



Motivation & training techniques of patients after SML implantation

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Introduction

- Reading is one of the most frequently performed psycho-physiological operations and requires cooperation of oculomotor system (miosis-convergence-accommodation- eye tracking)-perceptive system (optical media of the eye, retina) and interpreting processes in the brain
 - Low vision patients using visual aids are required to use head or hand movement more often than using natural eye movements to scan the text, which may result in vestibular-ocular conflict and discomfort
 - Images provided by magnifying devices are different from images patients were used to see with healthy eyes
 - Different reading technique with visual aids
- => Many visually impaired older adults have difficulty in getting used to a new device
- => **Need motivation and training**



Methods

- Experience with 8 patients implanted with Scharioth Macula Lens
- 3 pilot study + 5 multicentric study
- Settings: Dpt.of Ophthalmology, University Hospital, Hradec Králové, Czech Republic
- The SML was monocularly implanted in the better-seeing eye
- No severe complications during and after surgery
- Postoperative care and treatment as usual after cataract surgery
- At baseline and 1 day, 1 week, 1, 3, 6 and 12 months after surgery: uncorrected and best corrected visual acuity at distance (ETDRS charts), visual acuity at near tested using Jaeger Reading Cards and Radner charts, and complete clinical examination, after pupil dilatation
- Possible complications were recorded and patients were asked about quality of vision after SML implantation

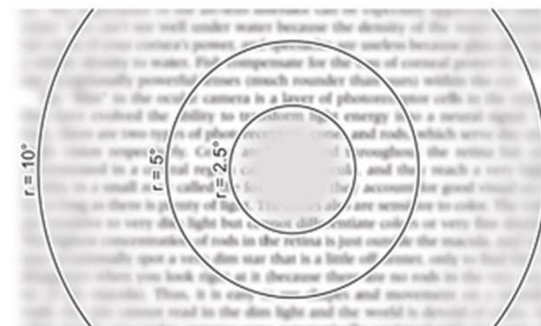
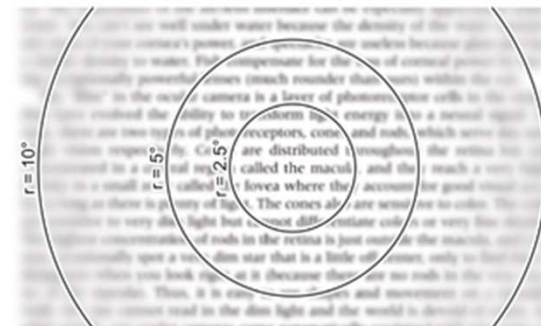
Note: Jaeger reading card is a chart on which paragraphs of text are printed, with the text sizes increasing from 0.37mm to 2.5mm, the smallest print that the patients can read determines their visual acuity

Preoperative care

- prevention of dissatisfaction after SML implantation
 - patient should share any specific visual needs with a doctor
 - test near vision with +6.0 diopters from distance of 15 centimetres preoperatively- it is experienced to be equal to uncorrected VA postoperatively
- patient must feel improvement of near vision with +6.0 dioptres
 - it helps to ensure the results achieved by SML are consistent with patient's expectations
 - a doctor should help patient to understand the principles of SML action - by magnification, it uses the rest of the damaged fovea to enable reading, it will not heal the retinal problem
 - patient's maculopathy must be inactive!
 - patient must meet the indication criteria for SML implantation

... you can't see well under water because the density of the water neutralizes most of your cornea's power, and spectacles are useless because glass also has a similar density to water. Fish compensate for the loss of corneal power by having exceptionally powerful lenses (much rounder than ours) within the eye.

The "film" in the eye's camera is a layer of photoreceptor cells in the retina. They have evolved the ability to transform light energy into a neural signal. In this, there are two types of photoreceptors, cones and rods, which serve day and night vision respectively. Cones are distributed throughout the retina but are concentrated in a central region called the macula, and they reach a very high density in a small zone called the fovea where they account for good visual acuity as long as there is plenty of light. The cones also are sensitive to color. The rods are sensitive to very dim light but cannot differentiate colors or very fine detail. The highest concentration of rods in the retina is just outside the macula, and you may occasionally spot a very dim star that is a little off-center, only to find that it disappears when you look right at it (because there are no rods in the very center of the macula). Thus, it is easy to see steps and movement on a moonlit walk, but one cannot read in the dim light and the world is devoid of colors. In other words, our eyes are very sensitive to motion and movement on a moonlit walk, but one cannot read in the dim light and the world is devoid of colors.



Postoperative care

- motivation and visual rehabilitation
 - All patients were advised to perform reading exercises every day
 - We provided them with instructions and training texts to facilitate the postoperative adaptation
 - READ WITHOUT GLASSES or other EXTERNAL MAGNIFIERS AT LEAST TWICE A DAY FOR 10 MINUTES A SESSION
 - sharp vision is achieved at a very near distance: 10-15 centimetres
 - read from the big to the smallest type you are comfortable with (high contrast reading materials are recommended at the beginning)
 - keep practicing until you can read comfortably (may be approx. 1 month but will probably improve over the first 12 months)
 - don't forget at good light conditions
 - have a rest when being tired
 - use artificial tears when you feel an eye discomfort



0.37 M	<i>I walked up the street, going about, well near the market house I met a boy with bread. I had made money a meal or two, and asked him where to get it. I then went to the baker's and asked for bread such as we had in Boston. I asked for a three penny loaf and was told that they had none such. His knowing</i>	12
0.50 M	<i>the difference of money and the greater cheapness I bade him give me three penny worth of any sort. He gave me three puffy rolls. I was surprised at the quantity but I took it, and walked off with a roll under each arm. Thus I walked up Market Street as far as Fourth Street, passing by the house</i>	13
0.62 M	<i>of Mr. Read, my future wife's father. She, standing at the door, saw me and thought I made a most awkward appearance, as I certainly did. Then I turned and went down Chestnut Street and a part of Walnut Street. Being filled with one of my rolls, I gave the other two to a woman</i>	14
0.75 M	<i>and her child. By this time the street had many clean and well dressed people in it, all walking the same way. I joined them and was led into the great meeting house of the Quakers'. I sat down among them and after looking around a while and hearing nothing said,</i>	15
1.00 M	<i>I fell fast asleep. This was the first house I was in, or slept in, in Philadelphia. Looking in the faces of people, I met a young man whose countenance I liked, and asked</i>	17
1.25 M	<i>if he would tell me where a stranger could get lodging. "Here", and he, "is one place that entertains strangers."</i>	18

Patient 1, HK- pilot

Man, 1939, AMD dry form

Surgery 13rd January 2015- right eye

Preoperatively:

UCVA 0.3, BCVA 0.3 (LE 0.2)

At near J.13 nat, J.5 with +6,0

Postoperatively:

1 day- BCVA 0.2, J.6 nat

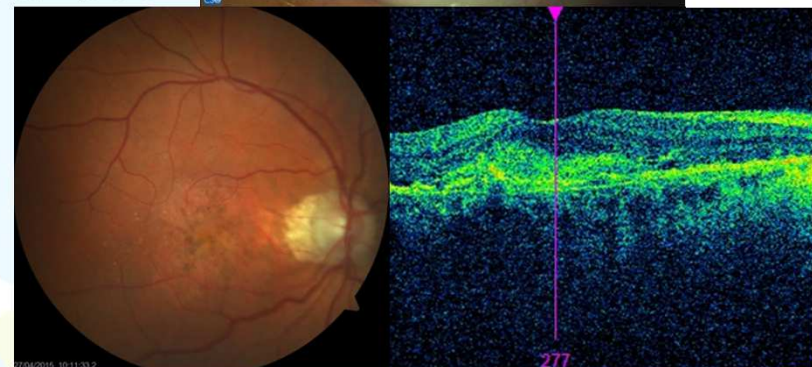
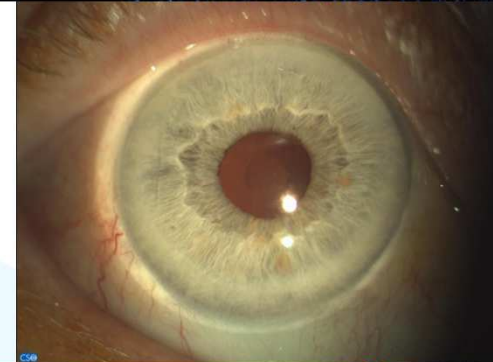
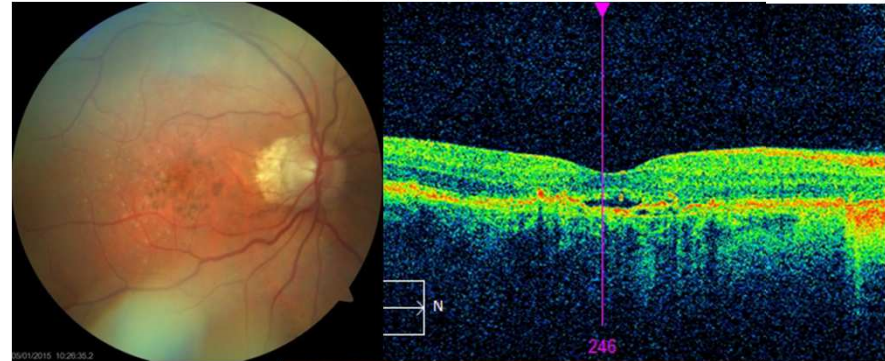
1 week- BCVA 0.4, J.1 nat

1 month- BCVA 0.3, J.2 nat, right eye disturbed

2-3 months- BCVA 0.2, J.7 nat

Switched into AMD wet form- Lucentis

BCVA 0.1 - stabilized, reading difficult



Patient 2, HK- pilot

Man, 1942, AMD dry form

Surgery: 23rd January 2015- left eye

Preoperatively:

UCVA 0.3, BCVA 0.3 (RE 0.1)

At near J.16, J.5 with +6.0

Postoperatively:

1 day- BCVA 0.06, J.12 nat

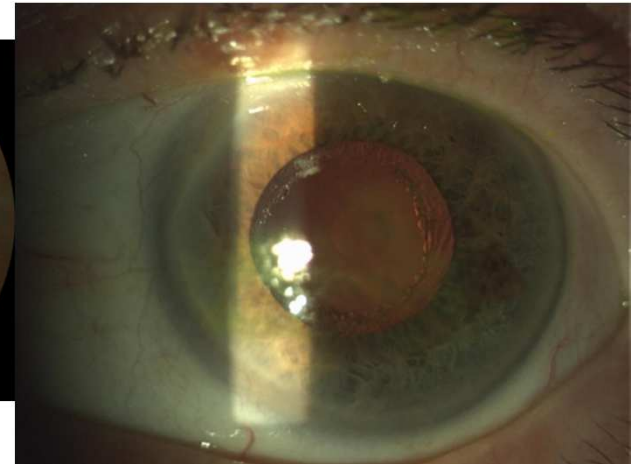
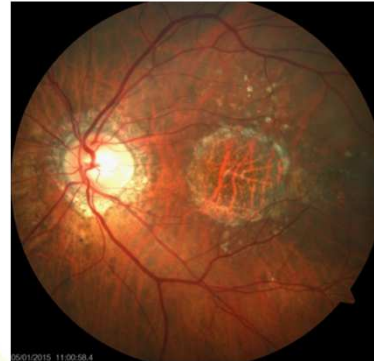
1 week- BCVA 0.3 with Pilocarpin, J.6

1-2 months- BCVA 0.3, J.5 nat, right eye disturbed

3 months- BCVA 0.15, J.6 nat, needed time to find the right position of text, fluent reading after few minutes, reading every day

6 months- BCVA 0.2, J.2 fluently- everyday reading exercise

12 months- BCVA 0.15, J.3 - still everyday reading, satisfied, able to read newspaper text, long reading fatigued



Patient 3, HK- pilot

Woman, 1930, AMD dry form

Surgery: 10th February 2015- right eye

Preoperatively:

UCVA 0.1, BCVA 0.3 (LE 0.3)

At near J.8 nat, J.1 with +6.0

Postoperatively:

1 day- BCVA 0.4, J.13 stenopeic

1 week- BCVA 0.3, J.1 nat

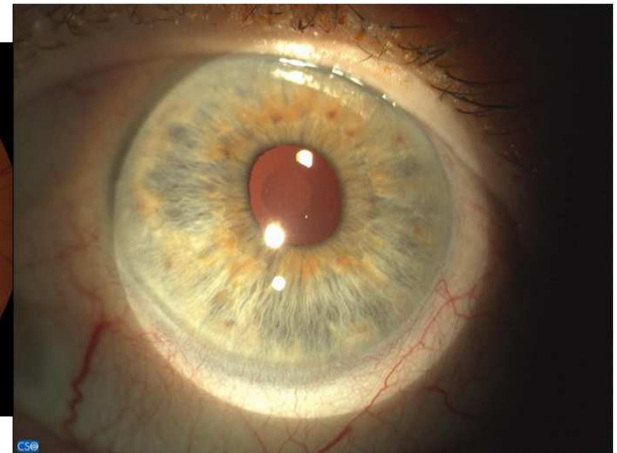
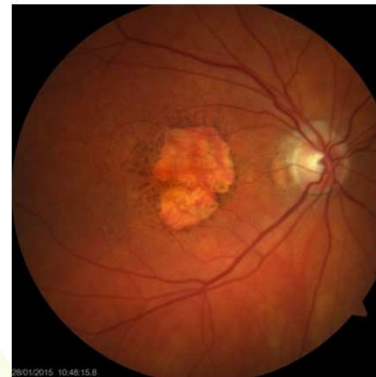
1 month- BCVA 0.2, J.1 nat, very happy

2 months- BCVA 0.3, J.2 nat, satisfied

3 months- BCVA 0.3, J.4 nat

6 months- BCVA 0.2, J.4 nat, needed good light condition, she had leg ache, she did not exercise reading everyday- no motivation

12 months- BCVA 0.15, J.5, she had a car accident, no reading exercise, short reading distance uncomfortable



Patient 4, HK- multicentric

Woman, 1936, AMD dry form
Surgery: 28th July 2015- left eye

Preoperatively:

UCVA 0.2, BCVA 0.25 (RE 0.2)

At near J.13 nat, J.2 with +6.0

Postoperatively:

1 day- BCVA 0.16, J.8 stenopeic

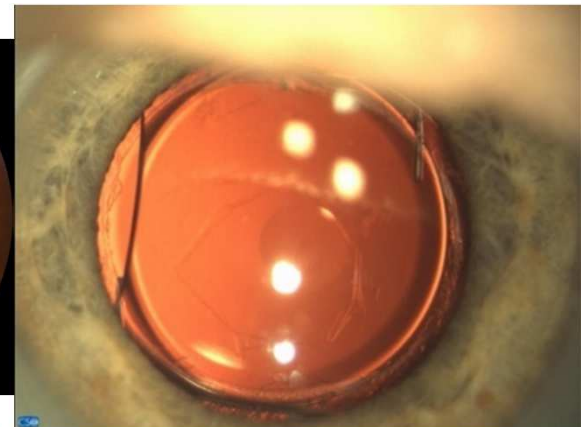
1 week- BCVA 0.25, J.8 nat

1 month- BCVA 0.25, J.2 nat, right eye disturbed- covered while reading

3 months- BCVA 0.25, J.3 nat, everyday reading, good light, able to read normal size text, short reading distance uncomfortable

6 months- BCVA 0.25, J.3 nat, reading often

12 months- BCVA 0.2, J.1 nat, able to read everything what she needed



Patient 5, HK- multicentric

Woman, 1937, AMD dry form

Surgery: 11th August 2015- right eye

Preoperatively:

UCVA 0.125, BCVA 0.25 (LE 0.2)

At near J.13 nat, J.5 with +6.0

Postoperatively:

1 day- BCVA 0.2 stenop., J.1 nat

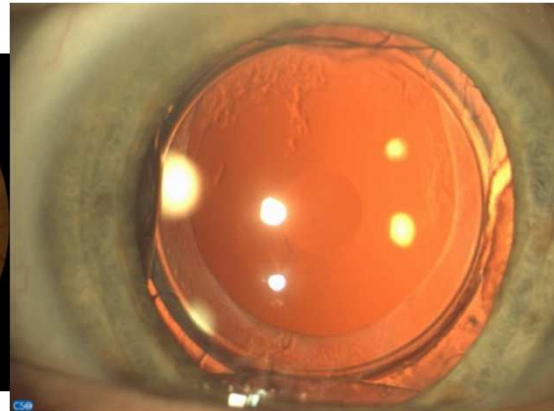
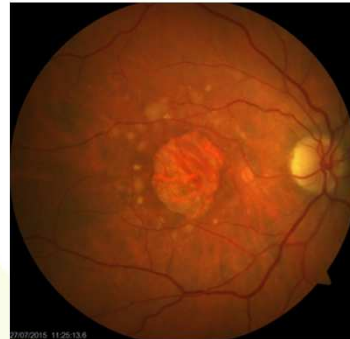
1 week- BCVA 0.3, J.2 nat

1 month- BCVA 0.3 , J.1 nat, satisfied, left eye did not disturb

3 months- BCVA 0.3, J.6 nat, reading fatiguing but possible

6 months- BCVA 0.25, J.8 nat, reading more difficult, recommended to exercise reading everyday

12 months- BCVA 0.25, J.5 nat, satisfied, able to read a book, got tired after 3 lines, then a short rest and able to read again



Patient 6, HK- multicentric



Woman, 1938, AMD dry form

Surgery: 13th October 2015- left eye

Preoperatively:

UCVA 0.25, BCVA 0.25 (RE 0.2)

At near J.14 nat, J.4 with +6.0

Postoperatively:

1 day- BCVA 0.25, J.1 nat

1 week- BCVA 0.2, J.1 nat

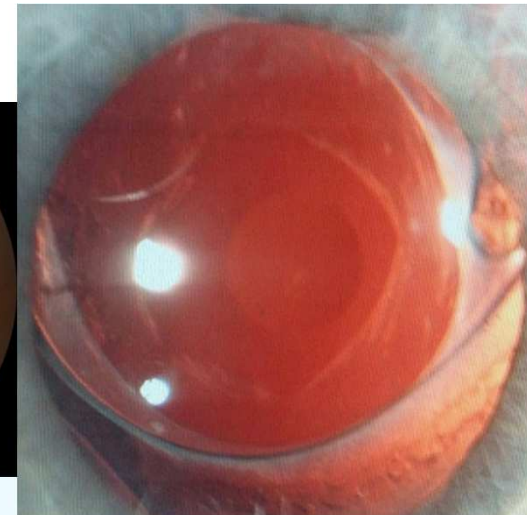
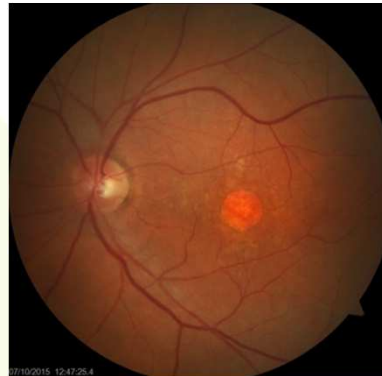
1 month- BCVA 0.2, J.1 nat

3 months- BCVA 0.25, J.1 nat

6 months- BCVA 0.3, J.1 nat

(12 months follow-up visit- 12 October 2016)

Satisfied, able to read a book, after 3 pages fatigued, needed good light, reading every day



Patient 7, HK- multicentric

Man, 1930, AMD dry form

Surgery: 20th October 2015- left eye

Preoperatively:

UCVA 0.16, BCVA 0.2 (RE 0.2)

At near J.13 nat, J.1 with +6.0

Postoperatively:

1 day- BCVA 0.16, J.13 nat

1 week- BCVA 0.4, J.1 nat, needed good light, right eye disturbed-cover

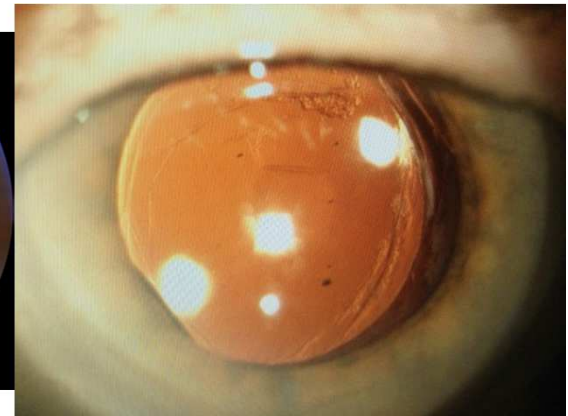
1 month- BCVA 0.3, J.1 nat, satisfied, reading exercises

3 months- BCVA 0.3, J.3 nat *

6 months- BCVA 0.25, J.3 nat *

(12 months follow-up visit- 20th October 2016)

* problems with reading speed and fluency, however reading is possible



Patient 8, HK- multicentric

Woman, 1935, AMD wet form inactive
Surgery: 1st February 2016- right eye

Preoperatively:

UCVA 0.3, BCVA 0.3 (LE 0.1)

At near J.13 nat, J.4 with +6.0

Postoperatively:

1 day- BCVA 0.1, J.8sl nat

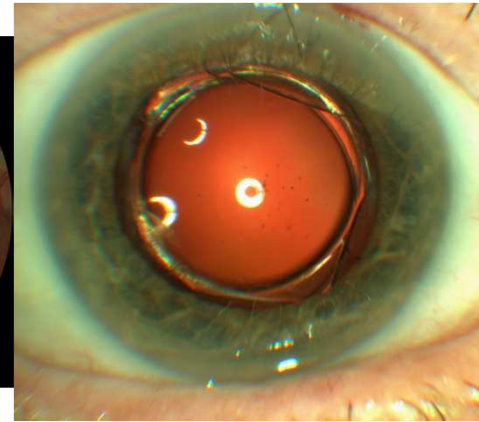
1 week- BCVA 0.2, J.6 nat, cannot read, blurred, left eye disturbed

1 month- BCVA 0.25, J.7 nat, she could read, but had knee ache and after bronchitis, she lost ability to read normal sized text- no reading exercise

3 months- BCVA 0.25, J.8 nat, able to read only headings, started to exercise reading

6 months- BCVA 0.25, J.5 nat, reading better, but fatiguing, good light

(12 months follow-up visit- February 2017)



Summary

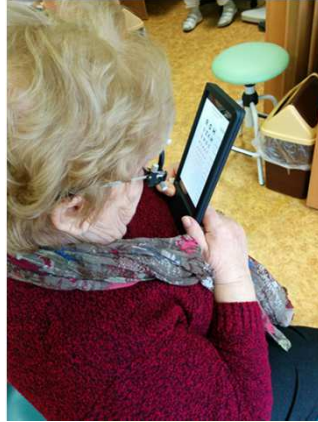
- Postoperative recovery was rapid and no complaints of diplopia or glare were recorded
- Patients reported problems with reading speed and distance
- Daily exercises improved their reading ability
- The eye without SML disturbed near vision of 5 patients; this eye had to be covered during reading for a temporary adaptation period of 2-4 weeks postoperatively
- spectacles with 1 glass removed and the other covered with semitransparent plaster



- After SML implantation, distance vision or visual field was not affected- paracentral vision

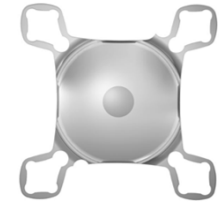
Summary - take a home message

- Patient must understand the principles of reduced reading distance



- Patient must know that his/her disease- AMD- is chronic and progressive and SML will not heal the problem of retina
- Patient realistic expectations should be established before surgery
- Patient should be motivated and should
 - exercise reading every day -training charts
 - read at distance of 10-15 centimetres, read in good light conditions
- Doctor/optician should repeat recommendations and improve patient's reading technique
- ***After SML implantation, care begins, not finishes***

Conclusion



- Macular degenerations and dystrophies often result in significant visual impairment that limits a patient's daily activities requiring good central vision, such as self-care, reading, recognizing facial features, driving, watching television, and other social activities. Thus, impaired vision is an important cause of depression and anxiety
- Scharioth macula lens is a new hope for low-vision patients, it is a suitable method to increase near visual acuity in patients with maculopathy
- According to our experience, careful preoperative examination, good indication and realistic patient's expectation and cooperation are crucial for optimal outcome
- The prospects of reading rehabilitation after SML implantation is promising; patient motivation and daily reading exercises are of utmost importance for achieving the best results and satisfied patient

Thank you for your attention

