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Chromotherapy of Macular Degeneration with Transitions Lenses and Green-Yellow Medical Filters and Special Programme for Psychoorganic Disturbances

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A B S T R A C T

Optical spectrum of the sunlight consists of visible or chromatic spectrum, with the range of wavelengths of electromagnetic vibrations from 7700 to 3900 AU, and the invisible spectrum: infrared and ultraviolet. Chromatic cpectrum gives rise to the sensation of colour, capable for simulating specialized retinal photoreceptors and is perceptible as light. This rule of perception of the particular range of the optical spectrum goes mainly for man, while particular deviations, more or less, are applicable to the rest of animal and plant life. The optical part of the spectrum belongs to nonionizing radiation. It created the life on the Earth, maintaining it nowadays and even threatening the human organ of vision, because the retina had not been yet adequately accomodated through evolution with its photoreactive metabolism. Human retina is very sensitive about possible harmful influence of ultraviolet and blue light even today in evolution, but also phototoxic on complete strong visible light. In their clinical and experimental work on animals, the authors prove with their own patent (P 20020077A)-Vojniković B&D, and in collaboration with Essilor Optic Austria GmbH, that particular medical filters in the range of green-yellow colour especially (565 to 570 nm), and in combination with »Transitions« successfully threat macular degeneration–AMD, slowing down its progression and having positive psychoorganic effect on the depressive mood of such patients with threatened sight. Full attention has been paid to the design of medical filter, so the periphery of the lens plays a positive role in blood concentration of melatonin, while the central part stimulates the sight and the concentartion of serotonine. Thus the physiological balance of melatonin and serotonin and the stability of psychophysical disturbances have been achieved.

Key words: *age related macular degeneration, medical filters, Essilor transitions, sunlight exposure, rehabilitation*

Introduction

Myth about the possibility of chromotherapy: precious stones, crystals, flowers has been existing from the ancient Greece and Egypt (4000 years B.C.). The God Thoth, called Hermes Trismegistus in the ancient Greece taught about chromotherapy[1]. Famous Aurelius Cornelius Celsus (1st century A.D.) studied chromotherapy on the basis of Pythagoras and Hippocrates doctrine. Upon arrival of Christianity the approach to chromotherapy was considered as occult and followed by persecutions. The real progress was made by Avicenna (cca 980–1037 A.D.). The progress of studying the efficacy of colours appeared with the Renaissance. The main teacher was famous Paracelsus [Philippus Aureolus Theophrastus Bombastus von Hohenheim (1493–1541)]. Great credit was given to Isaac Newton from the exact sciences for the nature of light and colours. Augustus Pleasantan issued a study about the influence of colours to animals, plants and human beings in 1876 year. Famous physician Seth Pancoast wrote the scientific study about chromotherapy in 1879 year. Edwin Babbitt established his theory about the influence of colours in treatment diseases in man in 1878 and 1896 years. S.V. Krakov provoked a revolution

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about the influence of colours on the vegetative system[1]. This cognition has been essentially the most important because the current knowledge proved it.

The optical part of the sunlight spectrum consists of visible or chromatic spectrum[2] with the range of wavelengths lambda 7700 to 3900 Angströms (AU) (Figure 1). There are two more ranges of the optical spectrum: ultraviolet from 390–15 nm and infrared 1 mm–770 nm. Spectral ranges are quantified, so in each natural phenomenon which absorbs these quanta there are specific response effects to this energetic stimulus. While the human eye, the retina, with its metabolism, is too sensitive and can be harmful about high ultraviolet quantum energies, the chlorophyll in plants has maximum absorbtion and the effect of activity just in this rate. The chromatic part of spectrum is not ionizing, and ranges from 3.1–1.8 eV (lambda=390–770 nm),calculated with Einstein's unit equation: $E=N_Ahc/lambda$. Minimal energy for the ionization of atom makes $E_{ion}=12$ eV. UV-C photons have the energy of 12.4–4.4 eV, what would seriously bring into danger the life of the Earth in case of penetration through the atmosphere. The earlier studies[2,3] present that particular spectral part (green–yellow) has the effect of treatment and prevention of macular degeneration. In the same time, the exposure to ultraviolet, blue light and too strong flux of the remaining part of the chromatic spectrum can lead to serious retinal damage after the cataract surgery in case of inadequate eyes protection[4,5]. It has been proved that the children who are unprotected and too much exposed to the sunlight also developed lesions in the visual field, in terms of the increased excitation threshold of the retinocortical pathway[3]. The positive effect in treatment by particular colours was stated in psychiatry[6], taking effect in stabilization of the vegetative system, with reference to daily regulation of blood serotonine and melatonine concentrations[7,8]. Graham Helen[1] improved chromotherapy establishing his claims and achievements on participation of the vegetative system as the basis of all psychophysical events of the organism. »Chakras« have been mentioned which are essentially particular segments of the vegetative system, being rather consistent with the acupuncture points. A negative effect of the sunlight spectrum in the occurrence of the actinic cataract[9] has been known, and the positive effect of the optical radiation in carcinoma treatment (PDT–photodynamic therapy) and macular degeneration as well[10]. During the evolution of species, and a man as well, the interaction of the environment and the internal body functions took place[8,11].

High sophisticated technology of proteomics proved today that the cumulative effect of the sunlight energy, and other sources of the optical radiation, reflect on creation of atypical protein sequences,and free radicals, in mitochondria of the particular retinal structures[11–14], representing metabolic aberrations in development of macular degeneration (AMD). Today, it is generally known that the sunlight, the chromatic one especially, plays the important role in relation maintenance and synchronization of the outher world and basic vegetative functions of the organism, through the balance of melatonin and serotonin production, thus acting on suprachiasmatic nucleus. Biosynthesis and secretion of melatonine and serotonine–biological clock, are disordered in great number of mental diseases,and in this reason,could be suggesting us the possibility of the influence to the balance of this system through the chromotherapy.

Patients and Methods

This clinical experiment comprises 125 adults with the initial and middle stage of macular degeneration (AMD) and 29 children where the initial damage of the retinal sensibility, because of stronger exposure to the sunlight without protection, was diagnosed by quantum perimetry. Life span in AMD patients was from 55 to 78 years, being 9–14 years in children. Detailed case histo-

SUNLIGHT WAVELENGHT AND FREQUENCY

color	λ(Å)	f(*10¹⁴Hz)	Energy (*10⁻¹⁹ J)
violet	4000 → 4600	7.5 → 6.5	5.00 → 4.30
indigo	4600 → 4750	6.5 → 6.3	4.30 → 4.20
blue	4750 → 4900	6.3 → 6.1	4.20 → 4.10
green	4900 → 5650	6.1 → 5.3	4.10 → 3.50
yellow	5650 → 5750	5.3 → 5.2	3.50 → 3.45
orange	5750 → 6000	5.2 → 5.0	3.45 → 3.30
red	6000 → 8000	5.0 → 3.7	3.30 → 2.50

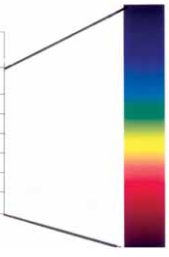

Fig. 1. The visible sunlight or chromatic spectral lines.

MEDICAL FILTERS WITH SPECTRAL TRANSMMITANCE CURVES
(By Vojniković B&D)
Spectrophotometer Instrument Serial Number EL98093266

Fig. 2. Triple medical filter: a) middle green-yellow (lambda 565–570 nm) and b) peripheric mesopic transmission filter (Patent-P20020077A).

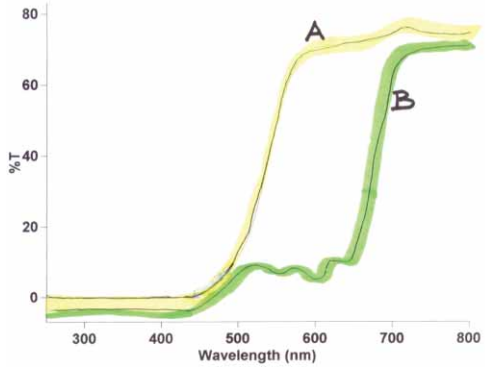

Fig. 3. Spectral transmittance curves: a) middle field and b) peripheric field or medical filter.

ries were taken from all the examined, about the time of exposure to the sun radiation, description of protection, sharpness of sight, fundus picture, biomicroscopy of the anterior segment and visual field: isopteric and quantitative–meridian thresholds. All the examined were given glasses with programme of medical filter. Three colour graded programme (Figures 2 and 3) was prescribed for the adults according to the own patent (P 20020077A), and Transitions-Essilor-Wienna programme, additionally coloured (made in our Optical studio) with medical filter in green-yellow spectar area (lambda=565–570 nm), in children (Figures 4 and 5).

Results and Discussion

In all 125 patients the visual field was improved. The peripheral isopter was extended and the macular and perimacular areas too. The central sight was improved in 80% patients for 0.10 to 0.15. All of the children developed normalization in the meridian thresholds sensitivity, but only in three of them it ammounted 70%, in comparison with previous worse conditions.In all patients retinal sensitivity rehabilitation was better in peripheric visual field,than in central part (Table 1, Figures 6 and 7). It was evident from the contact with the examined that they felt more pleasantly, cheerfully and in better mood when wearing these glasses. This data has been in accordance with many authors[1–4] that the harmful effect of too strong exposure to the sunlight, without protection especially, was proved. Small children and patients with postoperative cataract were particularly pointed out. According to numerous experiments about the harmful effect of too strong exposure to the optical radiation, we proved the green – yellow filter (lambda=565–570 nm) to be optimal, regenerating apoptotic cells of the retinal lay-

TABLE 1
IMPROVEMENT OF VISUAL ACUITY, VISUAL FIELD AND MERIDIAN THRESHOLDS IN ADULTS (125 PATIENTS) AND CHILDREN (29 PATIENTS), AFTER EMPLOYMENT OF MEDICAL FILTERS: GREEN-YELLOW AND COMBINATION WITH ESSILOR TRANSITIONS (6–12 MONTHS)

VISUAL ACUITY:
1. 80% central vision better in range of 0.10–0.15
2. 20% vision better in range of 0.05
3. Central visual field enlarged for 5–10 degrees, and peripheral for 10–12 degrees, in 80% of the patients
DECREASE OF MERIDIAN THRESHOLDS (asb):
1. Macular, in range of 3 asb
2. Perimacular and peripheric 20–40 degrees, in range of 10 asb

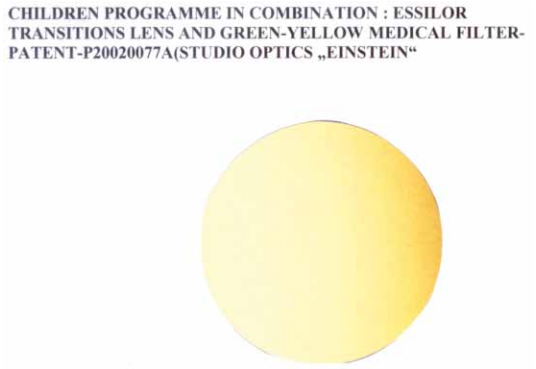

Fig. 4. New lense programme for children.

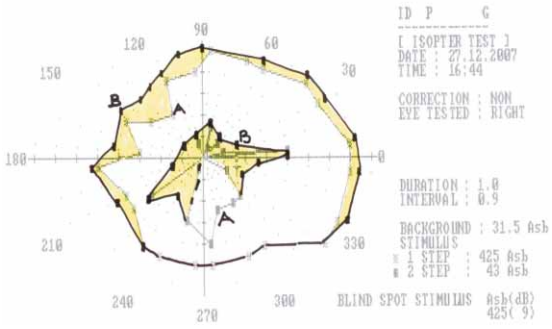

Fig. 6. Visual field in patient with macular degeneration (AMD) a) before and b) after 1-year treatment with triple medical filter (Patent-P20020077A).

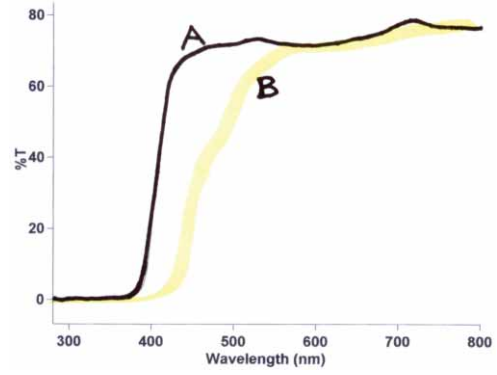

Fig. 5. Transmission curves: a) Essilor and b) colored in green--yellow.

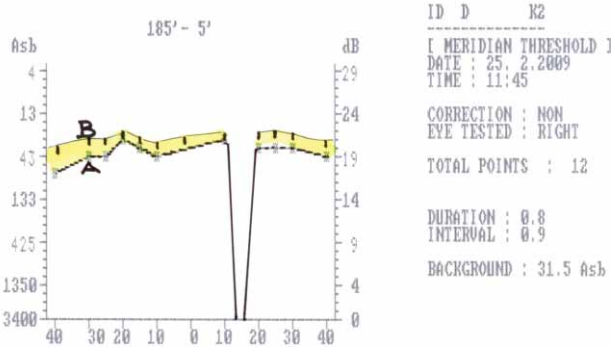

Fig. 7. Meridian thresholds in children after 1-year treatment with medical filter: Essilor Transitions & Patent-P20020077A.

ers, belonging at the same time to this spectral area acting on human mind in terms of better mood, treating depression and increasing optimism.

Conclusions

According to the achieved results in this clinical trial, and earlier extensive experimental work, the following conclusions can be made:

1. Intensified exposure to the sunlight, without protection especially, or to any source of the optical radiation, unavoidably leads to the damage of retina, increased excitation threshold of the retinocortical pathway and the periphery in the visual field, resulting in occurrence and advanced AMD.

2. Eye protection is indispensable in case of the intensified exposure to the optical radiation, the sunlight especially. It has been proved that the best results are achieved in children with the combination of Transitions and green–yellow filter of constant activity. The combination of graded three colour, centrally green–yellow filter (lambda=565–570 nm) and moderate mesopic filter of the upper and lower part of the field of the medical filter lens, in adults. In adults and children retinal sensitivity rehabilitation was better peripheric than central visual field.

3. This medical-therapeutic UV and blue light blocking,can benefit patients with following conditions: Macular degeneration-AMD, Aphakia and Pseudophakia, Developing Cataracts, Diabetic Retinopathy, Optic Atrophy, Retinitis pigmentosa and Glaucoma.

4. Owing to chromotheraphy, a pleasant balance of the vegetative system, improved mood, optimism for better sleep, in children especially, are achieved in all the examined with such prescribed medical filters.

5. Don't forget that colours are basically electromagnetic waves with great energetic effect, being transmitted through the organ of vision to suprachiasmatic nucleus, regulating the vegetative balance which makes the basis of all metabolic processes in the organism.

Colours are »costless« beauty for the human psyche and healthiness of the whole nature (Vesna Horvat).

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KROMOTERAPIJA MAKULARNE DEGENERACIJE S MEDICINSKIM ZELENO-ŽUTIM FILTEROM, TE KROMOTERAPIJA ODREĐENIH PSIHOORGANSKIH POREMEĆAJA

SAŽETAK

Poznato je da je retina ljudskog oka osjetljiva na vidljivi dio sunčeva spektra optičkog zračenja, u rasponu od 770 do 390 nm; tzv. kromatski dio spektra optičkog zračenja. Područje ultravioleta i infracrvenog spektra nevidljivo je za ljudsko oko, ali to ne znači da nije štetno za retinu, s obzirom da ga ona absorbira. Sunčeva svjetlost optičkog zračenja stvorila je život na Zemlji, ona ga održava, ali isto tako ima i štetno djelovanje, s obzirom da evolucijski oko nije u potpunosti prilagođeno svojim fotokemizmom. To je razlog da čovjek u odnosu na mnoge druge prirodne subjekte žive i nežive prirode mora voditi računa o svojoj zaštiti očiju već od najranije mladosti, s obzirom na kumulativni efekt optičkog zračenja. Autori su svojim patentom i u kombinaciji-suradnji s Essilorom, s transitions lećama, koncipirali novu

leću koja ima temeljnu kromatsku podlogu medicinskog filtera u zeleno-žutom području. Taj program koncipiran je za djecu, dok je za odrasle patentiran trikolor, s centralnim poljem zeleno-žutim filteromu centralnom polju, te s umjerenim mezopskim filterom na periferiji gore i dolje. Ta koncepcija ima svrhu regulacije uravnoteženog balansa melatonin-serotonin u krvi. Ispitivanja kvantitativnom perimetrijom, kako u djece, tako i u odraslih pokazala su bitno poboljšanje periferije i centralnog vida, nako tretiranja–uporabe ovih filtera u trajanju od 6–12 mjeseci. Autori preporučuju obveznu zaštitu očiju adekvatnim medicinskim filterima u tijeku jače insolacije.