

The Neurophysiology of Light The Five Pathways

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During the 19th century the American surgeon, Dr. E. Babbitt, M.D., proved that treatment with colored light could achieve very significant healing results through its effect on the human energy field, the light receptive autonomic nerve fibers in the skin and via the nerves that connect the eye directly with the limbic system.¹

In the beginning of this century the East Indian genius Darius Dinshah, who had immigrated into the USA, introduced a system of color therapy, that involves shining the color onto the body or body regions for about 1 hour/day.

The American physician H. Riley Spitler, M.D., after years of detailed research with colored light, concluded that light therapy applied through the eyes could augment the major control centers in the brain that regulate all body functions. Since the functioning of the eyes was directly dependent upon and mediated through the nervous system, this form of treatment directly affected visual function. With treatments designed according to each individual's physical and emotional make up, his treatments reduced stresses, both physiological and emotional.² He developed several instruments and started the science of "syntonic optometry". He found that the optimum treatment time is twenty minutes a day for a course of twenty days. This should be followed by a pause of several weeks before another twenty-day cycle. He achieved impressive healings in the over 3,000 patients he treated.^{2 3}

Colored light - when beamed into the eyes with a projector-like device – can activate repressed memories from childhood - even from the intrauterine period or from a past life - which may now become available to

work with in a psychotherapeutic way⁴. In terms of modern neurophysiology we believe now that distinct color frequencies can reactivate synapses in the brain^{5 6} which were previously blocked. If nerve conduction is reestablished in these areas, memories which were isolated, are reconnected with the synaptic network of the brain and can again be accessed and integrated by the conscious part of the brain. The detrimental effect of unremembered trauma on the body seems to disappear.

Memories connected to a physical or emotional trauma are held by circuitries in the limbic system, especially in the hippocampus and amygdala. These memories can be accessed with the correct color wavelength (for example, by using colored glasses). The exact color accesses the patients' problem – just like accessing a hidden file in the computer. Recommended treatment time with color glasses is 1hr per day. However, worn in a therapeutic session, a few minutes can be sufficient. The effect can be amplified by projecting light with an instrument into the eyes, and modulating the light with flicker frequencies⁷. Several "syntonic" instruments are available today. The effect can also be amplified and deepened by simultaneously using eye movements (example: Applied Psychoneurobiology) and/or tapping techniques (example: Mental Field Therapy). The quality of the light source (light bulb), the color filters and lens arrangements affect the therapeutic outcome. In our office we also use linear polarization filters to reach more specific regions within the brain.

I use the term "*color coding of memories*". Memories are color-coded! Use the right code and the memory surfaces. To make the connection to the repressed conflict-material, the practitioner has to determine the

exact correct color. Spitler, just like Dinshah, spent much of his life determining which color frequencies are needed to heal specific illnesses.

Several methods of determining the correct color are available today:

- Critical Flicker Fusion Test
- Color Visual Field Test
- Luescher Color Test
- Autonomic Response Testing (ART) – using muscle-tone biofeedback
- Steve Vasquez (Ph.D.) method - assessing emotional responses after color presentation
- Heart Rate Variability
- Kirlian Photography - used by Peter Mandel's color puncture practitioners)
- Intuition and experience
- Using the known physiological effects of color:

Blue – activates the parasympathetic nervous system. Calms – amazing for hyperactive children.

Red – activates sympathetic nervous system.

Blue-Green – heals post-traumatic tissue-injuries.

Yellow – anti-depressive.

Yellow/Green – liver detox.

Magenta – brings deeply held conflicts and emotions to the surface.

Language is full of knowledge about the connection of color and emotion, for example:
He's got the blues (blue slows us down and makes already slow people depressed)
I am in a black mood.

She's green with envy (envy is a liver emotion and the correct color is yellow/green).
Red-Hot love (red brings out emotion in people – including sexual passion)

Colors can have two distinct - and often opposite - effects. Because of the color-coding of emotions, treatment with color can either trigger the expected color-typical physiological reaction or, instigate the release of a related color coded emotion or problem. Take blue light, for example. Blue light will usually have a sedative effect. However, if i.e. a young man had been molested by his mother when he was a toddler- and she was wearing a blue bra at the time - blue may cause sympathetic arousal (distress) in this man until the trauma is healed.

1. The optic nerve travels from the retina, past the pituitary gland via the temporal lobe to the occipital lobe of the brain. This part of the visual system is dedicated to informing the conscious part of our brain of our surroundings - without interpretation.

2.

It was discovered fairly recently, that there is an additional nerve bundle leading directly from the retina to the hypothalamus (retino-hypothalamic tract)⁸. This explains the effect of color on the ANS

Blue stimulates the anterior hypothalamus, which harbors the main regulating part of the parasympathetic nervous system. This means that all colors in the bluish spectrum - from blue/green through blue to violet – normally have a sedating, digestion-activating, sleep-inducing effect.

Red stimulates the posterior hypothalamus and therefore the sympathetic nervous system. Red provokes anger. All colors in the red spectrum - from magenta through red/orange to yellow - have a stimulating, sometimes even provocative, character.

Green mediates between both systems.

A side-branch of this nerve tract reaches the amygdala directly, bypassing the hypothalamus. The two corpora amygdaloidea are truly the color sensitive area of the limbic system and highly responsive to the color the eyes are exposed to. A study demonstrated that each monochromatic color frequency excites specific neurons, which are not stimulated by adjacent, but dissimilar colors⁹. Each frequency in the color spectrum therefore has its own specific neurological and psychological effect^{10 11}.

The neurosurgeon, Norman Shealy, M.D.,PhD – discoverer and inventor of TENS (Transcutaneous Electric Nerve Stimulation) and the “spinal chord stimulator”, conducted a study investigating biochemical changes in the brain after beaming different colors into the eye (with the “Lumatron”). Remarkable changes were evident in the concentration of neurotransmitters in the cerebro-spinal fluid: norepinephrin, serotonin, beta-endorphin, cholinesterase, melatonin, oxytocin, growth-hormone, LH, prolactin and progesterone¹². These results explain why the treatment with color projection into the eye can have a profound effect on the hormonal system, the emotions, stress levels, sleep, brain function, and many other aspects of the patient's biochemistry and well-being. The profound effect of light stimulation to the retina on the body's metabolism has long been

established through the work of the brilliant German ophthalmologist Fritz Hollwich, M.D., Ph.D.¹³

4. A fourth nerve connection from the retina follows the lower optic tract, which is not used for vision and reaches the transpeduncular nucleus in the midbrain¹⁴. This nucleus is also light and color sensitive¹⁵. From here the signal travels via the superior cervical ganglion back via the brainstem to the pineal gland. This pathway is – amongst other less understood functions – responsible for the circadian day-night rhythm and the melatonin production in the pineal gland when it gets dark¹⁶. This pathway has been given much attention lately in research concerning the treatment of seasonal affective disorder.

5. A fifth, and maybe most exciting way in which color finds its way inside the body, i.e. the subconscious mind, the immune system, the limbic system, the nervous system etc - has only recently been discovered. There are more and more scientific hints that light can charge particles that travel in the lymph and blood as well as axonally inside the nerves^{17 18}. Researchers at the University of Vienna, Austria, found that albumin is one of the proteins able to be charged by colored light – and able to deliver this charge to tissues far away from the site of exposure. Through the outer layer of the skin light also affects pigments, fluorescent particles in the body fluids and inside the cells, that travel in the blood and lymph. After being energized in a color-wavelength and frequency specific way they are transported to their target sites where the light-energy is discharged (116)¹⁹. These light-discharges have an organizing and activating effect on cellular organelles and the cell metabolism in the target tissue such as the brain or inner organs^{20 21 22}.

This mechanism explains the effects of color-treatment via the skin - including the Dinshah Method, Peter Mandel's Color Puncture and the effect which colors of clothing have on mood and the immune system. A study showed that wearing black clothing immediately depresses the NK-cell activity and several other parameters used to judge the activity of the immune system. **Black** is carcinogenic. The opposite is also true: wearing rainbow colors stimulates the immune system and the mood. A chiropractor in Santa Fe, who I worked with, treated many clients successfully for many severe illnesses - by having them paint their toenails in specific colors (which he determined before). Wearing nail polish proved to be a truly medical intervention with many beneficial - and occasionally adverse - effects.

The German scientist Fritz Albert Popp PhD confirmed the prior research of Russian scientists and published

many of his own papers, on the fact that all cells in an organism use subtle light emissions to communicate with each other constantly. Cells gossip, inform, celebrate and grieve²³. Only cancer cells behave differently: they do not emit light. Recent research in stem cell therapy brought to light another astounding phenomenon: when cells are ill or in distress, they also give off “microscopic” sound signals. If the sound of a group of dying cells is artificially amplified, it sounds like a group of weeping and grieving women. Injected stem cells (from embryonic umbilical chords) follow this signal and settle in the area to lend their support. Stem cells are compassionate. Cells care for each other.

SUMMARY

A growing body of research on the physiological effects of light supports our position for the potential medicinal use of light and color.

The Eye Movement Method

This method originates to some degree in the scientific research of eye movements, and the clinical observations of the psychiatrist Milton Erickson. He discovered that the eyes wander involuntarily in a predictable direction when a patient tries to memorize certain events. If a patient is prevented from looking in that particular direction she/he cannot remember that particular event. The eye movements open the synapse in the brain. Which makes the connection from the conscious part of the brain to the unconscious part, where memory is stored.

This phenomenon is also known during the REM phases of sleep.^{24 25} When we dream and process the memories from our day the eyes move rapidly forth and back in directions which are determined by the content of the processed events.²⁶ During this time emotionally loaded daytime memories are consolidated.²⁷ Most often the eyes move sideways, forth and back, but they may also move up and down as well as in diagonal directions. If a person tries to remember something that someone has said in the past. (acoustic memory) the eyes will move involuntarily gaze to the left. If, for example somebody tries to remember a scene of a film (visual memory) the eyes will move to the upper left. Bandler and Grinder, the developers of Neurolinguistic Programming, observed Milton Erickson during his work and developed the following schematic:²⁸

As on the face of a clock:
1.30 = visual memories

3.00 = acoustic memories
= inner dialogue with the self
7.30 = kinesthetic sensation
9.00 = acoustic future projection
10.30 = visual future projection

The diagonal movement shows two main patterns:

1. Visual memories/kinesiologocal sensations (eg “my past is depressing me”).
2. Inner dialogue/inner projection (eg “I can’t imagine ever being successful”).

An Overview of the scientific publications over the last few years regarding eye movements is presented below:

Eye movements in rhythmic patterns occur spontaneously if someone daydreams, visualizes, imagines, or if someone represses thoughts and feelings into the subconscious.²⁹

Eye movements also occur spontaneously³⁰ in states of anxiety, intensive thinking and concentration.³¹ When a person works intuitively, or is creative, has feelings, mediates or reviews emotionally loaded events, these ‘thought patterns’ are always accompanied by eye movements.^{32 33}

The direction in which our eyes gaze determines whether we perceive the same object as ugly or beautiful. Eye movements determine the emotional coloring of what we observe.³⁴ In phobias, a similar phenomenon has been observed: depending on the direction of the gaze, the intensity of the fear fluctuates when the fear, causing object is looked at.³⁵ From studies in neurophysiology we know that eye movements activate synapses in the brain and make a connection between the cognitive conscious part of the brain, conscious memories and the unconscious. These activated synapses are located in the hippocampus- square in the middle of the limbic system- the main storage house for unresolved conflicts.^{36 37}

During the APN treatment, the rhythm of the eye movements has significant impact^{38 39} for the success of treatment. Spontaneously occurring eye movements have a clearly defined meaning: On one side, emotional memories are repressed into the limbic system,⁴⁰ consolidated and stored.⁴¹ On the other side there is an

immolation of the intensity of feelings that accompanies the memory.⁴² Many articles on these issues have been published in recent years, many of which were inspired by the work of Francine Shapiro (Ph.D.)⁴³

SUMMARY

Eye movements stimulate the limbic system, especially the amygdala and the hippocampus.^{44 45} Repeated eye movements facilitate the neurological connection between the conscious part of the brain and deeply repressed conflicts. These conflicts now become treatable.^{46 47} To access a suppressed memory the correct eye-movement direction has to be chosen (in addition to the right rhythm). I consider the eye movement to be a secret code that opens the door to the unconscious. In APN we call this: The eye-movement coding of memories. Memories are also color-coded.

In 1971 I encountered eye movement therapy for the first time. After a significant motorcycle accident I was brought to an 89 year old, modest and friendly women who was known as a healer in the area (Meersburg, Germany). She told me that the method she would be using was passed on within her family and goes back to Franz Anton Mesmer

(“mesmerizing”), who was one of her direct ancestors and had lived in the same town over 300 years ago. She asked me to lie down on her kitchen floor guiding my inner attention to my skin lacerations, bruises and abrasions. She then took the crucifix-chain off her neck and used it as a pendulum in front of my eyes asking me to follow the movements. Then she washed my wounds with soap and water (which amazingly did not hurt). She repeated the pendulum treatment once more. After the treatment I was totally pain free and within two weeks all my wounds has completely healed without any scarring.

- ¹ Babbitt, E.: *The Principles of Light and Colour: The Healing Power of Colour*. 1878, Reprint, Secaucus N.J.: Citadel, 1976.
- ² Liberman, Jacob: *Die Heilende Kraft des Lichts. Der Einfluß des Lichts auf Psyche und Körper*. Bern, 1995.
- ³ Ott, John: *Health and Light. The Effects of Natural and Artificial Light on Man and Other Living Things*, Columbus, Ohio: Ariel, 1973.
- ⁴ Liberman Jacob: *Die Heilende Kraft des Lichts. Der Einfluß des Lichts auf Psyche und Körper*. Bern 1995.
- ⁵ Neilsen, T.: *Affect Desensitization: A Possible Function of REMs in Both Walking and Sleeping States*. In: *Sleep Research*, 20, 1991, S. 10.
- ⁶ Ringo, J. et al.: Eye Movements Modulate Activity in Hippocampal, Parahippocampal, and Inferotemporal Neurons. In: *Journal of Neurophysiology*, 71, 1994, S. 1-4.
- ⁷ Barionuevo, G. u.a.: *The Effects of Repetitive Low-Frequency Stimulation Control and "Potentiated" Synaptic Responses in the Hippocampus*. In: *Life Sciences*, 27, 1980, S. 2385-2390.
- ⁸ Moore, R.: *Visual Pathways and the Central Neural Control of Diurnal Rhythms*. The Neurosciences 3rd Study Program, Cambridge, Mass.: MIT, 1974.
- ⁹ Hill, R.: *Single Cell Response of the Nucleus of the Trans-Peduncular Tract in Rabbit to Monochromatic Light on the Retina*. In: *Journal of Neurophysiology*, Vol. 26.
- ¹⁰ Birrin, F.: *Color Psychology and Color Therapy*. Secaucus, N.J.: Citadel, 1978.
- ¹¹ Toupin, A.: *Photic Activation and Experimental Data Concerning Colored Stimuli*. In: *Neurology (Minneapolis)*, 16, 1966, S. 269
- ¹² Shealy, Norman: *Effects of the Lumatron upon Neurochemicals*. Lecture given for Dr. Shealy by Dr. Klinghardt at the 6th Int.Rehab. Med. Ass. Congress, Madrid, Spain, 1990.
- ¹³ Hollwich, F.: *The Influence of Ocular Light Perception on Metabolism in Man and in Animal*. Berlin, 1985.
- ¹⁴ Wurtman, R.: *The Effects of Light on the Human Body*. In: *Scientific American*, July 1975, Vol. 233, Nr. 1, S. 68-79.
- ¹⁵ Hill, R.: *Single Cell Responses of the Nucleus of the Trans-Peduncular Tract in Rabbit to Monochromatic Light on the Retina*. In: *Journal of Neurophysiology*, Vol. 26.
- ¹⁶ Wurtman, Richard u.a.: *The Medical and Biological Effects of Light*. In: *Annals of the New York Academy of Sciences*, Vol. 453, 1985
- ¹⁷ Hebeda, K.: *Light Propagation in the brain Depends on Nerve Fiber Orientation*, In: *Neurosurgery*, 35, 1994, S. 720-724.
- ¹⁸ Popp, Fritz A.: *Biophotonen. Ein neuer Weg zur Lösung des Krebsproblems*. Heidelberg, 2. Aufl. 1984.
- ¹⁹ Grass, F.: *Biophotons, CNS and the Possible Role of Pigments and Fluorescent Substances*. Biological Effects of Light Symposium, Atlanta, Georgia, Okt. 1995.
- ²⁰ Szent-Gyorgyi, A.: *Introduction to a Submolecular Biology*. Academic Press: N. Y., 1960.
- ²¹ Szent-Gyorgyi, A.: *Bioelectrics*. Academic Press, N.Y.: New York, 1968.
- ²² Hollwich, F.: *The Influence of Ocular Light Perception on Metabolism in Man and Animal*. Berlin, 1985.
- ²³ Popp, Fritz A.: *Biophotonen. Ein Neuer Weg zur Lösung des Krebsproblems*. Heidelberg, 2. Aufl. 1984.
- ²⁴ Aserinsky, E.: *Regularly Occuring Periods of Eye Motility and Concomitant Phenomena During Sleep*. In: *Science*, 118, (1953), S. 273.
- ²⁵ The Biology and Function of Rapid Eye Movement Sleep. In: *Current Opinion in Neurobiology*, 3, 1985, S. 355-369.
- ²⁶ Gabel, S.: *Information Processing in Rapid Eye Movement Sleep: Possible Neurophysiological, Neuropsychological, and Clinical Correlates*. In: *Journal of Nervous and Mental Disease*, 175, 1987, S. 193-200.
- ²⁷ Tilly A.J.: *REM Sleep and Memory Consolidation*. In: *Biological Psychology*, 6, 1978, S. 293-300.
- ²⁸ Conner, J.O./J. Seymour: *Neurolinguistisches Programmieren. Gelungene Kommunikation und personliche Entfaltung*. Freiburg, 1995.
- ²⁹ Antrobus, J.S. Eye Movements Accompanying Day Dreams , Visual Imagery, and Thought Suppressions. In: *Journal of Abnormal and Social Psychology*, 69, 1964, S. 244—252.
- ³⁰ Day, M.E.: An Eye Movement Phenomenon Relating to Attention, Thought and Anxiety. In: *Perceptual and Motor Skills*, 19, 1964, S. 443-446.
- ³¹ Teitelbaum, H.A.: *Spontaneous Rhythmic Ocular Movements: Their Possible Relationship to Mental Activity*. In *Neurology*, 4, 1954, S. 350-354.
- ³² Monty, R.A. et al.: *Eye Movements and the Higher Psychological Functions*. Hillsdale, N.J.: Erlbaum, 1978.
- ³³ *ibid*
- ³⁴ Drake, R.A.: *Effects of Gaze Manipulation on Aesthetic Judgments: Hemisphere Priming of Affect*. In: *Acta Psychologica*, 65, 1987, S. 91-99.
- ³⁵ Merckelback, H./van Oppen, P.: *Effects of Gaze Manipulation on Subjective evaluation of neutral and phobia-relevant stimuli*. In: *Acta Psychologica*, 70, 1989, S. 147-151.
- ³⁶ Barionuevo, G. u.a.: *The Effects of Repetitive Low-frequency Stimulation Control and Potentiated Synaptic Responses in the Hippocampus*. In: *Life Sciences*, 27, 1980, S.2385-2390.

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- ³⁷ Day, M.E.: *An Eye Movement Phenomenon Relating to Attention, Thought and Anxiety*,. In.: *Perceptual and Motor Skills*, 19, 1964, S. 443-446.
- ³⁸ Barionuevo, G. u.a.: *The Effects if Repetitive Low-frequency Stimulation Control and Potentiated Synaptic Responses in the Hippocampus*. In: *Life Sciences*, 27, 1980, S. 2385-2390.
- ³⁹ Larson, J./ Lynch, G.: *Thetta Pattern Stimulation and the Induction of L.T.P.: The Sequence in which Synapses are Stimulated Determines the Degree to Which the Potentiate*. In.: *Brain Research*, 489, 1989, S. 49-58.
- ⁴⁰ Ringo, J. et al.: *Eye Movements Modulate a Activity in Hippocampal, Parahippocampal, and Inferotemporal Neurons*. In: *Journal of Neurophysiology*, 71, 1994, S. 1-4.
- ⁴¹ Tilly, A.J.: REM Sleep and Memory Consolidation. In: *Biological Psychology*, 6, 1978, S. 293-300.
- ⁴² Neilson, T.: *Affect Desensitization: A Possible Function of REMs in Both Walking and Sleeping States*. In: *Sleep Research*, 20, 1991, S. 10.
- ⁴³ Shapiro, Francine: *Eye Movement Desensitization and Reprocessing Basic Principles, Protocols and procedures*. New York: Guilford, 1995.
- ⁴⁴ Barionuevo, G, u.a. *The Effects of Repetitive Low-Frequency Stimulation Control and Potentiated Synaptic Responses in the Hippocampus*. In: *Life Sciences*, 27, 1980, S. 2385-2390.
- ⁴⁵ Ringo, J. et al.: *Eye Movements Modulate Activity in the Hippocampal , Parahippocampal, and Inferotemporal Neurons*. In: *Journal of Neurophysiology*, 71, 1994, S. 1-4.
- ⁴⁶ Shapiro, Francine: *Eye Movement Desensitization and Reprocessing Basic Principles, Protocols, and Procedures*. New York Guilford, 1995.
- ⁴⁷ Barionuevo, G. u.a.: *The Effects of Repetitive Low-frequency Stimulation Control and Potentiated Synaptic Responses in the Hippocampus*. In: *Life Sciences*, 27, 1980, S. 2385-2390.
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