MODERN SYNTONIC OPTOMETRY

by Raymond L. Gottlieb, O.D., Ph.D. (1978)

Syntonic optometry is among the most direct, fast acting and far reaching tools available to developmental optometrists. I have been involved with syntonics for the past five years. The longer I work with it, the more impressed I am with its power.

You may wonder why the title of this paper is "Modern Syntonic Optometry". I used the word "modern" because syntonic technique has changed in the past dozen years. Before the late 1960's the application and diagnostic emphasis in syntonics was as medical as it was optometric. Modern syntonics is exclusively optometric with special emphasis on developmental optometry. Diagnostic information comes from history, analytical examination, oculo-motor skills, pupillary responses, visual field plotting, symptoms and observations. This information is used for diagnosis, progress evaluation and post treatment assessment. The results of the treatment are generally clear and are often quite striking. I have found the results amazing. The majority of visual training patients can be helped greatly. John Ellson, O.D., of Pasco, Washington told me recently that the amount of time it takes for training in his office has been cut in half since using syntonics.

Merely looking at colored light can improve vision, learning and behavior. This is a fact for me. I have seen it change behavior and performance in just a few days. I know it is hard to believe that color can be that effective. It is not logical or natural for you to conclude that what I claim is possible. I am convinced that it is valid and useful. I will share with you some of the information that has allowed me to believe what I claim. I hope it will open your thinking in this direction.

As you already know, sunburn and tanning only happens if ultraviolet frequencies are present in the impinging light. The nervous system (the retina and visual system) responds uniquely to different light frequencies. Different frequencies of light cause separate electrochemical responses which we call color. Without this we would be color blind.

Scientific literature over the past twenty years contains an increasing amount of information about the biological effects of color and light. In a recent review article Martinek and Berezin[1] describe light frequency effects on enzyme systems which regulate biological activity. Enzymes generally act as biological catalysts. Certain enzymes become 500% more effective if stimulated by one light frequency than if exposed to light of a different frequency. Through color one may amplify the rate of enzymatic reactions. In addition, light has the power to activate some inactive enzymes. With others light has the power to deactivate them. Another system described by the authors shows how photosensitive enzyme systems can depolarize certain biological membranes. This ability to photo-regulate the potential difference across membranes puts light in an extremely powerful position as a biological amplifier (much like the grid in a vacuum tube amplifier). Finally, light has been found to affect not only the enzymes but also the substrate upon which the enzymes operate. Photoexcited states of molecules have entirely different chemical properties than the ground states. It has been demonstrated that with the help of light sensitive substrates one can not only regulate the rate, but even initiate an enzymatic reaction. The conclusion of this review article was that light and color can play a remarkable role in regulating the effectiveness of certain enzyme systems in our bodies.

But that Is not all. A similar conclusion was reached by Albert Szent-Gyorgyi[2,3] in a series of books on bioelectricity and submolecular biological systems. Szent-Gyorgyi is a Nobel Prize winner and is the discoverer of vitamin C. His books point out the limitations of the present thinking in biochemistry. Current thinking in biochemistry and biophysics concerns itself only with chemical reactions which act on the atomic or molecular level. The subatomic and submolecular reactions which concern modern physists are ignored by the biological sciences. Szent-Gyorgyi feels that the position and spin characteristics of the electrons in their orbital levels have great relevance to biological function, especially in the storage and transformation of biological energy. All of the energy which we take into our bodies is derived directly from the sun's light energy.[4] Through photosynthesis the sun's energy is stored in plants which we eat. Our digestion and assimilation is concerned with breaking down, transfering and storing this light-created energy. Szent-Gyorgyi discovered that many of the enzymes and hormones involved with energy processing are colored. That is, when they are in solutlon they are not clear or white, but are colored. Not only are they colored, but they often exist in two different states, each a different color (like the blue and red of the venous and arterial blood). These enzymes and hormones are sensltlve to selected light frequencies which can alter them from one state to the other. Szent-Gyorgyi feels that the magnetic shape of the molecule is changed by light due to the changes in electron spin and orbital level. This changes the power of these catalysts to cause reactions since one magnetic configuratlon might fit more easily with a target molecule causing a greater likelihood of a reaction.

But that is not all. Light works not only inside the body causing minute changes in chemical reactions, but a recent article from the May 1979 Scientific American[5] shows the economic importance of using laser light for catalyzing chemical reactions in industry. The advantage of using light rather than heat, agitation, or chemical catalysts is that monochromatic light produces more specific chemical reactions than the other catalysts thus eliminating unwanted side products. The results of the light induced chemical reactions are more predictable and more pure.

And now you can see why I believe that syntonics can cause changes in my patients. The above reports indicate that light is an effective regulator of chemical reactions and can help regulate our energy and balance systems. Light can act as a catalyst for chemical reactions depending upon the frequency.

But there is one thing more. A further line of evidence supporting light as a biological control comes from the work of Richard Wurtman at MIT. In a July 1975 article in Scientific American called "The Effects Of Light on the Human Body"[6] he describes a neural pathway for light reception which is non-visual and which is known to control sexual and other biological behavior. The pathway includes retinal stimulatlon which excites fibers in the inferior accessory optical tract (non-visual) which synapse in the transpeduncular nucleus in the midbrain. Hill and Marg[7] found this nucleus to be color sensitive in rabbits (i.e., it responds differently to different frequencies of light). The transpeduncular nucleus then connects with the superior cervical ganglion which influences the pineal gland. The pineal is known to be a biological transducer which controls the effects of environmental changes in light on the brain and body. The pineal is considered to be an endocrine gland because of its great influence on the other endocrine glands in the body. The pineal protrudes into the the cerebrospinal fluid contained in the third ventrical. Hypothalamic cells which line the third ventrical are sentitive to the chemical sectretions of the pineal. The hypothalmus is a major control center for vital homeostatic balance systems of the body such as respiration, body temperature, sugar, protein, fat, mineral and water metabolism, blood pressure, pulse

rate, fluid retention, *p*H, hunger, thirst, etc. It is also directly connected with the pituitary gland, the well known "master gland" of the endocrine system.

And now you can see why light can have such a profound effect on the functioning of the body. Light can control the highly sensitive, high gain control systems of the body which regulate the chemical balance and energy control systems of the body. Chemical balance and energy availability have a great influence on the eyes and the visual system. In the case typing literature of the Optometric Extension Program the fatigue or insufficiency of the functions of accommodation and adduction of the B_1, B_2 and C_1 type cases was considered to be caused by physiological imbalances in the autonomic due to improper chemical proportions in the cells.[8] The A and C_2 type syndromes were considered to be toxic (chemical imbalance or diseased state).[9] In recent years our literature has tended to ignore or play down the A nd C_2 types as well as the systemic etiology of the fatigue in the B and C_1 types. I think this is a mistake. I think the toxic and chemical imbalance influences are much more prevalent than we consider them to be. It is at this level that syntonic optometry can affect such a great influence.

As you may already know, the symptoms of the Streff syndrome include: lowered acuity (especially at near), single letter acuity better than single chart acuity, abnormal color vision, monocular diplopia, and an unusual pupillary reflex.[10] These symptoms form part of the syntonic diagnostic battery, and these patients generally respond well to light therapy.

Even more important than that, a major syntonic diagnostic tool is visual field testing. Visual fields are plotted at the near point, at twenty centimeters, usually on a stereocampimeter. I have seen youngsters with visual fields restricted down to the size of a dime. If the field is constricted we often find symptoms of poor oculomotor skills and poor recoveries which characterize children with learning difficulties. How can we expect a child with a severely contracted field to be able to follow a small moving target, perform accurate fixations or recover on phoria or duction tests? You can't fuse, find, or follow what you can't see in your peripheral vision.

You can easily see that if constricted fields or metabolic imbalances exist in conjunction with a visual problem, our work can proceed much more successfully if these rectrictions can be eliminated. Not only can visual field contractions and enlarged blind spots be normalized, but oculomotor, visual acuity, accommodative and fusional problems can be significantly improved with syntonic therapy alone.

I know you will be interested in seeing some practical results from using syntonic therapy. The following case reports are examples of results from current patients in my office. These examples are typical of many more which are contained in my files.

Patient C.B., age 7 3/4,could not learn to read. He had been put back into Montessori kindergarten after a year of first grade in public school. Other symptoms included: low frustration threshhold, avoidance and immature behavior, short attention span and segmented behavior. On May 5, 1979 he was examined and found to have poor visual abilities in many tests. His rotations were extremely poor, his nearpoint convergence was 9"/15" with hard suppression, near cover was esotropia of 15° and poor recoveries on all ductions. His pupil showed expansion after five seconds and his visual field was restricted to 21° (using a 1 1/2° white target). One month later (April 10, 1979) his mother reported the following changes in his behavior. "He is calmer, has improved self-confidence, much better performance at home and at school, and he began spontaneosly to read at school." Later in April he was transferred into the first grade class. His rotations were smooth, his near convergence was 2"/3" with no suppression, cover showed absence of tropia, his duction recoveries were normal except 16b, his

pupil response was normal, and his field had expanded to 60° (1/3° white target) with normal blind spot size.

Eric O., a nine year old boy, was examined on June 27, 1979. He was referred through a school screening I had done. His parents were not aware of any problems at school or at home. He was described as a shy, cooperative child, who had a hard time waknq up and getting going in the morning. The findings included very poor rotations with loss of place, head movements, and eye jerks; near convergence of 9"/17" (using light rather than silver ball), low duction recoveries on all ductions, cover test negative, sudden expansion of pupils, and his visual field was 40° diameter, enlarged blind spot 23° vertical diameter (1 1/2° target) and his color fields were only 1° in diameter. On August 1, 1979 his mother reported a great decrease in nasal catarrh, wakes up easily with good energy in the morning, is more alert and active, and less shy now. His rotations were smooth with only rare jerks, his near convergence was 2"/5" (using the ball), duction recoveries were normal, white field, 1/ 3°, 77° diameter, blind spot 11° vertical dimension, and his color fields were 20°+.

These are typical results. Syntonics works with adults as well as children. In 1933 Spitler[11] did a survey of optometrists using syntonics therapy. They reported on over 3,000 patients with various subnormal optometric findings. Over 80% of the problems responded to syntonization techniques.

You may wonder about the syntonics organization and how you may become a syntonist. The College of Syntonic Optometry is nearly fifty years old. Presently it is probably the fastest growing organization in optometry. Four years ago there were only fifteen members of the college; today there are over seventy. Among its members are a state association president and two members of state boards of optometry. The equipment needed to practice syntonics includes a campimeter type of field plotter as well as the syntonics instrument and filters. The equipment just mentioned can be supplied by the college for about $1100.

To become a syntonist you must take the basic course. This is a two day (AOA approved) course. The cost of the course is ~~$165~~ ($225 in 1995) including literature and one year membership In the college. You will learn the theory, instrumentation, diagnostic testing and criteria and the practice management aspects of syntonic optometry.

The college is presently engaged in reestablishing a library center for information relating to tbe use of color In health care. In addltion, a nation wide research project has been instituted to validate our clinical results. Those of you who are interested in attending a basic course may write to me. If a sufficient number of O.D.'s are interested a course can be arranged in your area.

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