabled Children with Syntonics*. He concluded that syntonics increased visual fields and learning performance in children with learning disabilities.³⁰ Jacob Liberman published *The Effect of Syntonic Colored Light Therapy on Certain Visual and Cognitive Functions* in 1986. He concluded that those treated with syntonics had increases of 400% in visual span, 208% in field size, 700% times in visual memory, 160% in auditory memory, and 75% had improved school work.³¹ Steven Igersoll published *Syntonics as Reading Enhancement at the Livingston Developmental Academy* in 1999. He employed an integrated visual learning program (IVL) with students training attention, perceptual, cognitive

techniques as one control, syntonics by itself and IVL and syntonics as treatment. Reading was measured using the Visagraph. He found that only when syntonics was included did the visual fields expand and this was critical to reading improvement. The best outcomes were with syntonics and IVL.³² John Searfoss published *Visual Performance Fields* in 1994 and *Loss of Visual Sensitivity in School Age Children* in 2000. He found 20% of children in grades 3 to 10 have constricted fields. This field constriction lead to a dysfunction of visual processing with a loss of parallel integration of the Magno-Parvo Systems. This is accompanied by loss of visual attention flexibility. Searfoss emphasized the role of attention in learning and visual field deficits. Without attention there can be no visual perception.³³

The Annual Conference on Light and Vision

Various study topics have been presented over the years, sponsored by the College of Syntonic Optometry. These include research done by the individual doctors in their offices. An overview will give the reader a sense of the wide range of topics that have been explored and reported. Various presentations have noted that there is a strong correlation between Syntonic treatment and anomalous spatial projection, retinal scanning, photo transduction altering blood hormone levels, and altered EEG patterns in reading and vestibular disorders. Others have noted that syntonics and cranial sacral therapy removed constrictions and reduced enlarged blind spots in the visual fields. My work demonstrated a relationship of syntonic treatment to flicker fusion, seasonal affective disorder, traumatic brain injury, heart rate variability, and reading disorders. (These presentations have been published in *The Journal of Optometric Phototherapy*, and can be seen accessed via <http://www.syntonicphototherapy.com>)

Using Syntonic Phototherapy

Syntonic phototherapy is prescribed for patients who have deficits in ocular motor skills, binocularity, accommodative facility, visual discrimination, visual fields, and information processing, as well as systemic anomalies such as headaches and various ocular pathologies. Treatment requires 20 minute sessions, three or four times a week while viewing specific frequencies of color. The color is administered through various instruments with a white light source, a collimating lens, and different colored

absorption filters. Specific filters are prescribed for particular conditions.

Patients with a history of head trauma, high fevers, ear infections, emotional trauma, and headaches are frequently candidates for treatment. Most show anomalies in the autonomic nervous system. A sign of this is often seen with the pupil release to direct illumination. A penlight held a few inches from each eye will show a release in constriction within a few seconds. The degree of this failure to hold constriction is proportional to autonomic fatigue. This is referred to as an Alpha-Omega Pupil. The severity of the release corresponds to constrictions both in the ocular motor skills and visual fields.

Visual fields are measured with a campimeter at near and with using kinetic sensitivity to white and colored 1.5 degree targets for the central 60 degrees. These fields are monocular and include the blind spot. All responses are recorded from non-seeing to seeing. Color fields taken with green, red, and blue are critical for determining toxicity and the emotional causes of visual anomalies. Color fields also are diagnostic for systemic disorders like cardiovascular problems, metabolic and endocrine disease, and to differentiate exogenous and endogenous toxemias. For example, a constriction in the green field indicates a focal infection; the red field, a systemic or organic disturbance and in the blue field, a problem in the adrenals or thymus glands.³⁴ There are only two automated field charters that correlate with these fields. One is the Frequency Doubling Technology which can measure magno-cellular defects in the field. Deficits in motion fields will disturb binocular and accommodative function, reading speed, comprehension, tracking skill, and information processing. Studies since 1927 have found 9 to 27% of unselected children have visual fields less than 15 degrees in diameter.³⁵ Vision therapies are not complete until the fields and blind spots are normalized. Patients with strabismus often have a constricted field in the deviating eye which can be expanded with syntonic treatment relatively quickly. Without full fields normal binocular fusion is difficult to achieve. It is the importance that Syntonics places on visual fields and pupils in diagnosis and treatment that differentiates this practice from classical vision rehabilitation. Some of the obstacles to successfully treat difficult cases with traditional vision therapy can be overcome with the incorporation of syntonics.

Treatment and diagnosis embrace the idea that imbalances in the autonomic nervous system need to

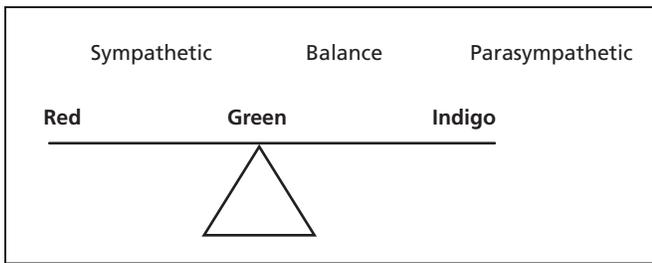


Figure 1

be addressed. A simple balance board of the autonomic and the actions of color represent this basic tenet with red stimulating sympathetic and the indigo activating the parasympathetic system. (Figure 1)

Sympathetic actions include dilation of the pupils, increased tearing and intraocular pressure, decreased accommodation and convergence (sympathetic over arousal creates an exo response), and systemic effects like increased pulse, blood sugar, and blood pressure. Sympathetic actions occur through the thyroid, adrenal medulla, pituitary, gonads, and muscles. Parasympathetic activation contracts the pupils, decreases tearing and intraocular pressure, increases accommodation and convergence, while systemically lowering pulse and blood pressure and sugar. Parasympathetic actions occur through the parathyroid glands, adrenal cortex, digestive tract, liver, pancreas, and spleen. The endocrine glands supply the blood with hormones that stimulate and relax all ocular motor activity. Spittler theorized that most binocular and accommodative disorders were conditioned through autonomic imbalances and light frequencies could restore balance to the autonomic nervous system and its supportive role in vision. For example a patient suffering a head injury would, through excessive sympathetic arousal from trauma, have exophoria as a conditioned motor posture. The application of blue and indigo light, parasympathetic activators, can cause an esophoric reflex and thus recondition the phoria. The success of using this approach has been seen clinically with accelerated results when combined with classical fusion training. Syntonic therapy will create a balance in the neurophysiology that allows faster results. A consideration of autonomic imbalance is very important for those practicing syntonics. Of course the autonomic nervous system does not function simply as a balance board.

Light frequencies can have local and nonlocal effects on the autonomic nervous system. The branches of the autonomic can be coupled so as the sympathetic branch is stimulated the parasympathetic

branch is inhibited and vice versa. They may operate in a coupled nonreciprocal mode: mutually antagonistic or can be co-activated or co-inhibited. Here either the sympathetic or parasympathetic are both excessively stimulated and depressed. This often happens with trauma and is in evidence when patients are full of rage or deep withdrawal. Finally, there can be unilateral or uncoupled modes where only a local effect occurs from either the sympathetic or parasympathetic branch. This is seen with acute injuries to a small area, such as a corneal abrasion.

Alan Shore, who has done extensive research on the biology of emotion, concludes the autonomic nervous system (ANS) and its neuro hormones wire the chemical events that mediate behavior. The site of this regulation is the prefrontal cortex where the ANS is coupled with the dual limbic pathways and the brain stem. This dominates the hypothalamic – pituitary-adrenal axis. Vision information is critical to the frontal limbic cortical loop and is integral in creating memory.³⁶ This demonstrates the intimate relationship between vision, motor planning and emotion in the frontal cortex. This system is easily injured in head trauma which we see as autonomic dyscontrol. This manifests as compromises in immune function, losses of peripheral vision, and Post Traumatic Vision Syndrome. Syntonic's role in restoring balance to the ANS can be profound in trauma cases. Clinically, head trauma is an area of treatment showing great success using syntonic phototherapy. I believe light frequencies play a major role in restoring the brain's neurological plasticity. Phototherapy can play a major role in restoring and rewiring neurological pathways in visual rehabilitation.³⁷

The thalamus is also receptive to light stimulation. The thalamus acts as a gating system for attention and arousal. It has a high level of electrical discharge with periods of still points in the electrical patterns. It is during these still points of electrical activity that light can reset thalamic output. All the sensory, as well as motor nerves pass through the thalamus. Spittler theorized that certain light frequencies can serve to stimulate or depress sensory or motor activity in the visual system.³⁸ This also corresponds with the autonomic nervous system: red (sympathetic) is a sensory stimulant, orange a motor stimulant, yellow an intense motor stimulant, and green an equilibrator for physiological balance. Blue acts as a sensory depressant, indigo a motor depressant, and violet an intense sensory depressant.

Treatment protocols almost always use a combination of filters. The prescription of color combinations also follows Arndt's Law of Physiology: "*Mild Stimuli will excite physiological action, moderate ones will favor it, but strong ones will retard the action or abolish it altogether.*"³⁹ Colors at the end of the spectrum are rarely prescribed alone and most are combined with green which brings the filter combination towards the middle of the spectrum. Syntonics in the early years was very biomedical as a treatment approach. In the 1960's an optometrist Charles Butts redesigned the basic course with emphasis on the OEP 21 point exam, pupil responses, motility, and visual fields.⁴⁰ Treatment emphasized four basic filter combinations. This was later refined into four basic syndromes called "Acute", "Chronic", "Emotional Fatigue", and "Lazy Eye".⁴¹ While prescribing is also an art, using clinical syndromes can be an excellent starting point for filter analysis.

These four syndromes are summarized as follows: Acute Syndrome: individuals with a history or symptoms that relate to a recent onset with problems such as infection, head trauma, anoxia, stroke, and high fevers. Symptoms include headache, hypersensitivity or pain. This syndrome requires palliation to first alleviate symptoms using indigo and blue-green filters to reduce cortical and retinal swelling, inflammation, and pain. The most common diagnostic findings include: exophoria, convergence insufficiency, orbital pain, headaches, enlarged blind spots, visual field defects, deficiency of smooth ocular pursuits and abnormal pupil responses. Pathology may include conjunctivitis, uveitis, cataract, and macular degeneration.

Chronic Syndrome: individuals with chronic or degenerative health problems which are organic, metabolic, toxic, or from past trauma. The filter combination used is yellow-green which is used as a physiological stabilizer and detoxifier. Symptoms include fatigue, loss of visual stamina, asthenopia, headaches, photophobia, and transient blur. Diagnostic findings include: constriction of the visual fields, esophoria, low recoveries in ductions, accommodative insufficiency, reduced red/green fields, and blue field constriction if the liver is involved. Yellow green is often combined with indigo-red or ruby when emotional instability is also present.

Emotional Fatigue Syndrome: individuals tend towards emotional exhaustion, mood swings, and negative thoughts, agitated or depressed affect may

also be noted. Symptoms include: transient blurred vision, asthenopia, allergies, headaches, asthma, fluid retention. Diagnostic criteria include: low breaks and recoveries in ductions, significant pupil release (The Alpha Omega Pupil), fatigue exophoria. Ruby, or red-indigo filters are used in combination to balance the sympathetic and parasympathetic for adrenal support. This is usually used for 10 minute followed by yellow green. Emotional and physiological imbalances are usually linked.

Lazy Eye Syndrome: Red-orange is used to act as a strong sympathetic stimulant to treat esotropia or amblyopia. This filter combination is thought to build electrical charge in the cell membranes in order to break through synaptic resistance to overcome amblyopia and binocular suppressions. Diagnosis also may include constriction of the fields, abnormal retinal correspondence, and poor fusion.

Optometric phototherapy is delivered to the patient by choosing various several instruments. The oldest and most clinically proven is the Cameron Syntonizer developed in the 1920's. It consists of a tube light source with a 40 watt vibrational bulb boosted to 140 watts via a transformer. The patient views the filter combinations through a collimating lens 50mm in diameter at 50 cm in a darkened room for 20 minutes. The light source may be pulsed up to 12cps. This instrument has been used with success on thousands of patients. In the 1980's John Downing invented the Photron Light Stimulator employing a plasma light source, the College filters, and a flicker system to increase the photo-driving aspects of the colors. He developed a neurological analysis based on constitutional profiles to balance the individual.⁴² This was soon followed by the Spectral Receptivity Trainer invented by Jacob Liberman. Liberman added dialoging with the patient to determine which colors created discomfort or resistance upon viewing. Different colors were viewed until no resistance was noted and all colors were of equal comfort.⁴³ Next, John Searfoss created The Photon Wave. He employed narrow band filters with a "rainbow technique" where the patient viewed all the colors. Treatment ended with the most comfortable colors that were self-selected for the final 20 minutes.⁴⁴ Other healing professions later created total body immersion in color, adding sound, kinesthetic and vestibular stimulation to treatment protocols.

Case Illustration

CJ, age 9 was seen for a developmental vision examination. He complained of chronic headaches in school, loss of place reading, skipping words, and blurred vision at near. He suffered a head injury that did not require medical treatment. He had significant pupil release, 9 diopters of exophoria at near, and reduced ductions. binocular accommodation facility was $-1.25/+2.75$. He also had reduced versions, poor Visagraph findings, and a 20 degree near visual field. He would be classified as an “acute syndrome” case. Upon 20 sessions of indigo (10 minutes) and blue-green (10 minutes), major changes were noted. The exophoria was reduced at near, binocular accommodative facility ranges were $-2.50/+2.75$, versions full and smooth, visual fields were expanded to 60 degrees with normal blind spots. Pupil responses showed minimal release. Parents reported improved reading and writing performance. Visagraph findings also were improved: fixations /100 words went from the original finding of 313 to 162, regressions from 139 to 38, span from .32 to .62, and comprehension from 69 words per minute to 160. This all occurred in a 6 week period using only syntonics treatment. It is common to see large improvements much faster when syntonics is used either alone or, most frequently, as an adjunct to standard vision therapy regimens.

Optometric education provides the student with more exposure to the use of light than any other profession. The prescribing of lenses or vision therapy to alter human visual performance is incomplete without consideration being given to the spectral components of light. Syntonics is a time honored and clinically established modality of treatment. Syntonic therapy's role in balancing the neurophysiology helps provide the foundation for learning and all motor training. There is paradigm shift of monumental proportions toward using mechanical, bioelectric, magnetic, gravitational, thermal, acoustic, and photonic therapies. In our quantum age, optometry in general, and vision rehabilitation in particular, can benefit exploring the application of optometric phototherapy.

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