



Cataract, ocular surgery, aphakia, and the chromatic expression of the painter Jovan Bijelić

Katarakta, operacija oka, afakija i hromatska ekspresija slikara Jovana Bijelića

Ljubiša Nikolić, Vesna Jovanović

Department of Ophthalmology, Faculty of Dental Medicine, University of Belgrade,
Belgrade, Serbia

Abstract

Background/Aim. Approaching art from the standpoint of optics and the artist's eye pathology can sometimes explain the shift of the spectral colors in the work of some artists with cataract and aphakia. This may not be obvious in the paintings of other artists with the same eye pathology. The aim of this study was to create a timeline from the recently obtained details of the cataract surgery, his best corrected aphakic visual acuity, and the last paintings of the artist Jovan Bijelić. **Methods.** The research included primary and secondary source material: Bijelić's paintings from all stages of his career, interviews with Bijelić and his eye surgeon, art criticism, sources with the description of Bijelić's symptoms, hospital archives, discussion with art historians, comparison of his palette from different periods. **Results.** Jovan Bijelić was nearly blind from cataract in 1957. He underwent an unsuccessful cataract surgery in 1956, followed by enucleation of the operated eye. In 1958, 20/25–20/20 vision was regained, after the extracapsular cataract extraction and sector iridectomy in his right eye, with the posterior lens capsule discision afterwards. Xanthopsia and cyanopsia are not present in his art, which is not a representation of visualized objects. **Conclusion.** The response of Jovan Bijelić to cataract and aphakia was predominantly a change of his style.

Key words:

cataract; ophthalmologic surgical procedures; postcataract aphakia; color vision; art; famous persons.

Apstrakt

Uvod/Cilj. Pristup umetnosti sa stanovišta optike i patologije umetnikovog oka može ponekad da objasni skretanje spektralnih boja u radovima nekih slikara sa kataraktom i afakijom. Kod drugih umetnika sa istom patologijom ove promene ne moraju biti očigledne. Cilj ovog rada bio je da se istraži odgovor slikara Jovana Bijelića na kataraktu i afakiju upoređivanjem novih podataka o njegovoj katarakti, operaciji i najbolje korigovanoj afaknoj ošttrini vida sa slikama nastalim u tom periodu. **Metode.** Podaci su prikupljeni pretraživanjem primarnih i sekundarnih izvora: Bijelićevih slika iz svih perioda njegovog rada, novinskih članaka i intervju sa Bijelićem i njegovim hirurgom, umetničkim kritikama, izvorima sa opisima Bijelićevih simptoma, arhivima klinika, razgovorima sa istoričarem umetnosti i slikarem. **Rezultati.** Jovan Bijelić je bio gotovo slep 1957. Jedno oko mu je bilo neuspešno operisano od katarakte 1956, a kasnije i enukleisano. Posle ekstrakapsularne ekstrakcije sa iridektomijom i kasnijom discizijom kapsule, desnom oku je dve godine kasnije vraćena odlična ošttrina vida od 0.9–1.0. Ksantopsija i cijanopsija nisu prisutne u Bijelićevom slikarstvu jer on nije prikazivao posmatrane, već imaginarne predmete, često menjajući stil. **Zaključak.** Odgovor slikara Jovana Bijelića na kataraktu i afakiju prevashodno se manifestovao u promeni stila.

Ključne reči:

katarakta; hirurgija, oftalmološka, procedure; afakija, postkataraktna; vid, kolorni; umetnost; slavne ličnosti.

Introduction

The sclerotic nuclear cataract may induce myopia, monocular diplopia, glare, haloes, and a shift from the violet-blue to yellow-orange colors of the visible spectrum (xanthopsia). The world seen through an opacified brunescient lens is devoid of clear violets and blues, and becomes immersed in a yellowish atmosphere. To the contrary, the

absence of the lens, aphakia, enables the near-ultrashort wave-lengths of light, invisible to a normal eye, to stimulate cones, and give a light-blue appearance to the white objects (cyanopsia).

Richard Liebreich¹, the chief ophthalmologist in St. Thomas' Hospital in London, was the first to recognize the possibility of a connection between cataract and art through his studies on Turner. As a graduate from L'Ecole des

Beaux-Arts in Paris and a pupil of the inventor of ophthalmoscope, von Helmholtz, he was the right person to analyze the influence of painters' eye disease upon their work. At an old age, Libriech examined the painter Claude Monet, who suffered from cataract but underwent surgery many years later. Monet's well-documented xanthopsia during the cataract aging, as well as his postoperative cyanopsia became a common knowledge² and the reason for a belief that both the disease and the state of aphakia produced by the lens extraction must have a profound effect on the palette of the artist. Accepting Trevor Roper's³ advice that one should be cautious in interpreting art using optics as the sole tool, we aimed at finding another example of a painter with cataract and postoperative aphakia, and examining his/her work.

The aim of this study was to investigate the response of the painter Jovan Bijelić to the symptoms caused by cataract and aphakia, by obtaining the unknown details of his cataract surgery, aphakic correction and visual acuity.

Methods

This research included investigation of primary and secondary source material: Bijelić's paintings from all stages of his career, interviews with Bijelić and his eye surgeon, art criticism, sources with the description of Bijelić's symptoms by his friends; the time line of the palette used in his paintings and his eye disease; the hospital archives; discussion with an art historian and an artist; data on other artists' cataract; descriptions left by the doctors who underwent cataract surgery.

Results

Biography

Jovan Bijelić was born in a hamlet Revenik near Bosanski Petrovac on June 30, 1884 and died in Belgrade on March 12, 1964. He graduated from the Art Academy at Krakow. Further studies in Paris broadened his knowledge, but the main influence came from the German expressionist group "The Blue Rider", and from Vasily Kandinsky's abstract art. Yet, the most influential were his memories of the Bosnian mountains and their vivid colors, "kept within and carried wherever he went, lived and painted".

Bijelić was a serene optimist in spite of a chronic anxiety brought by the uncertain artist's income and poor dwelling conditions, and stressed by war, imprisonment and the tragic execution of his daughter.

His opus includes at least 981 paintings in oil or tempera exhibited at more than two hundred group shows, aside from a few of his own; countless drawings and watercolours, thirty historical compositions and dynastic portraits, numerous scenographies, almost a dozen pupils who became well-known artists, and a few novels⁴. His painting, influenced by Cezane at first, then cubistic, and shortly afterwards abstract, followed by neorealistic, then fauvistic, turned into expressionism until finally, after cataract surgery, he created

a series of almost abstract paintings simultaneously with a few vividly coloured and sharply drawn Bosnian landscapes.

Art criticism

The art critics praised Bijelić early as a completely modern painter, a colorist able to discard the unnecessary from his painting, even to dissolve the form, in order to compose a brutal symphony of opposed colors⁵. It was not a simple decision, but a process of cleansing his palette and of changing the style until the circle was closed: from the first abstract painting in 1921 to its revival in 1960. In that year, Bijelić himself summarized his approach: "I am going to be more concise in my work, and I shall depict only what is essential in the motive... These paintings may appear abstract to someone, but they will stem from the real life⁶."

Recollections of the imminent blindness

Passages from Smail Tihić's⁷ "Jovan Bijelić: life and work" are almost the only available source of the artist's wrestling with the eye disease. He was painting even when he barely perceived colors at the palette, while his friends' opinion helped him to get an impression of what he had created⁸ (Figure 1).



Fig. 1 – Jovan Bijelić. "Tempest over Marinko's Pond" (Oil on canvas, 1955; Courtesy of Dušan Vukićević).

His left eye was lost after cataract surgery in autumn 1956⁹. Yet, his rich inner experiences helped him to combat the blindness⁷.

At his retrospective exhibition in 1957, Bijelić could only imagine the paintings using his tactile sense and listening to the description of each of them⁷. Even in such a situation, he expressed his characteristic optimism⁹.

Ocular surgery

Professor Olga Litričin, the doyen of our ophthalmologists, remembers well the days when Bijelić was hospitalized in 1956. Unfortunately, she did not get a chance to see him. The archive from that time does not exist at the University Eye Hospital in Belgrade, and no document was found to show the operative and postoperative course of his first cataract surgery.

The Archive of University Clinical Center, Ljubljana, keeps the documents on Bijelić's treatment in 1958 under the numbers 11763 and 32640.

16.IV 58. *Enucleatio bulbi sin.* Op: prof As Dr Stergar

25.IV 58. Course normal. Right eye (RE): Reddish colored cataract without red reflex from the periphery.

16.VI. 58. Visual acuity (VA) RE Light projection. Fundus invisible.

Left eye (LE) Anophthalmus. Right eye cataract surgery postponed because of an acute hepatitis.

29.X 58. Extr. cat. dex. extracaps. c. irid. tot.

/A large nucleus hardly passes through the round pupil, therefore total iridect. The vitreous pushes behind the lens, but retracts after the instillation of water/.

Op: Doc Stergar As. Doc Dr. Dereani

Cataract surgery, right eye (December 1958) #32640

6.XII 58. Discisio cat. sec.dex. Op. Doc Dr. Stergar As. Dr. Hrovatin

15.XII 58. The eye is quiet. The cornea transparent. The pupil in semimydrasis, without reaction (Mydrasis medic.). A total iris coloboma at 12. An arcuate remnant of the secondary cataract in the upper nasal part of the pupillary aperture. The central portion of the pupil clear.

Fundus: normal. Javal RE 2.0/180° VA RE +10.0 sph

+1.50cyl/180° 5/6

25.XII 58 VA RE +10.0 = cyl +1.50/5° 5/6- 5/5

27.XII.58. Rp/ RE +10.0+1.50/5° LE +10.0

RE +13.0 = cyl +1.50/5° LE+13.0 PD 68/67

Demission: 27.XII 58. Dg. Cat. sen. dex. cured

On November 18, 1958, after cataract extraction, the daily newspaper "Borba" published the article "The painter Jovan Bijelić has regained sight"¹⁰, quoting Dr. Stergar's remark that Jovan Bijelić had endured this more complicated surgery very well. The artist described his anxiety before the patch removal, his confidence and the first visual experience after many years. The article ends with the conclusion that the treatment was a full success and that the painter would soon discard the black glasses¹¹.

Aphakia

During the period of adaptation to aphakic glasses (a couple of photographs show Bijelić wearing them), Bijelić was missing the canvas with his brush while attempting at painting¹¹.

Two years after surgery, Bijelić exhibited a few landscapes (Figure 2) and a series of paintings in an almost abstract style (Figures 3 a and b).

A remark indicates that Bijelić did not see well at that time: "A change of palette, which is not as resonant and glowing as it used to be can be explained by a diminished visual ability, which dropped to 30% of the prior possibilities after surgery in Ljubljana"¹².

Doctors as patients: descriptions of vision through cataract and through aphakic glasses

Gaetan de Clerambault¹³ gave a very detailed description of his symptoms of cataract, the experience of bilateral cataract surgery performed by Ignatio Barraquer, and of aphakic vision. Troublesome object distortions, haloes, and ocular fatigue were his dominant symptoms of cataract.



Fig. 2 – Palette from Bijelić's landscapes ("Bihać", oil on masonite, 1960).



Fig. 3 – Palette from Bijelić's abstract art (1962).

Barraquer's surgery with the use of vacuum was fast, gentle and highly successful, except for the iris prolapse in one eye due to the the pressure on the globe during postoperative period. Aphakic vision was dominated by blue and violet colors: white objects seemed to be bluish to one eye and slightly violet to the other and faces seemed to have blue or violet orbits. Allan C. Woods¹⁴ experienced aphakia so profoundly that he wrote an editorial with a bottom line: "It can not be cured, it must be endured". Walter Stark has had an aphakic eye since an injury at the age od 10, and cataract surgery at the age of 12. Fascinated by his cyanopsia, he has investigated the ultrashort wave perception quite extensively¹⁵.

Other painters' experience with cataract surgery and aphakia

Two well-known artists underwent cataract surgery at about the same time as Jovan Bijelić: Sir Mathew Smith, a British fauvist, in 1952, and Kay Sage, an American symbolist painter, in 1959 and 1960¹⁶.

Sir Mathew has never complained of either xanthopsia or cyanopsia. He continued to paint in the same style after surgery, feeling only that the colors seemed more vivid¹⁶. The palette used in one of his oil paintings created postoperatively does not show any signs of cyanopsia, but these signs can be traced in his pastels (Figure 4).

Kay Sage's palette during the development of cataract does show grey-yellowish and ochre hues (Figure 5). After a painful and partially successful bilateral cataract surgery, she stopped painting and created small sculptures made of wires, bullets and stones. She also wrote poetry. Finally, Kay Sage committed suicide, which she had already unsuccessfully at-

tempted immediately after her husband's death in 1955¹⁷.

Discussion

In 1956, Bijelić was left with a low vision in his only functional eye. There are no hospital records to show why his left eye had lost sight and became atrophic after surgery. Most probably an expulsive hemorrhage or a massive vitreous prolapse with a subsequent retinal detachment must have happened. Bijelić's blood pressure values as measured in Ljubljana, at one point reached 190/90 mmHg. Such a spike during cataract extraction through a large incision could have triggered the expulsive hemorrhage. Two years later, the fear of the sympathetic ophthalmia originating from the blind, atrophic left eye was an indication for enucleation.

The right eye was operated by using extracapsular cataract extraction with sector iridectomy, and discision of the remaining posterior capsule at a later date. What was the reason for choosing this technique? The prevailing method at that time was intracapsular cataract extraction by grasping the capsule with the Arruga forceps and taking the whole lens out of the eye. A great skill was required for such a maneuver, which limited the number of able surgeons and uncomplicated operations. One of them was Leopold Ješe, who had performed intracapsular cataract extraction 22 years before Bijelić was hospitalized¹⁸.

To overcome this difficult approach, some ocular surgeons accepted the Ignacio Barraquer's method of phacoerisis, using a vacuum device called erisiphake¹⁹. Its jovial inventor liked to picture the action of vacuum as the kiss of a beloved women compared to the grasp of the cat's claws exerted by the forceps. The vacuum extraction gained popularity after the introduction of enzymatic zonulolysis by

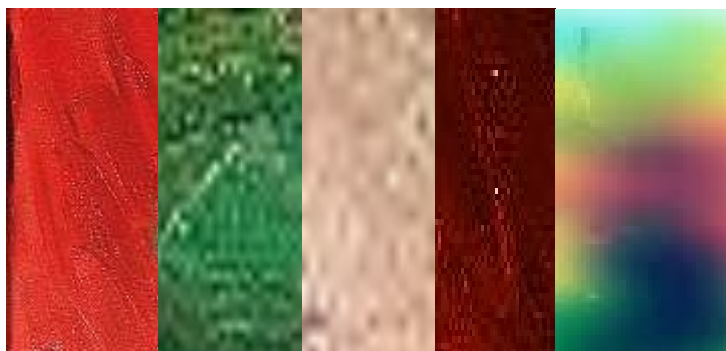


Fig. 4 – Palette used by Matthew Smith after cataract surgery. The last stripe shows the approximate colors from his pastels.



Fig. 5 – Palette used by Kay Sage in her last paintings before cataract surgery.

Joaquin Barraquer²⁰ but was soon replaced by the safest method of all, Krwawitz's²¹ intracapsular cataract kryoextraction. However, both the zonulolytic enzyme alpha-chymotrypsine and the kryoextractor were unavailable at the time of Bijelić's operation²². According to a paper presented at the anniversary celebration of the Maribor Hospital, yet another method was used by the ophthalmologists of this town in the vicinity of Ljubljana at the end of the fifties: a revived and modified colonel Smith's²³ tumbling technique, called Hruby's cataract expression²⁴. It worked well in the hands of colonel Smith, who had performed thousands of cataract extractions in India, but was not suited for testing in the only eye of Jovan Bijelić. Nor was the forceps intracapsular extraction with such dreaded complications as the vitreous prolapse or the rupture of the tense posterior capsule and the nucleus drop into the vitreous²⁵. Instead, Dr. Stergar chose a method which could leave a barrier both to the expulsion of the ocular content, and to the movement of the nucleus backwards: extracapsular cataract extraction.

This method invariably lead to discision of the posterior capsule at a later date; but was the sector iridectomy necessary? Again, without a viscoelastic to form the anterior chamber and to push the vitreous back, and a microscope to command a detailed view of the involved ocular structures, it was probably the safest choice for Dr. Stergar and for Bijelić, as it had been for Dr. Cutela and for Claude Monet. The modest comment of how well Bijelić had endured a somewhat complicated surgery reflects both the psychological pressure on the surgeon operating on a monocular patient, as well as the push of the vitreous behind the lens which had happened during extraction. The reward was an excellent best corrected vision of 20/25–20/20, with moderate two diopters of astigmatism.

Did this excellent visual acuity last or Bijelić became legally blind again, as Tihic¹² suggested? Was this the reason to paint his almost abstract "Compositions"? As the secondary cataract can not reobscure vision after discision, and the corneal edema from the late endothelial decompensation is conspicuous, the presumed loss of visual acuity could be caused either by macular or the optic nerve disease. It is impossible to prove or disprove the development of such diseases in Bijelić's eye during some 18 months after the final examination in Ljubljana, when a normal *fundus* appearance had been recorded. But, how could he paint those Bosnian landscapes with such a certainty of drawing with a visual acuity of 0.2–0.3 (20/60)? A careful analysis of the vocabulary used in the constatation that a diminished visual ability, which dropped to 30% of the prior possibilities after surgery in Ljubljana, reveals the use of the term visual 'ability' instead of the 'acuity'. It indicates that this constatation may be a misinterpretation of a medical report showing a 30% diminution of the working and visual 'ability', which used to be issued to all monocular patients, whose sound eye had a good visual acuity, in order to get a compensation from the state insurance.

Adaptation to the aphakic correction with glasses is a process which involves the neural plasticity: it takes time, patience and even endurance, as suggested by Dr. Wood. The ability to adapt to a new perception of the world also depends on the character, temper and age.

One of the most readily noticed obstacles is the magnifying effect of the strong convex spectacle lenses intended to replace the refraction of the extracted crystalline lens. The objects seen through them do not seem to be larger, but they appear to be closer. That it why Bijelić was missing the canvas with the brush in his attempt to paint during the early postoperative course. His photographs with aphakic glasses indicate that he had finally succeeded to learn how to walk and work with them.

The abrupt change of color perception after cataract extraction is another obstacle. Provoked by Claude Monet's paintings of the same subject seen through his cataract or with his aphakic eye, and his letters with a detailed explanation of the troubles with perceiving colors have been an issue in hundreds of articles until the water lilies which turned from yellow-brown into blue-violet after cataract surgery became a common place²⁶. Was every artist with cataracts and later aphakic spectacle correction doomed to paint in this color register?

The aging lens block the increasing amount of light of the short wavelengths; and yet, we do not notice a different color perception because of a cerebral adaptation to this slow process. Even with a sclerotic nuclear cataract this slow shift towards yellowish appearance of the world does not have to be conspicuous. Only after cataract extraction the quantity of light, especially of the shorter wavelengths that reaches the retina, changes abruptly creating a shift of color in the blue-violet direction. This shift can be enhanced by the aphakic spectacle lens chromatic aberation²⁷. Some studies indicate that this barrier deprivation syndrome can last from six months to three years²⁸, while others, using achromatic settings, estimate that re-adaptation is likely to be a cortical process which takes three months²⁹. Why then Monet needed three years to adapt, and how long did other painters need?

Most aphakic and pseudophaking patients, even some aphakic artists like Sir Matthew Smith, notice only that colors seem more vivid than before. Others, like Dr. Walter Stark, easily notice that what appears white to the phakic eye seems to be bluish to the aphakic eye. Further, some extremely sensitive persons, like Dr. Gaetan de Clerambault¹³, notice even the difference between two aphakic eyes: one of them sees things bluish, the other – violet. Monet was one of these sensitive, impatient, old persons with monocular aphakia, who could see the difference and knew only too well how he wanted to perceive colors in order to create different appearances of the same visible objects. The incessant change of the spectacle correction, of the tinted and transparent glasses, and a deliberate closing of the aphakic eye, distracted him from the process of adaptation. In this state of interrupted chromatic mechanisms, his heroic attempts to catch the most elusive among the characteristics of an object, its color, created both the fluctuations of his mood and the axiom of the palette changes according to the presence of a cataract or aphakia.

As an expressionist, Bijelić was far away from Monet's colorist intentions. His colors were not a reflexion of light from the objects: they stemmed from the inner state of tension, opposing each other in the heights over his imaginary landscapes. A burst of blues, reds, greens and yellows in Figure 1 did not represent any object seen through his advanced cataracts; it was the

image of distortion created by the conflict between the intruding outer world and the order of the inner world³⁰. No eye disease can be suspected from this painting, as no style that Bijelić has ever used before can be recognized in it. This art is closest to *Art Informel*, which has just appeared in France.

Admittedly, Bijelić used plenty of blues in his Bosnian landscapes seen through the aphakic spectacle correction. But these blues are within the boundaries of a firm, almost scholarly drawing, matched by a very rich spectrum of other colors, and do not leave the river and the sky to spill over the red roofs of the light ochre houses, or the green trees (Figure 2).

His "Compositions", (oil on lesomite, 1962) had been created in a search of the essence in art, as Bijelić himself explained. The painting is characterized by a reduction of both form and color: burnt Sienna and yellow ochres stand out from a light-blue "background". The artist did not paint a white wall, appearing bluish to him – he simply matched the colors to get a painterly effect (Figure 3).

Similarly, Matthew Smith may seem to have cyanopsia when judged by the palette of his pastels, but one look at those prevailing reds and greens taken from his oil

paintings after cataract extraction will assure us that he used the colors to paint a picture and not to represent an object (Figure 4).

Finally, the palette of Kay Sage's last paintings contains colors that may suggest xanthopsia, but these colors also seem to suit best the mood and atmosphere of her symbolist art (Figure 5).

Conclusion

The monocular spectacle-corrected visual acuity of Jovan Bijelić, after an uneventful extracapsular cataract surgery and posterior capsule discision, was excellent. His artistic response to cataract and aphakia was predominantly a change of the style of painting.

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