
بسم الله الرحمن الرحيم

SUB THRESHOLD [MICROPULSE] LASER Treatment in Ophthalmology

By

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The word LASER is an acronym for

L ight

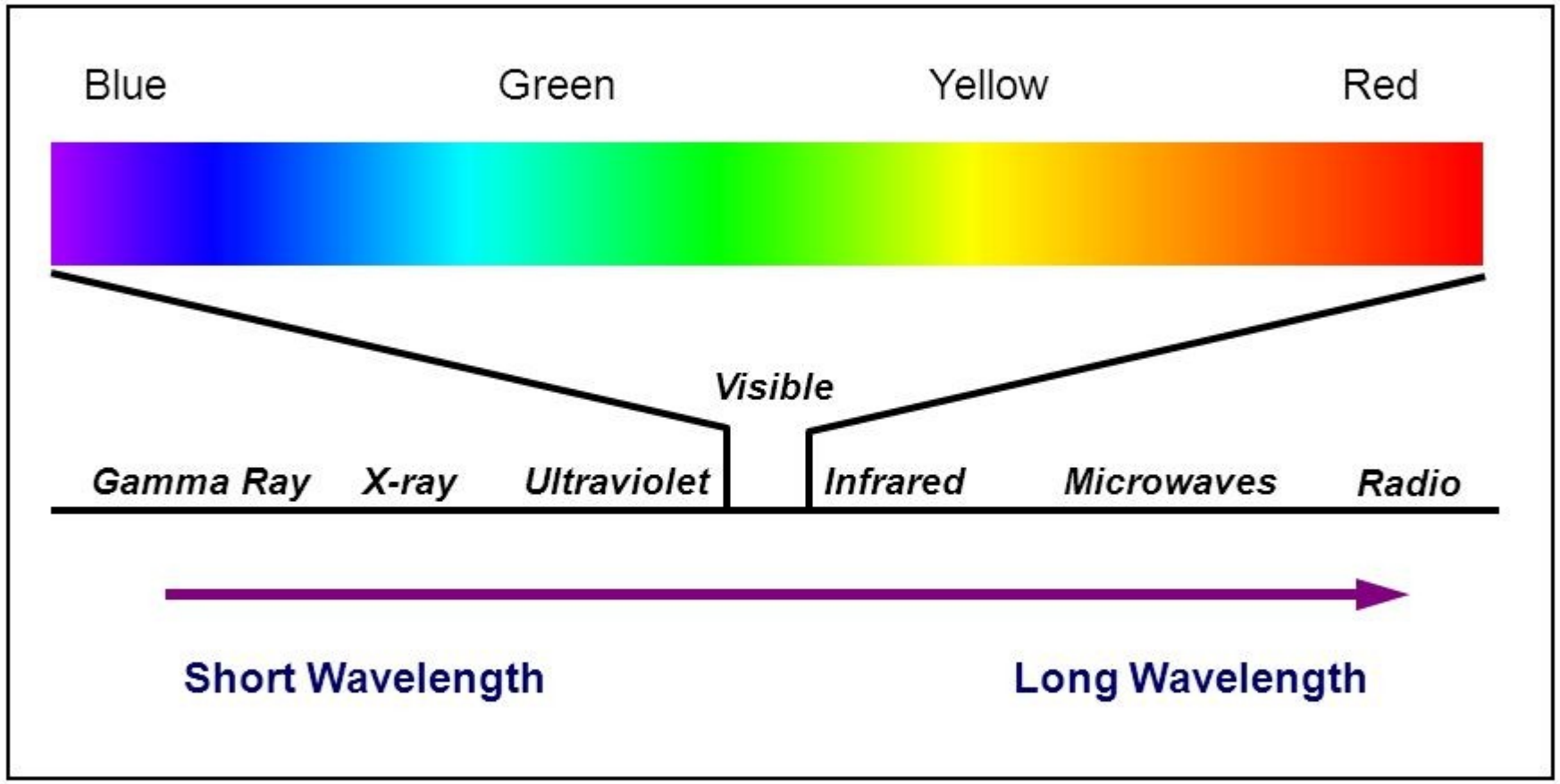
A mplification by

S timulated

E mission of

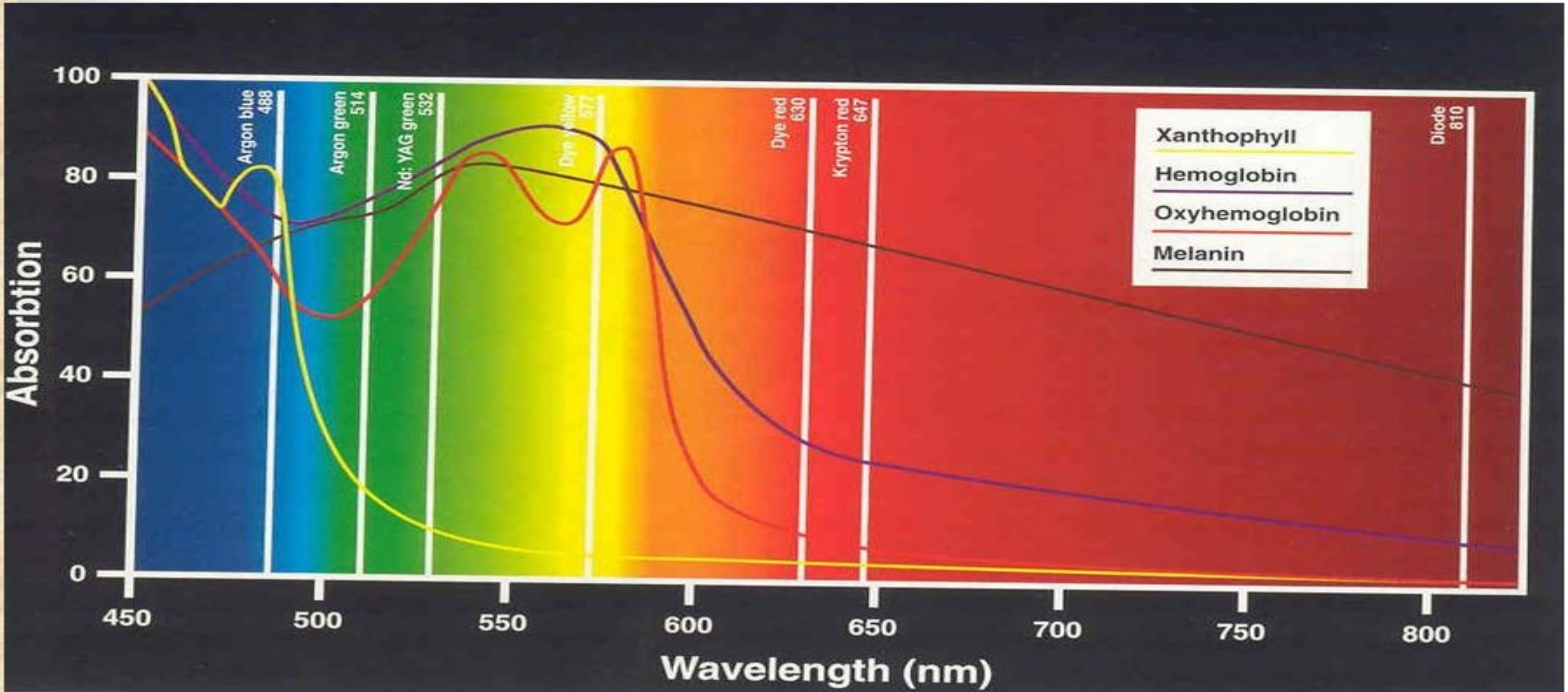
R adiation

ELECTROMAGNETIC SPECTRUM



Lasers operate in the ultraviolet, visible, and infrared.

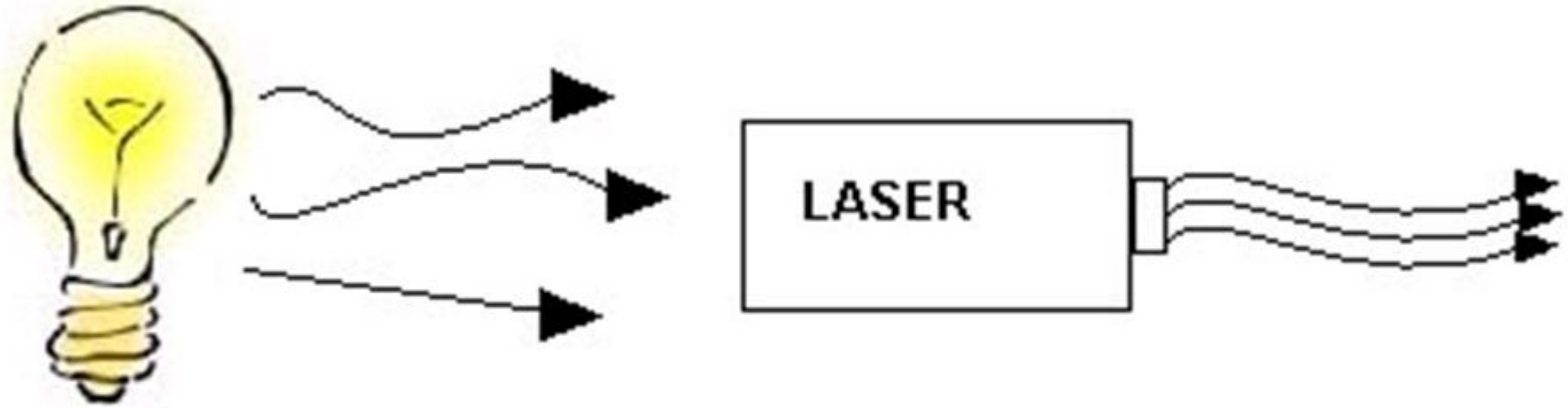
Absorption spectrum in ocular tissues



Laser output

- Continous mode: Continous output, externally controlled, has uniform power
- Pulse mode: Concentrated energy, delivered over short period
- Q switched lasers: Intracavitary shutter allows rapid energy release, short high power pulse
- Mode locking: Ultra short pulses in pico seconds

Incandescent v/s Laser Light



1. Many wavelengths
2. Multidirectional
3. Incoherent

1. Monochromatic
2. Directional
3. Coherent

Introduction

- Photothermal elevation that does not produce visible intraretinal damage during or after laser treatment termed subthreshold laser treatment.

- subthreshold laser treatment may be as effective as conventional laser treatment but with less iatrogenic damage to the tissues surrounding the area of the burn.

There are five types of subthreshold laser. These five are;

- Subthreshold micropulse laser (SMPL)
- Selective retina therapy (SRT)
- Subthreshold nanosecond laser (SNL)
- Endpoint management (EpM)
- Transpupillary thermotherapy (TTT)

- SMPL is a widely utilized technique with many names including microsecond pulsing, subthreshold diode micropulse laser, MicroPulse, SubLiminal, and Smart Pulse.
-

The subthreshold laser is a new technology based on cell photostimulation that enables us to decrease the total laser energy

Subthreshold{ micropulse} laser treatment (MPLT) is a safe, nondamaging therapeutic tool, selectively targeting the retinal pigment epithelium (RPE)

- STMPL deactivate the microglial cells, thus decreasing the retinal inflammatory response and biomarkers of Müller cell ,in DME

- The RPE plays a significant role in repairing the retinal barriers, regardless of the type or location of the laser application

The Absence Of Micropulse Chorioretinal Laser Damage Permit Retreatment Of The Same Area.

- The Absence Of Chorioretinal Scaring Allows For An Overlapping Application Of laser shots.

- Frequent Retreatment Of Involved Retinal Areas Is Also Possible Without Fear Of Creating Retinal Scarring.

The SMLT stimulate retinal pigment epithelium (RPE) cells to regulate different factors,

sparing the neural retina and preserving the functional integrity of the photoreceptors.

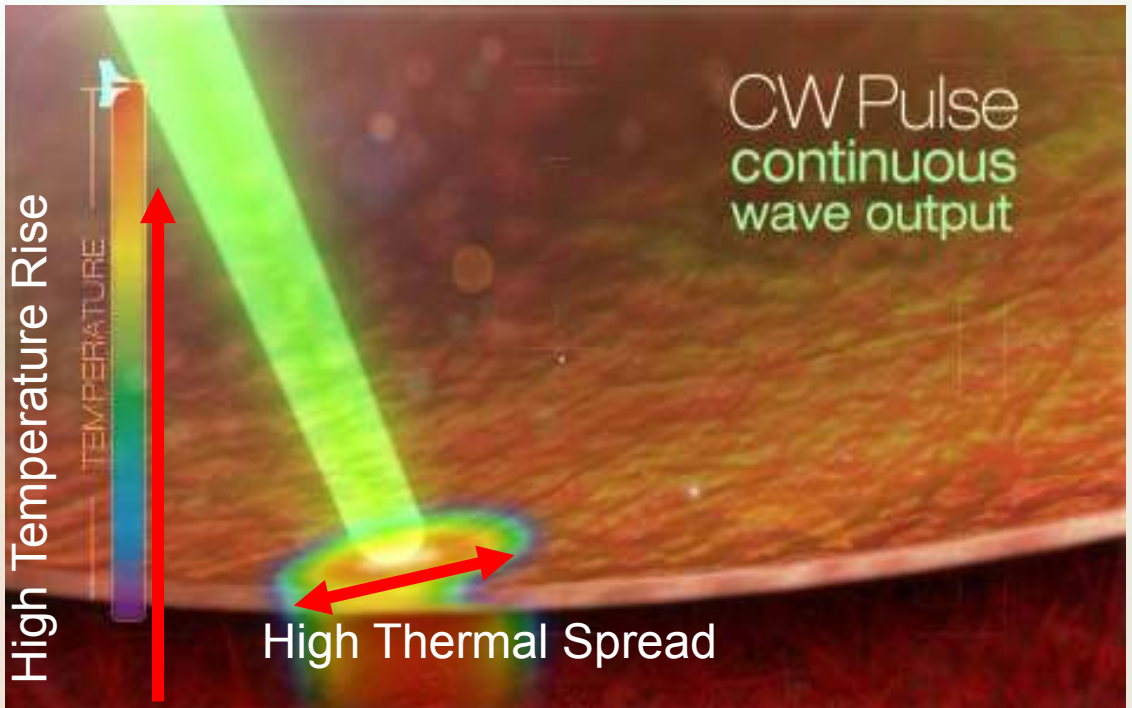
Effect of SMPLT

- SMPLT results on:
- -Decrease in proinflammatory proteins and the VEGF level .

- -Deactivate the retinal microglia and reduce diabetes-induced inflammation.
- -Decrease in bioindicators of Müller cells activation

Continuous Wave Laser Effects on Tissue

- Temperature rise causes photocoagulation
- Heat
  - Absorbed by surrounding tissue
  - Takes time to return to baseline

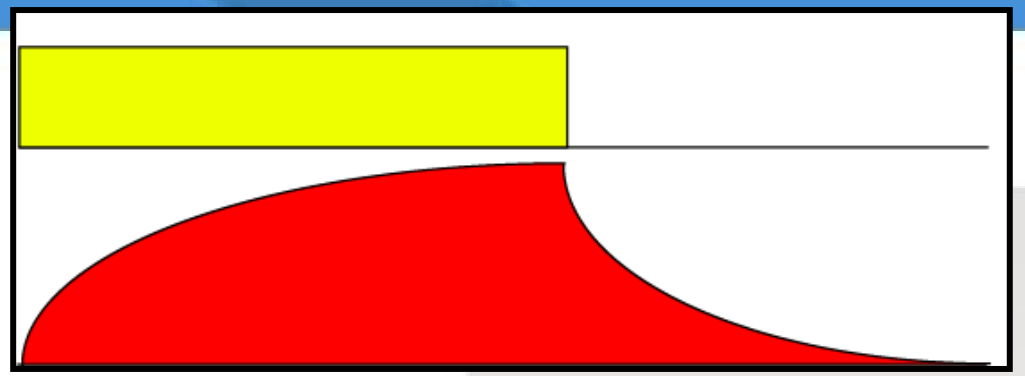


- For micropulse, a continuous-wave laser beam is chopped into a train of short, repetitive, with low energy pulses separated by a brief rest period which allows the tissue to cool between laser pulses

MicroPulse™ Laser Settings

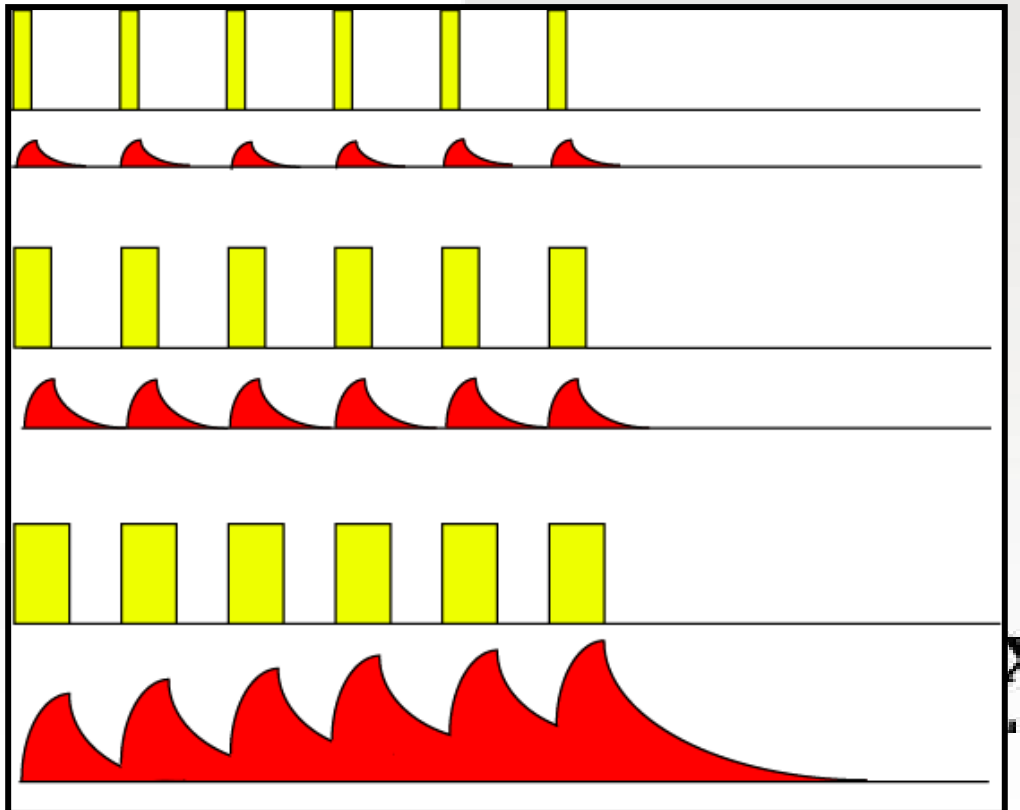
Standard CW Laser Pulse (10ms)

Temperature rise with standard CW



MicroPulse "chops" the laser delivery, delivering a "train" of pulses

Thermal rise is controlled by the <u>On</u> and <u>Off</u> times of the laser, resulting in CONTROLED cellular thermal injury



OPHTHALMOLOGY

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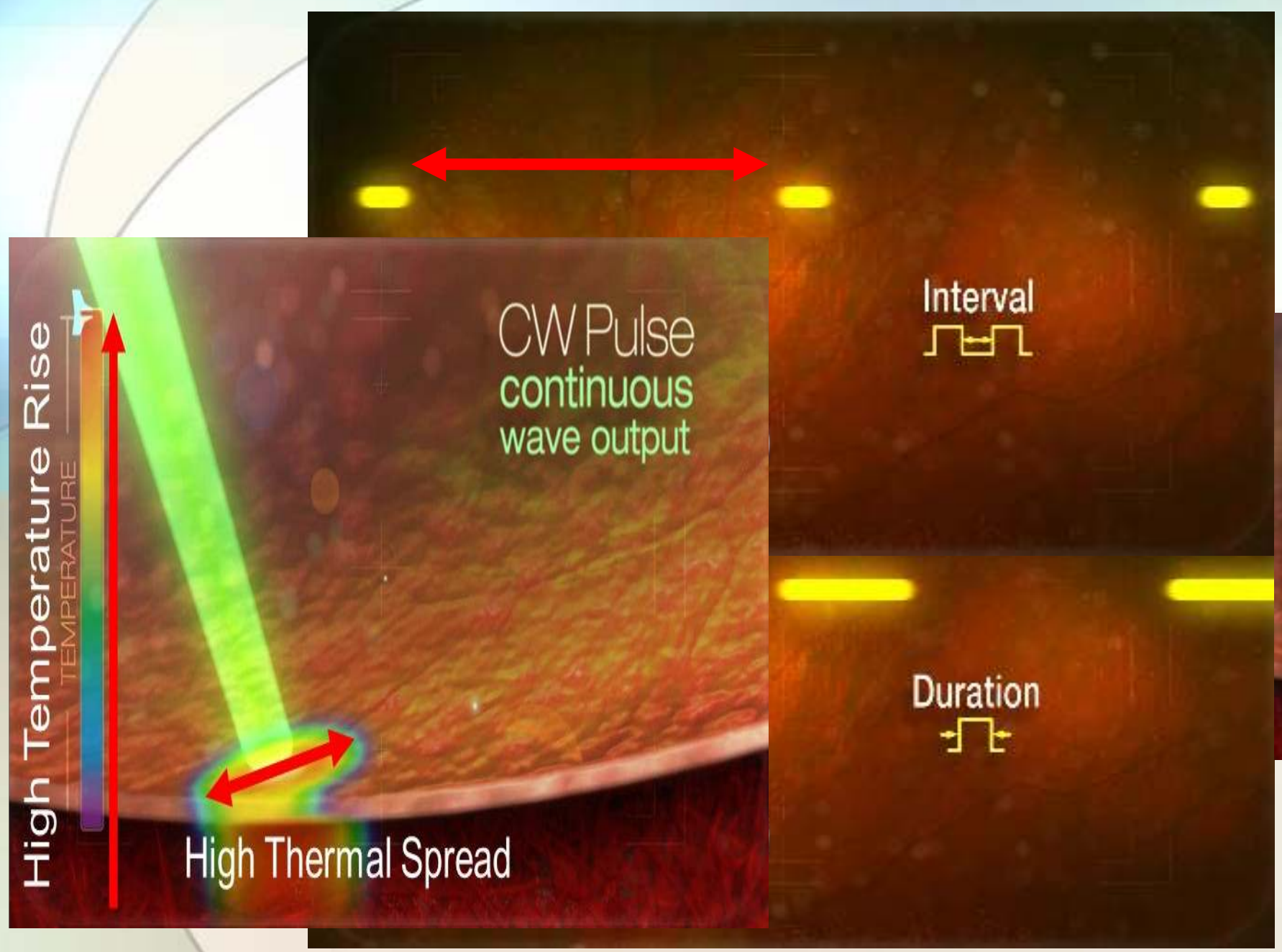
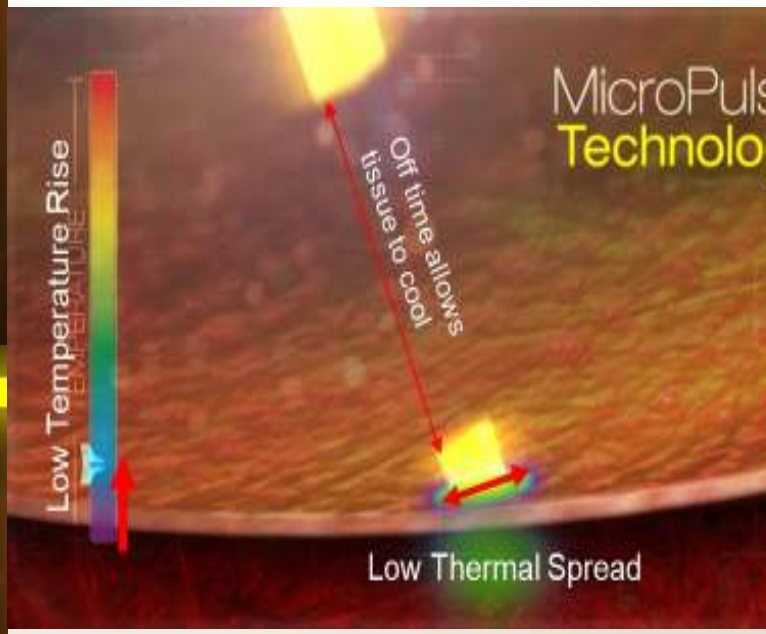
ur reputation.

MicroPulse™ Terminology

- MicroPulse settings parameters:
  - "On" time (MicroPulse Duration)
  - "Off" time (MicroPulse Interval)
  - "(sum of Duration and Interval) Period
  - "Duty Cycle" (percent Duration over Period)


High Temperature Rise
TEMPERATURE
CW Pulse
continuous
wave output
High Thermal Spread
Interval
Duration


Low Temperature Rise
TEMPERATURE
Off time allows
tissue to cool
Low Thermal Spread

- This method
  - Provides fine control of laser output
  - Controls thermal effects of laser on tissue
  - Permits tissue sparing procedures

MicroPulse™ Applications

- MicroPulse technology has been successfully used to treat patients with:
  - Retinal diseases
    - Macular Edema
    - Proliferative Diabetic
    - ME due to CRV OCCLUSION or BRV OCCLUSION
    - CSR
    - SMD
    - PROPHYLATIC
  - Glaucomas

- Complications that have been associated with the use of conventional lasers for retinal photocoagulation include:
  - Reductions in visual acuity
  - Visual field
  - Color vision
  - Night vision
  - Contrast sensitivity.

- Other complications include
  - Choroidal neovascularizatin (CNV)
  - Hemorrhage, epiretinal fibrosis
  - Serous detachment of the peripheral retina are not seen with micropulse ttt.
- It has, been suggested that full thickness retinal damage may not be needed to obtain beneficial effects from laser.

- Subthreshold laser treatment is effective as conventional laser treatment but with less iatrogenic damage to the tissues surrounding the area of the burn in the RPE.

1. **Combination with Other Treatments**: **Anti-VEGF injections,** Some patients receive a combination of SML and anti-VEGF therapy.
2. **- Severity of the disease**: Mild cases may require fewer sessions.
3. **-Response to treatment**: Some patients may need additional sessions for optimal results.

- THe number of SMLT sessions varies, but a personalized approach ensures the best outcome for each patient.

- Int J Ophthalmol. 2020; 13(10): 1606–1611.
- Published online 2020 Oct 18. doi: 10.18240/ijo.2020.10.15
- PMCID: PMC7511389
- PMID: 33078112

- Subthreshold micropulse laser versus intravitreal anti-VEGF for diabetic macular edema patients with relatively better visual acuity

- Sezen Akkaya, Banu Açıkalın, Yusuf Emre Doğan, and Fatih Çoban

- Yellow SML treatment is superior to IV anti-VEGF injection in DME patients with relatively better BCVA for increasing visual acuity and decreasing CMT at 6, 9, and 12mo. SMLT can be a good alternative first-line therapy for DME with BCVA ≤0.15 logMAR.

PHOTOBIOMODULATIN

NEAR INFRARED LIGHT THERAPY, OR PHOTOBIOMODULATION THERAPY (PBMT), HAS GAINED WORLDWIDE ATTENTION IN RECENT YEARS AS A NEW SCIENTIFIC APPROACH FOR THERAPEUTIC APPLICATION IN OPHTHALMOLOGY.

Transscleral Subthreshold Micropulse Diode Laser For Treatment of Retinopathy

{TAHA TECHNIQUE}

This Study is Indexed in

Quantitative Biology > Tissues and Organs

Transscleral Micropulse Diode Laser for Treatment of Diabetic Retinopathy

Hamed Nasreldin Taha, Ahmed Gamal, Sarah Hamed Nasreldin

(Submitted on 7 Oct 2017)

In this study, we introduced a new simple effective technique for the treatment of diabetic retinopathy by the treatment of the periphery of the retina by transscleral micropulse diode laser (Taha Technique). Macular edema was improved and vitreous hemorrhage was disappeared in most of the cases.

Subjects: **Tissues and Organs (q-bio.TO)**
Cite as: **arXiv:1710.02628 [q-bio.TO]**
(or **arXiv:1710.02628v1 [q-bio.TO]** for this version)

Submission history

From: Sarah Hamed Nasreldin Taha [view email]
[v1] Sat, 7 Oct 2017 03:56:14 GMT (1076kb)

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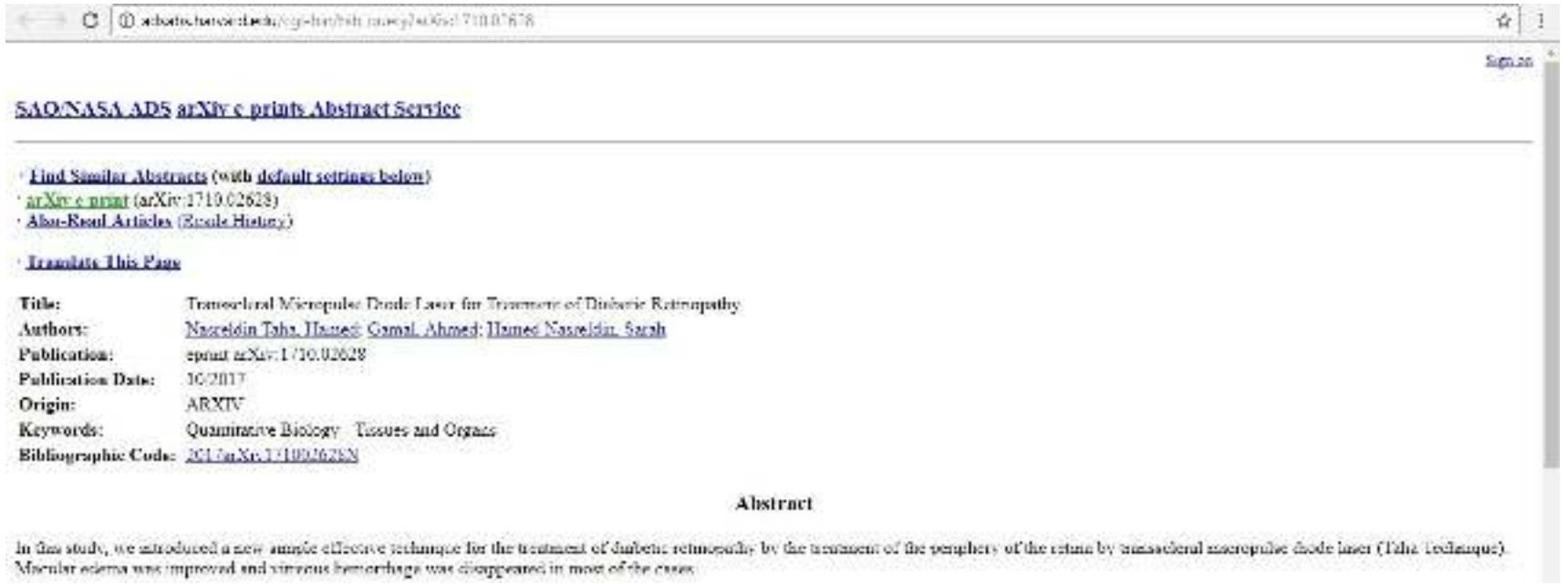

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Title: Transorbital Micropulse Diode Laser for Treatment of Diabetic Retinopathy
Authors: Nasreldin Taha, Hamed; Gamal, Ahmed; Hamed Nasreldin, Sarah
Publication: eprint arXiv:1710.02628
Publication Date: 10/2017
Origin: ARXIV
Keywords: Quantitative Biology - Tissues and Organs
Bibliographic Code: 2017arXiv171002628N

Abstract

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17th ESASO Retina Academy

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KARGER

48

Trans-Scleral Subthreshold Micropulse Diode Laser for Treatment of Diabetic Retinopathy

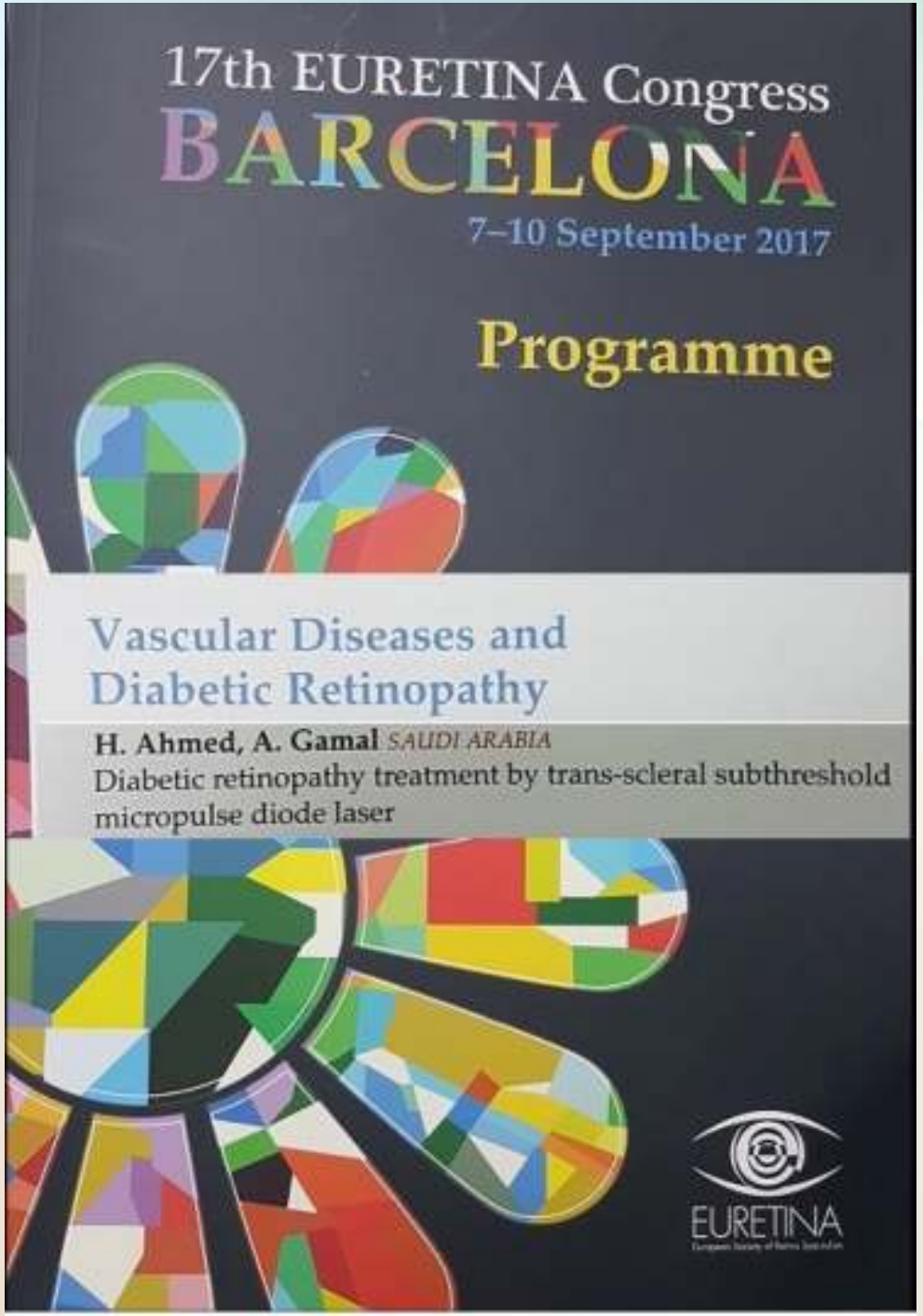
Ahmed H.

Saudi German Hospital, Jeddah, Saudi Arabia

Introduction/Background: Full thickness retinal damag
not be needed to obtain beneficial effect from laser. The
pigment epithelium (RPE) plays a significant role in repair
outer and inner blood-retinal barrier regardless of the typ
location of laser application. The absence of micropulse c
retinal laser damage permits re-treatment of the same are
aim is to study the effect of diabetic retinopathy treatm
trans-scleral subthreshold micropulse diode laser.

Methods: This study included 46 eyes of 34 patients wh
diabetic macular edema and/or proliferative diabetic retino
Patients were divided into 2 groups:

Group 1 has macular edema thickness less than 400 µm.


17th EURETINA Congress
BARCELONA
7–10 September 2017
Programme
Vascular Diseases and
Diabetic Retinopathy
H. Ahmed, A. Gamal SAUDI ARABIA
Diabetic retinopathy treatment by trans-scleral subthreshold
micropulse diode laser
EURETINA

- This is a new technique {TAHA technique} for treatment of vit. haem. retinopathy and macular edema.
- We applied trans conjunctival and transscleral sub threshould diode laser by slit lamp 7 mm from limbus.
- We focus on the sclera and defocus posteriorly to the retina and choroid .
- Laser shots were applied to the periphery the retina up to the fornix

- Laser shots were applied 360 degree by the same way to the retinal periphery.
- Fixed laser parameters were used. ; power 700mw, 0.2sec exposure time, 5% duty cycle and 150u spot size
- Laser sittings were 300 shots/sitting.
- Laser sittings every week in the first month then every month.
- When the macular thickness starting to improve ,we stop laser tt and follow up

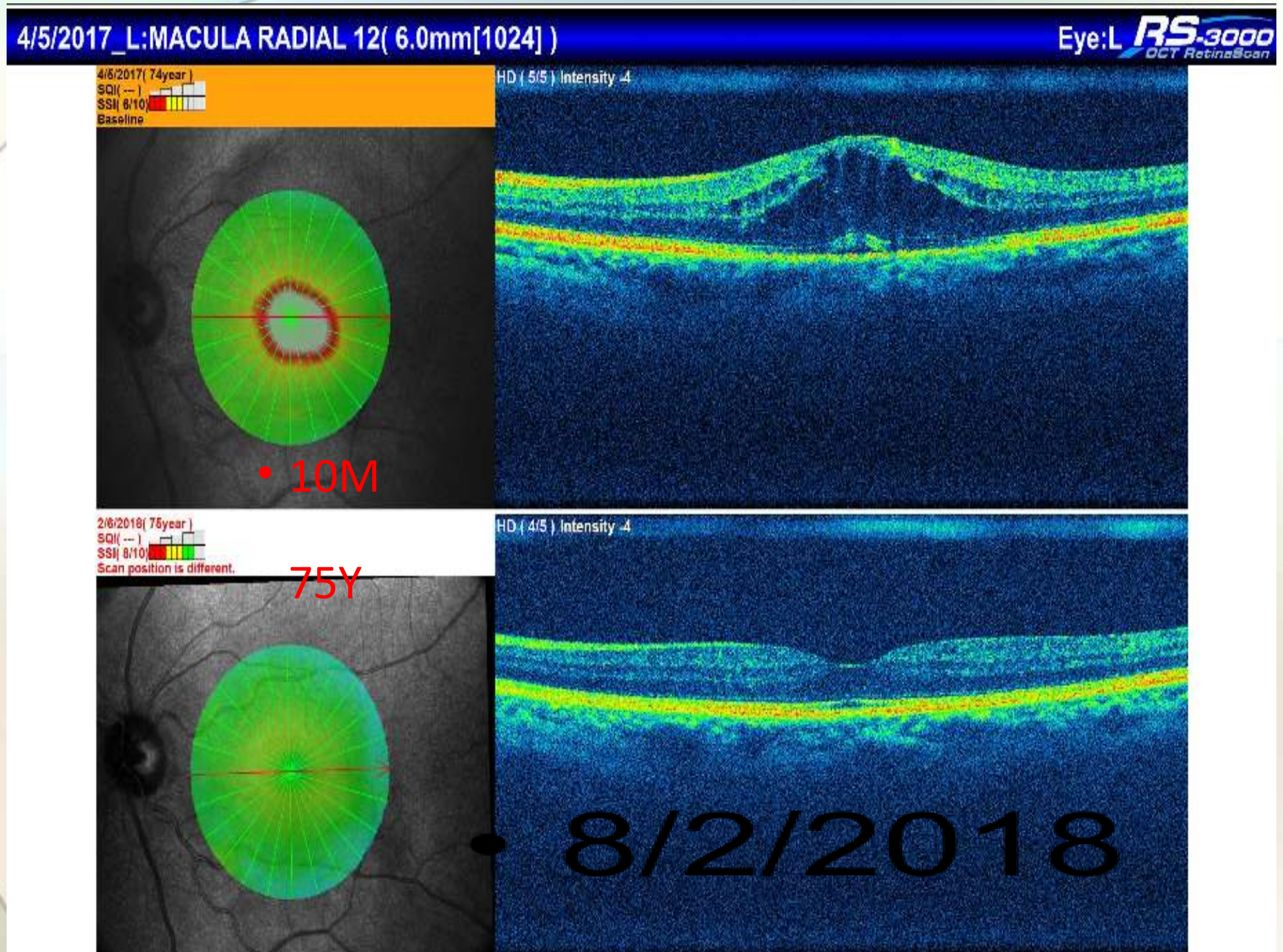
The sub threshold laser tt stimulate the retinal pigment epithelium, Muller cells and glial celles to release mediators in the vitreous for repair of ME and retinopathy.
It looks like a physio therapy at the cellular level.

- This way of treatment is safe, simple easy and effective.

- The frequency ;of laser sitting help in continuous release of cytokines at the therapeutic level without increase the size of the retinal treated area

Micropulse Laser Cases

Diabetic Macular Edema Cases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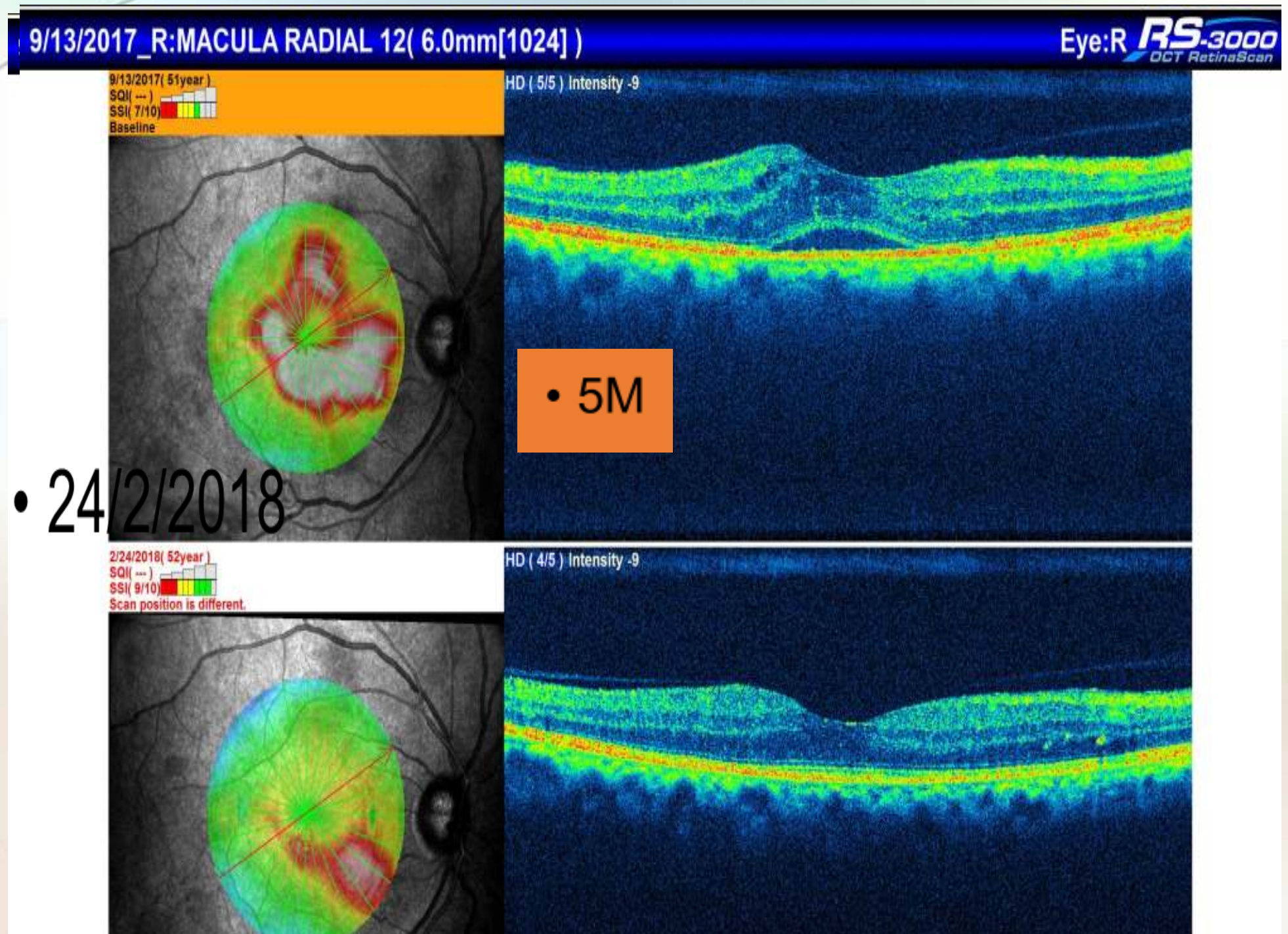
Eye:L
RS-3000
OCT RetinaScan
4/5/2017(74year)
SQI(---)
SSI(8/10)
Baseline
HD (5/5) Intensity -4
• 10M
2/6/2018(75year)
SQI(---)
SSI(8/10)
Scan position is different.
75Y
HD (4/5) Intensity -4
• 8/2/2018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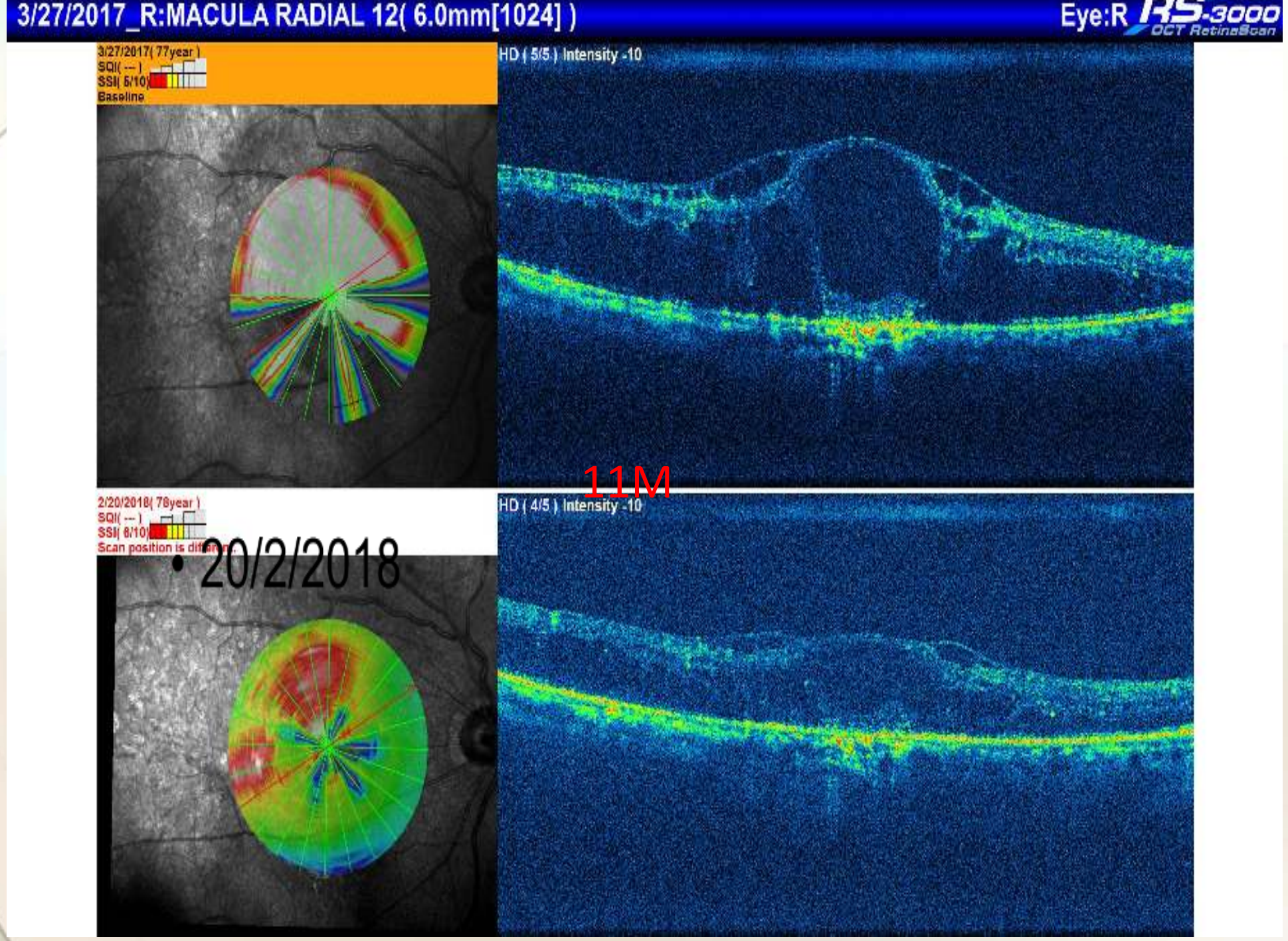
Eye:R
RS-3000
OCT RetinaScan
9/13/2017(51year)
SQI(---)
SSI(7/10)
Baseline
HD (5/5) Intensity -9
2/24/2018(52year)
SQI(---)
SSI(9/10)
Scan position is different.
HD (4/5) Intensity -9

- 24/2/2018
- 5M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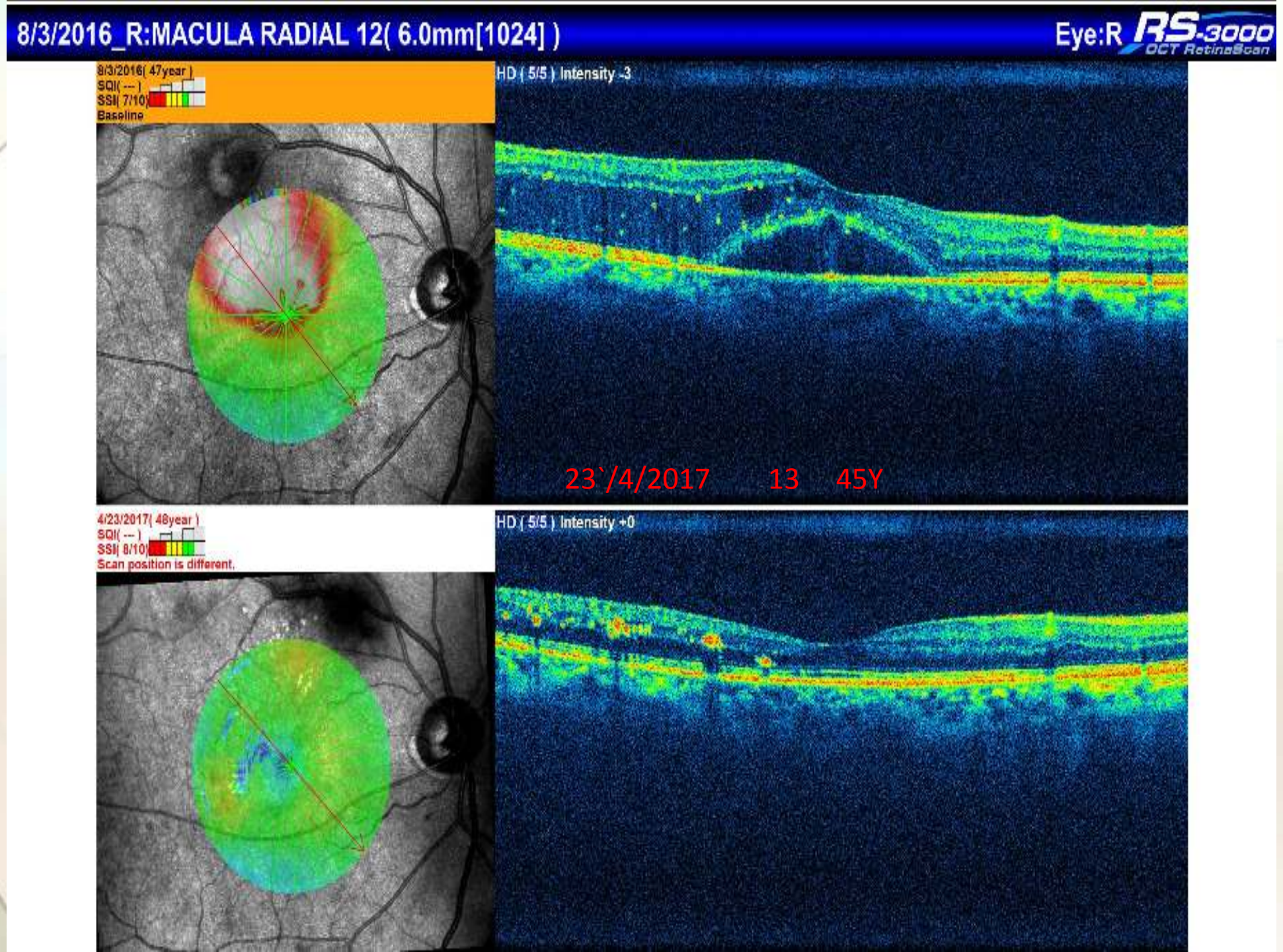
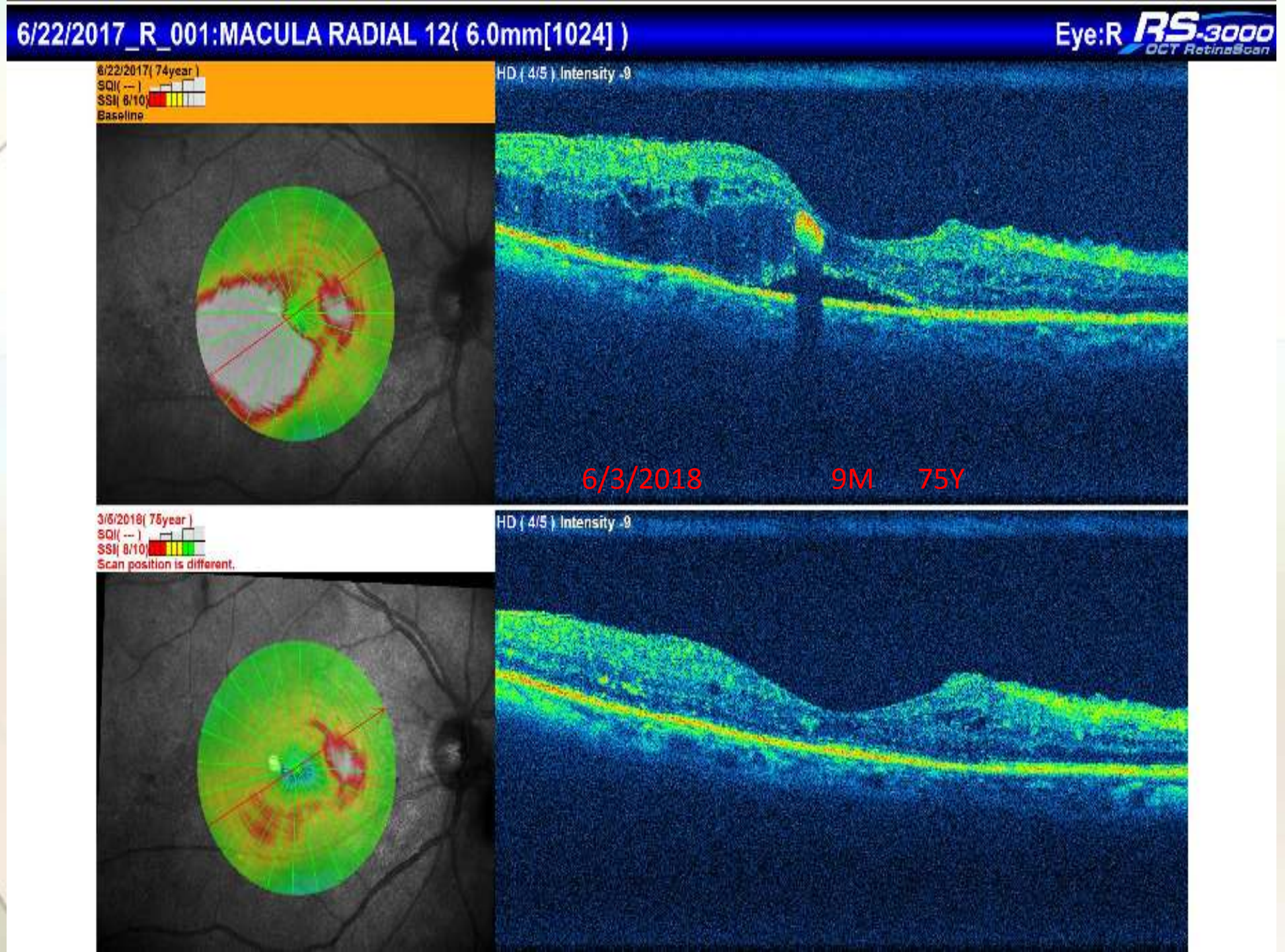
Eye:R
RS-3000
OCT RetinaScan
3/27/2017(77year)
SQI(---)
SSI(6/10)
Baseline
HD (5/5) Intensity -10
11M
2/20/2018(78year)
SQI(---)
SSI(8/10)
Scan position is diff
• 20/2/2018
HD (4/5) Intensity -10


8/3/2016_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
8/3/2016(47year)
SQI(---)
SSI(7/10)
Baseline
HD (5/5) Intensity -3
23`/4/2017 13 45Y
4/23/2017(48year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (5/5) Intensity +0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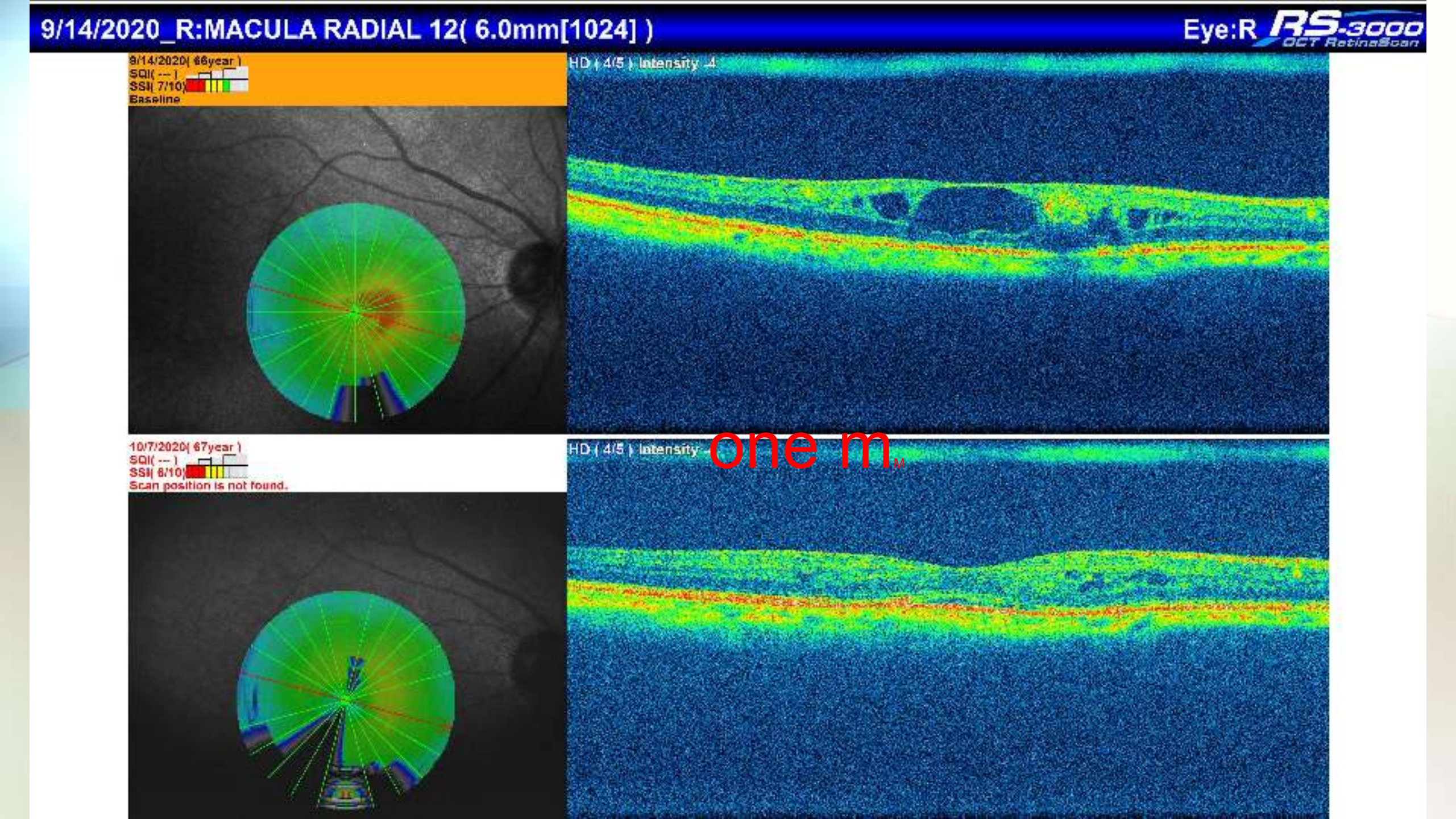
RS-3000
OCT RetinaScan
6/22/2017(74year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity -9
6/3/2018
9M
75Y
3/5/2018(75year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -9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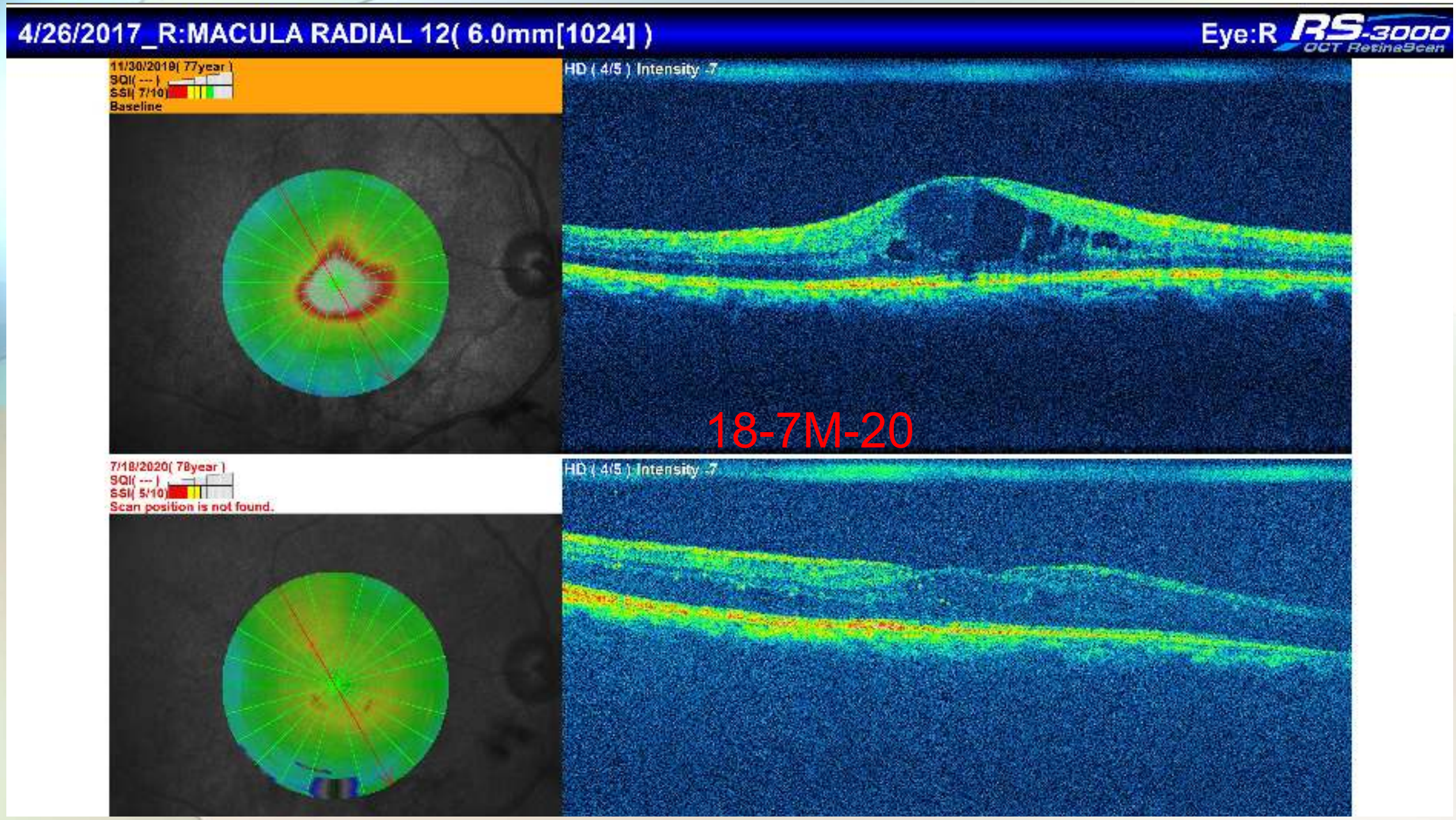
Eye:R
RS-3000
OCT RetinaScan
9/14/2020(66year)
SQI(---)
SSI(7/10)
Baseline
HD (4/5) Intensity -4
10/7/2020(67year)
SQI(---)
SSI(6/10)
Scan position is not found.
HD (4/5) Intensity
one m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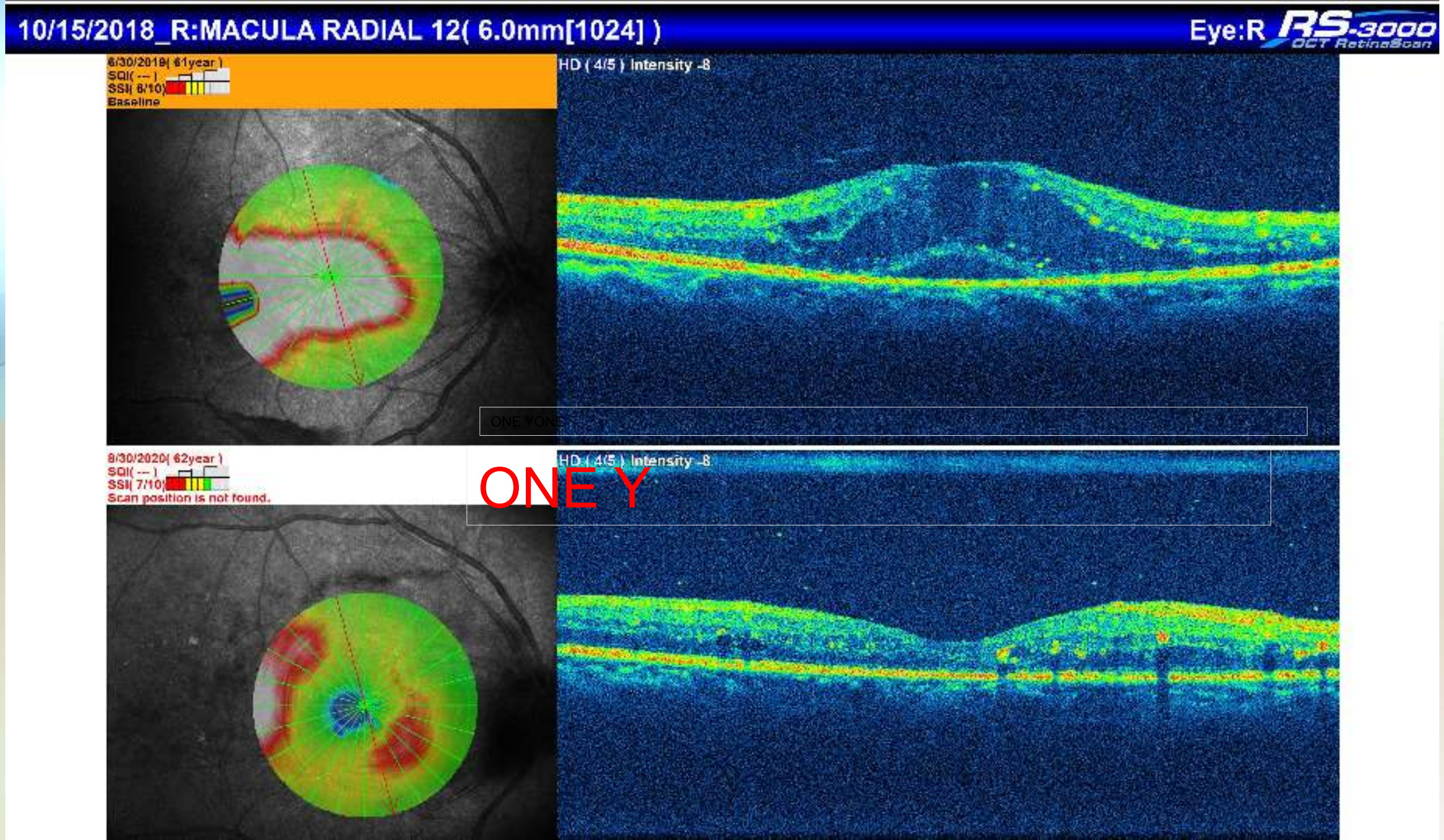
Eye:R
RS-3000
OCT RetinaScan
11/30/2019(77year)
SQI(---)
SSI(7/10)
Baseline
HD (4/5) Intensity -7
18-7M-20
7/18/2020(78year)
SQI(---)
SSI(5/10)
Scan position is not found.
HD (4/5) Intensity -7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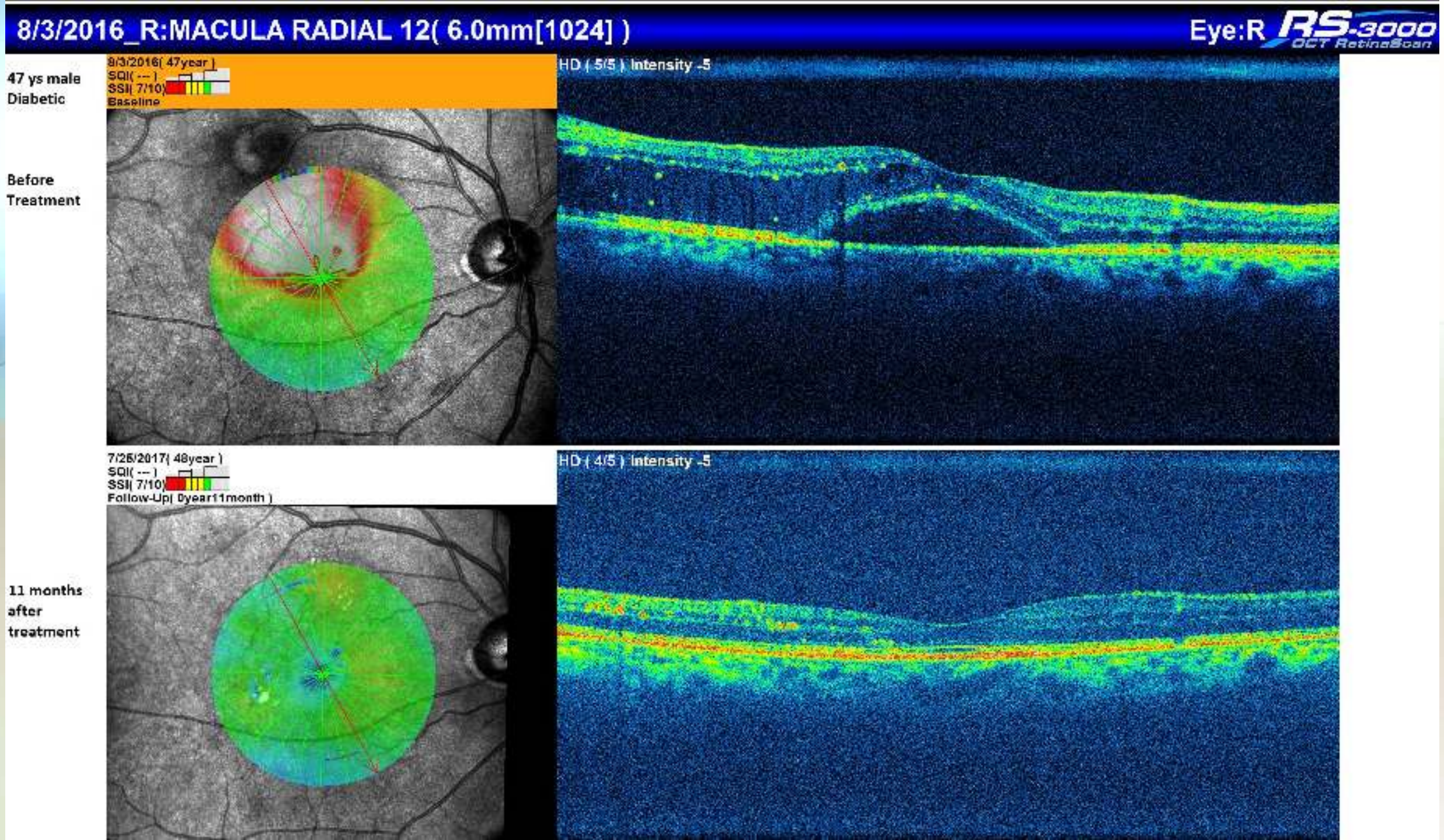
Eye:R
RS-3000
OCT RetinaScan
6/30/2019(61year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity -8
ONE YONE
8/30/2020(62year)
SQI(---)
SSI(7/10)
Scan position is not found.
HD (4/5) Intensity -8
ONE Y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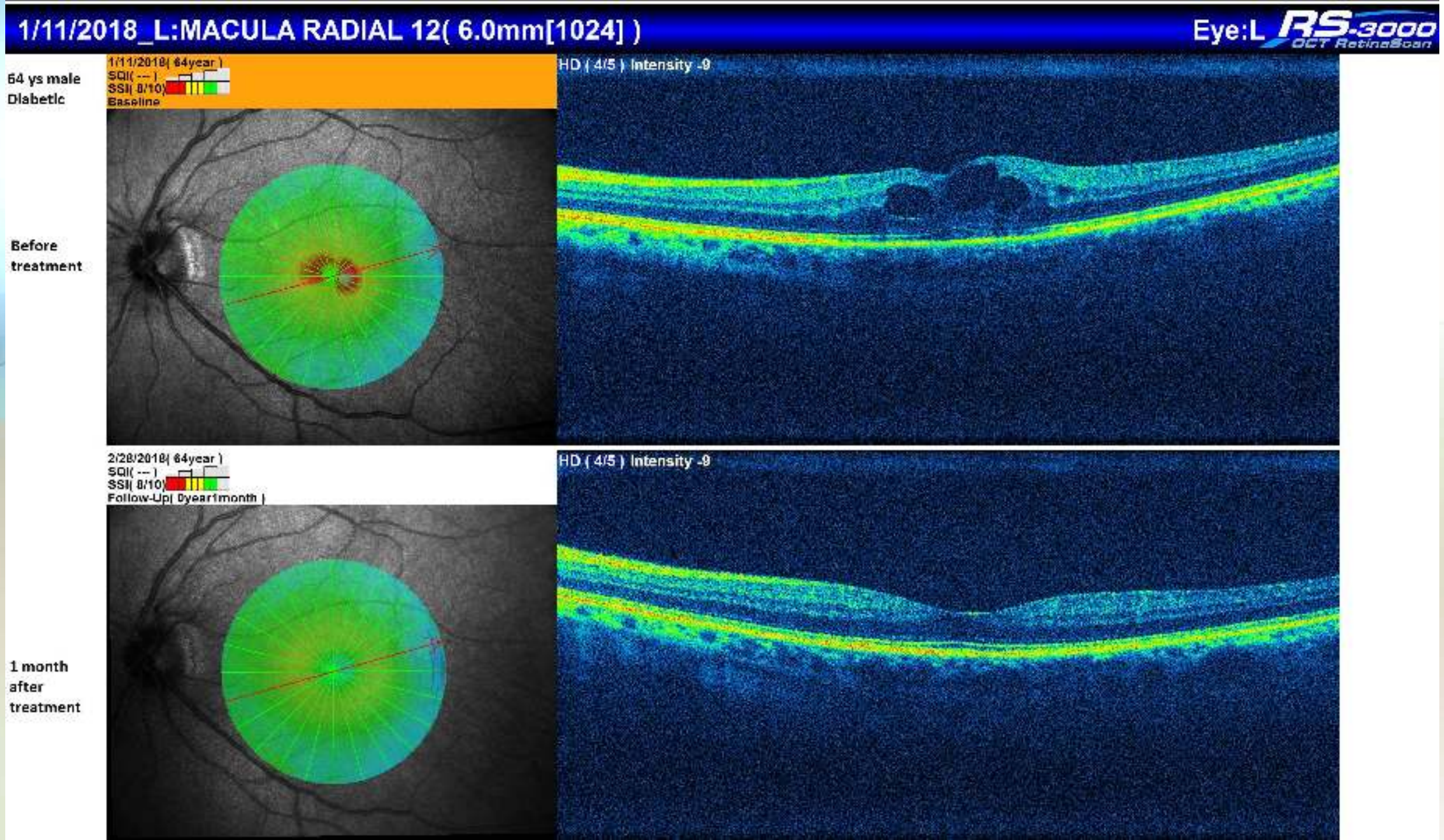
Eye:R
RS-3000
OCT RetinaScan
47 ys male
Diabetic
Before
Treatment
8/3/2016(47year)
SQI(---)
SSI(7/10)
Baseline
HD (5/5) Intensity -5
11 months
after
treatment
7/26/2017(48year)
SQI(---)
SSI(7/10)
Follow-Up(0year11month)
HD (4/5) Intensity -5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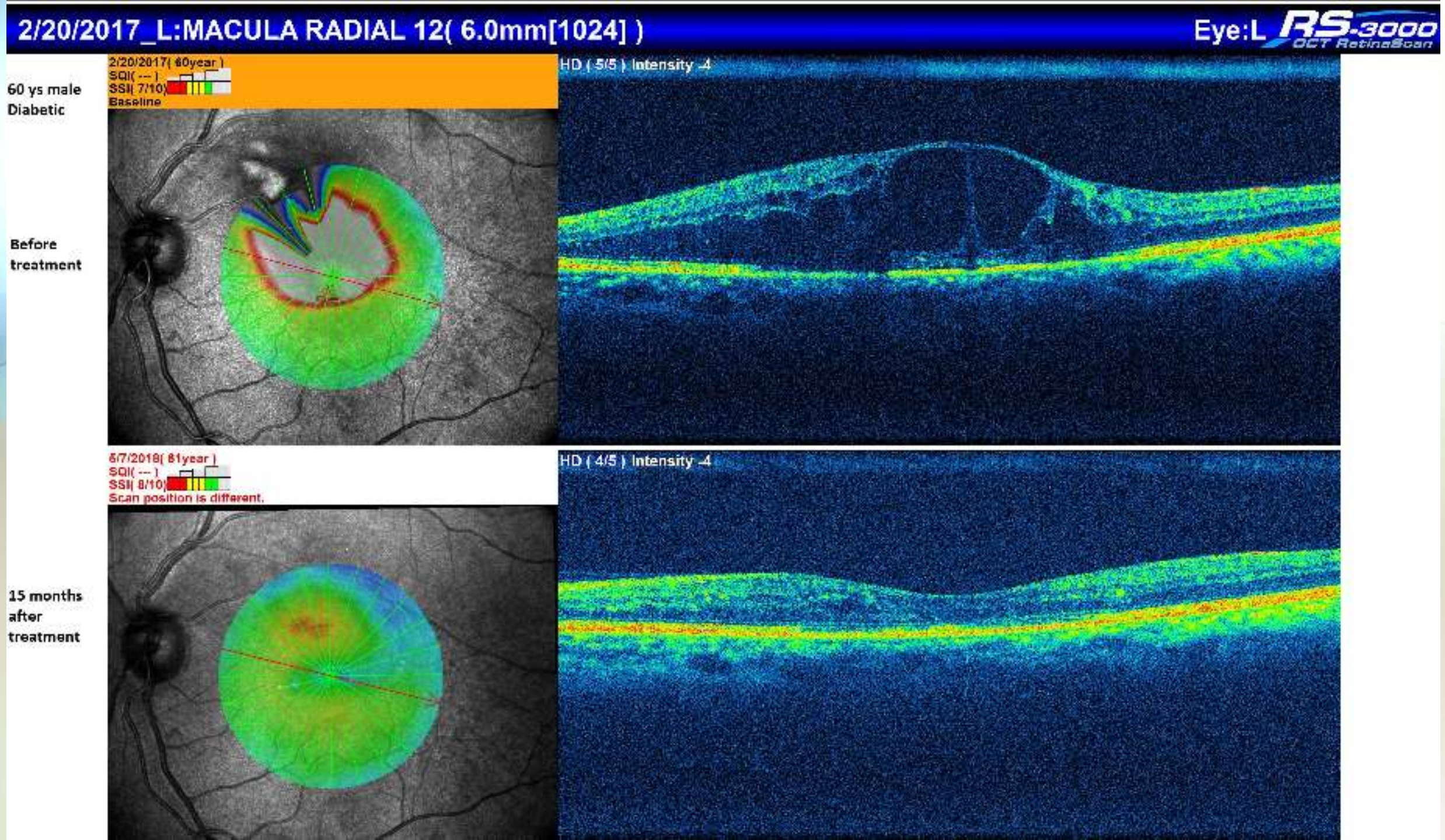
Eye:L
RS-3000
OCT RetinaScan
64 ys male
Diabetic
1/11/2018(64year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity -9
Before
treatment
2/28/2018(64year)
SQI(---)
SSI(8/10)
Follow-Up(0year1month)
HD (4/5) Intensity -9
1 month
after
treatment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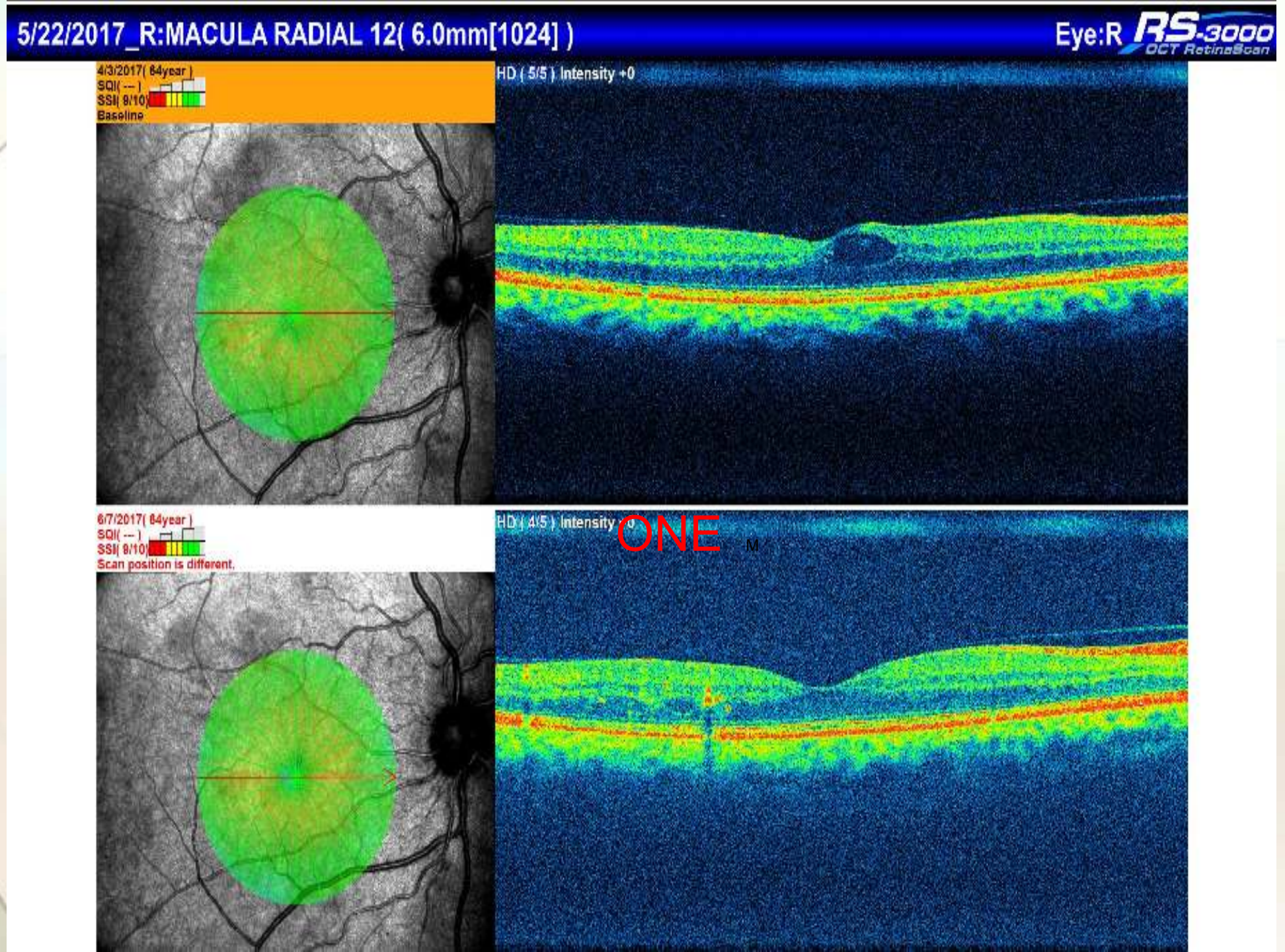
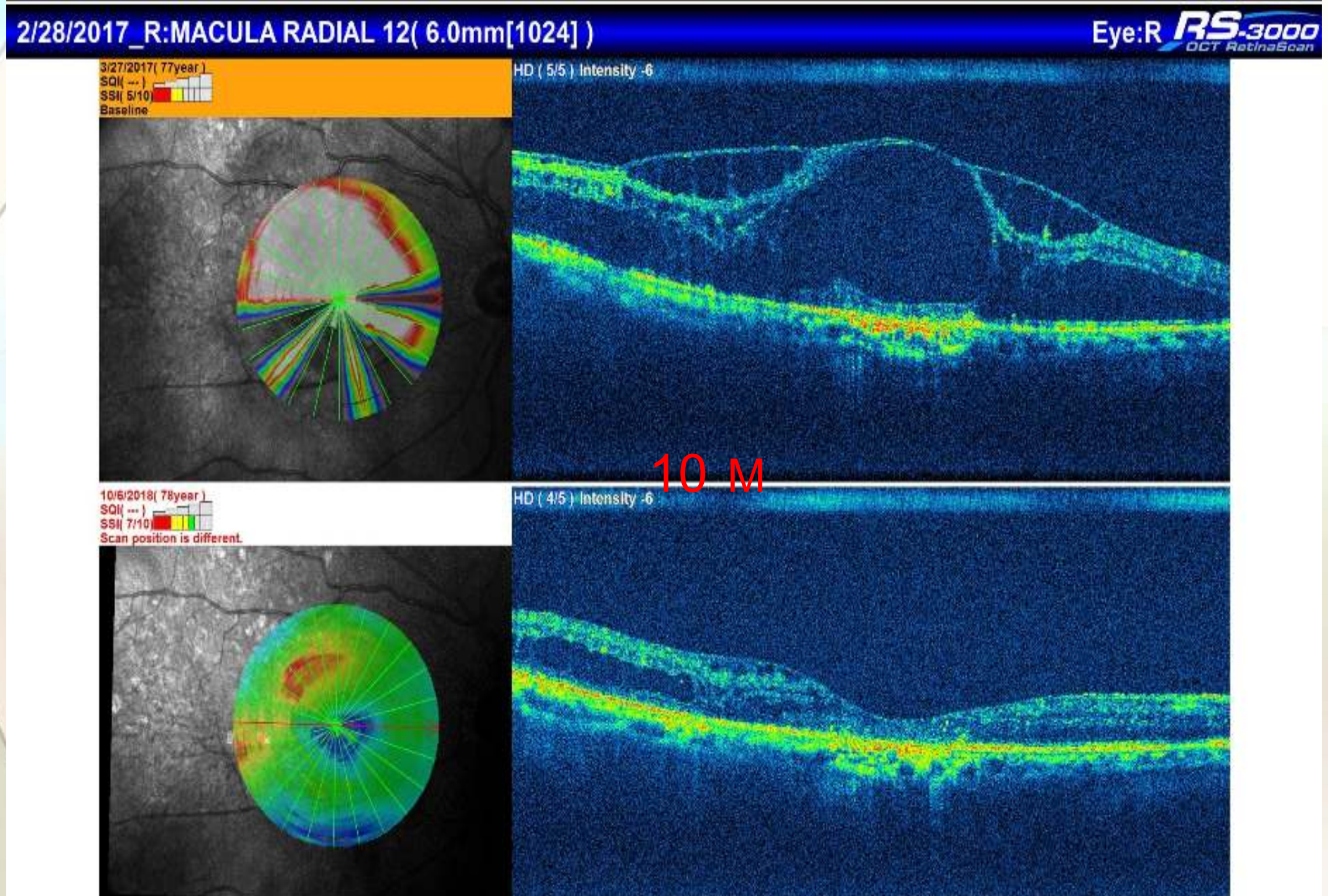
Eye:L
RS-3000
OCT RetinaScan
60 ys male
Diabetic
2/20/2017(60year)
SQI(---)
SSI(7/10)
Baseline
HD (5/5) Intensity -4
Before
treatment
5/7/2018(61year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -4
15 months
after
treatment


5/22/2017_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
4/3/2017(64year)
SQI(---)
SSI(9/10)
Baseline
HD (5/5) Intensity +0
6/7/2017(64year)
SQI(---)
SSI(9/10)
Scan position is different.
HD (4/5) Intensity +0
ONE
M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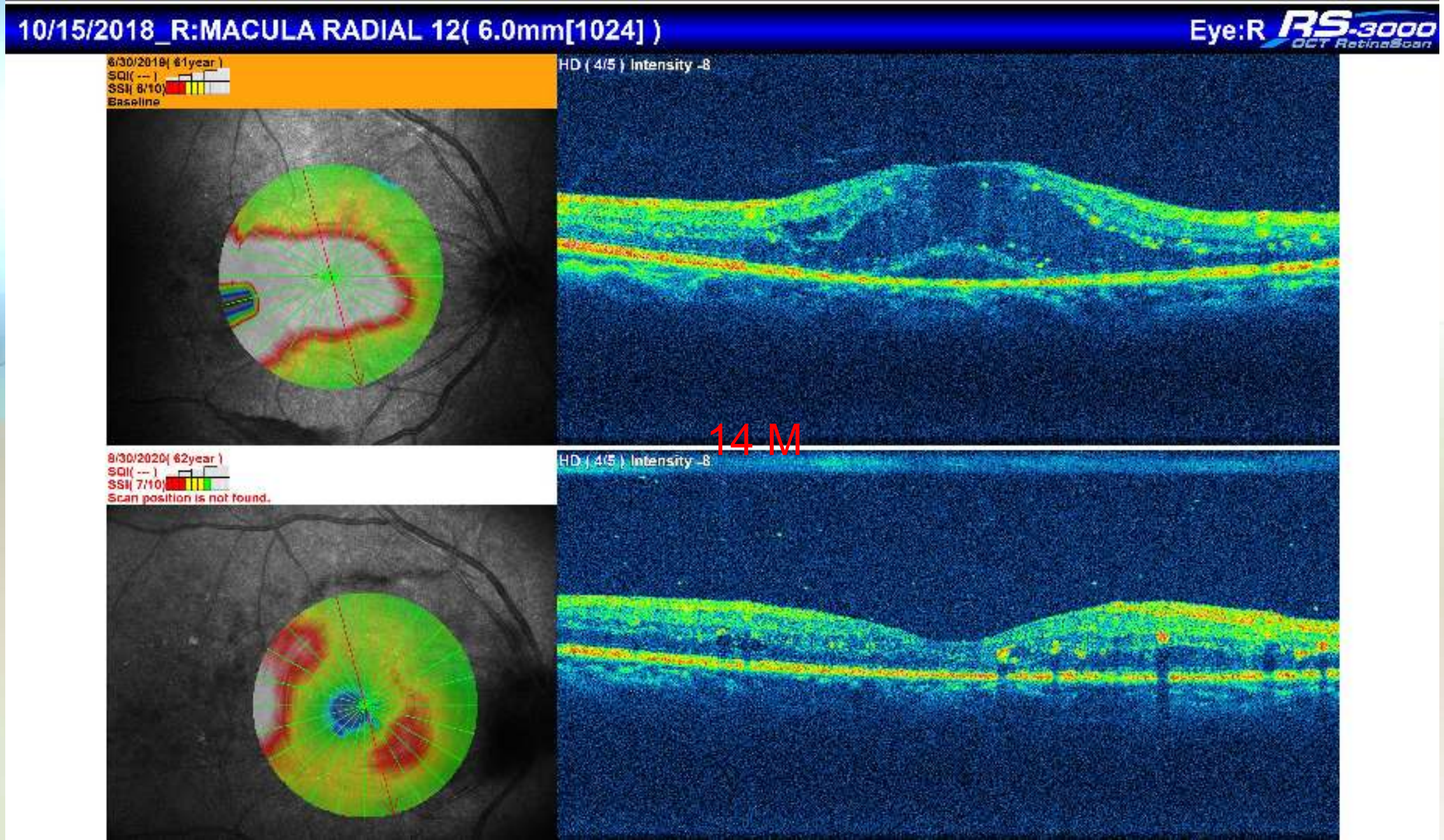
Eye:R
RS-3000
OCT RetinaScan
3/27/2017(77year)
SQI(---)
SSI(5/10)
Baseline
HD (5/5) Intensity -6
10 м
10/6/2018(78year)
SQI(---)
SSI(7/10)
Scan position is different.
HD (4/5) Intensity -6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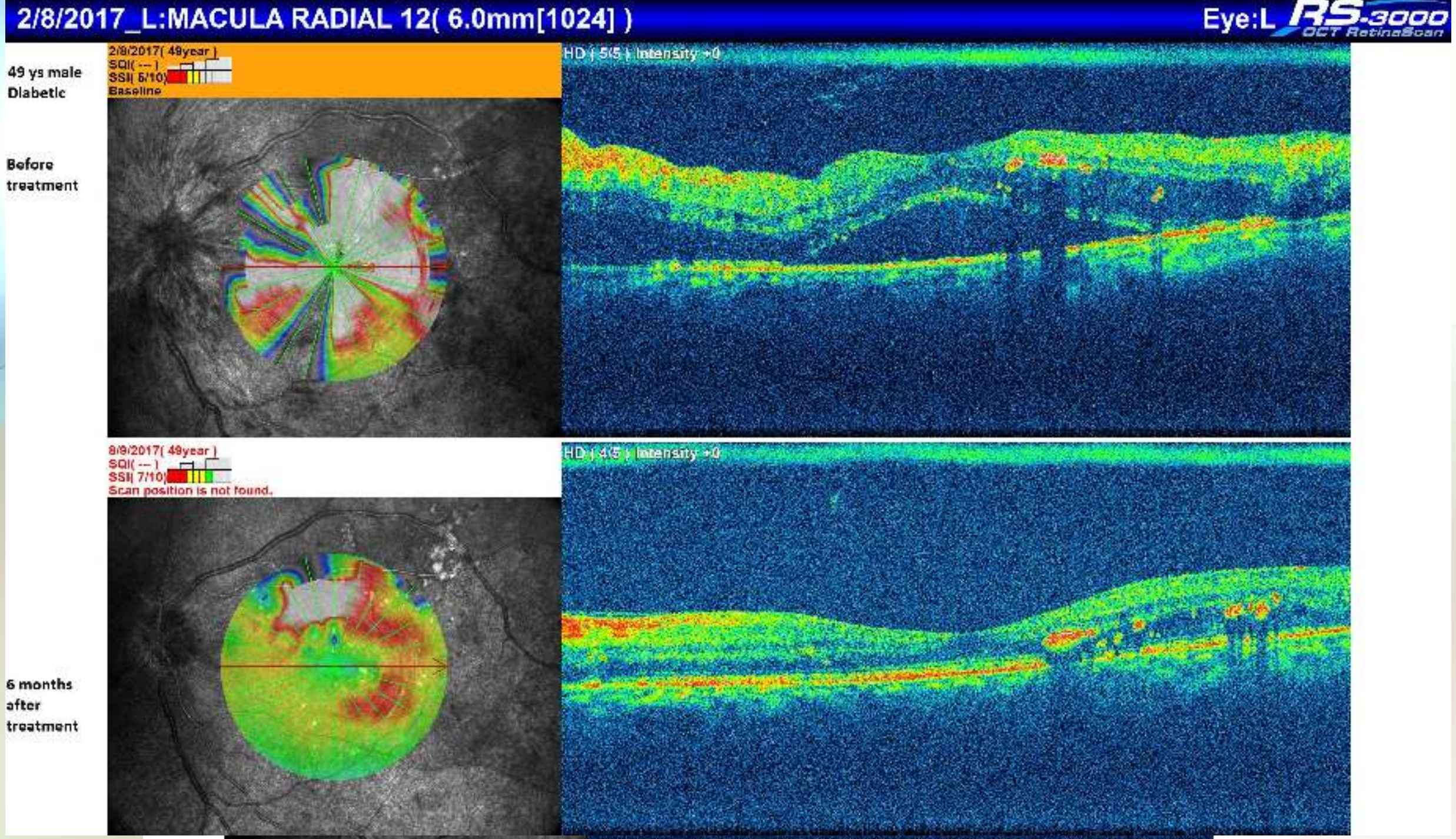
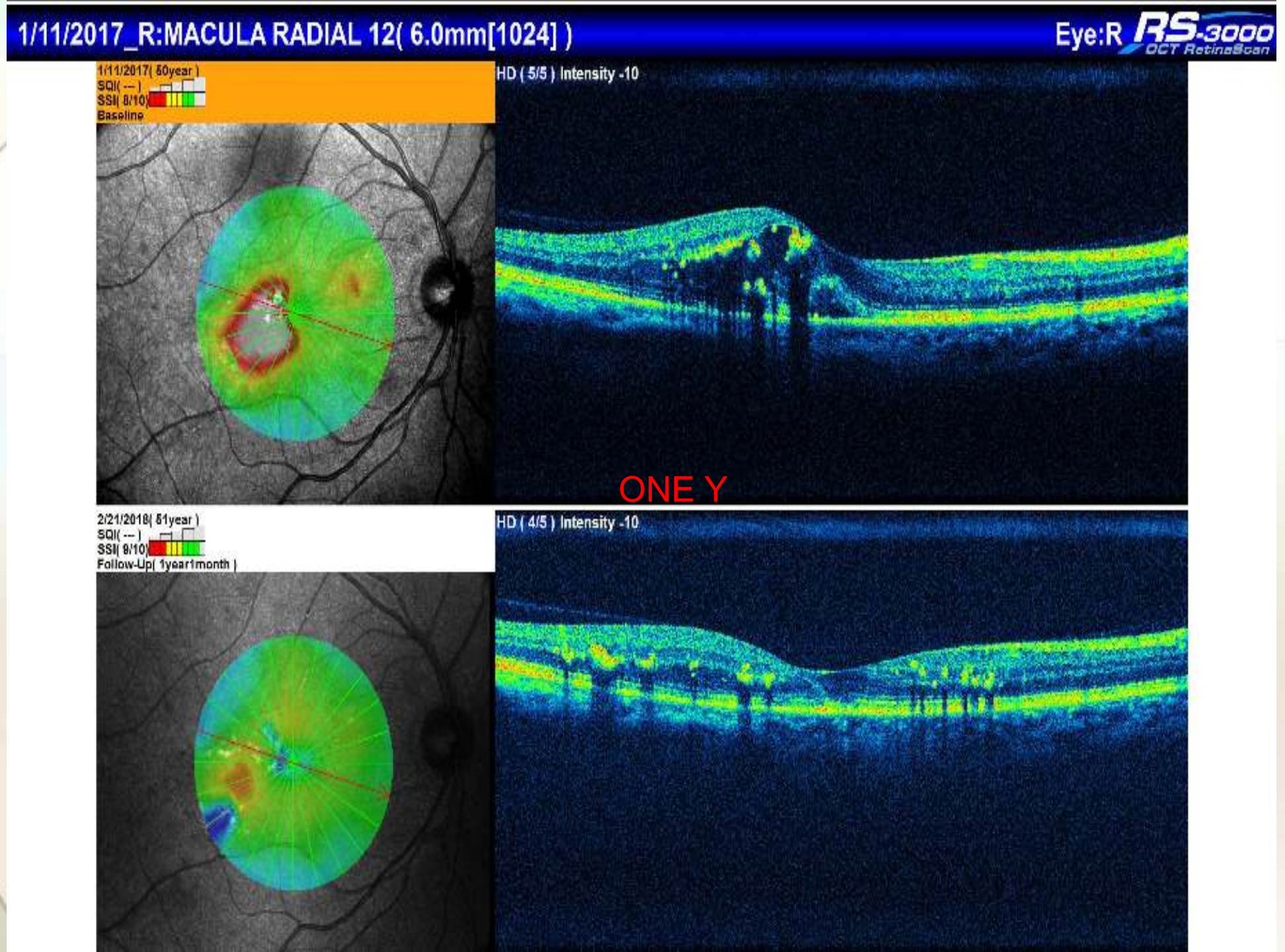
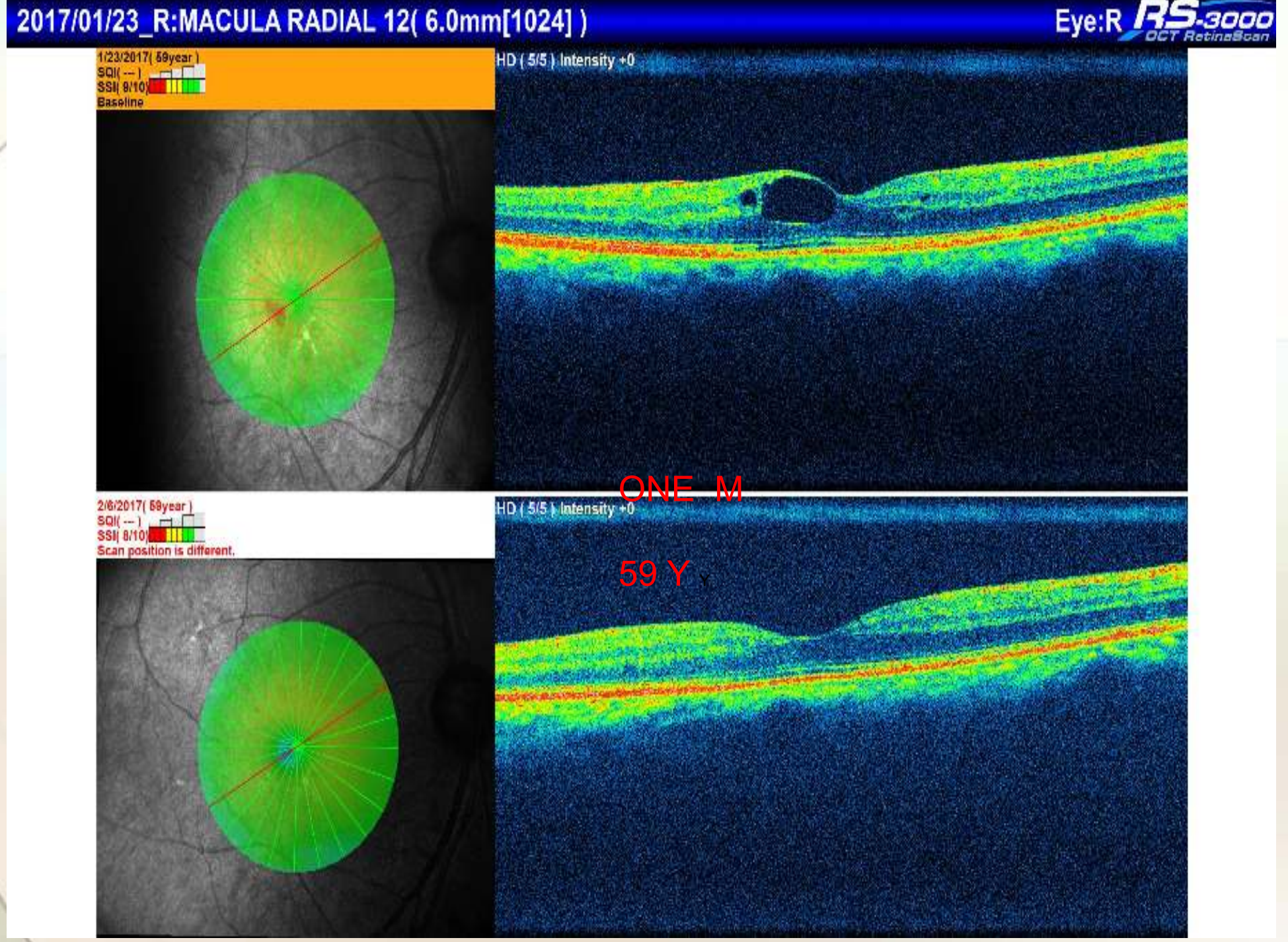
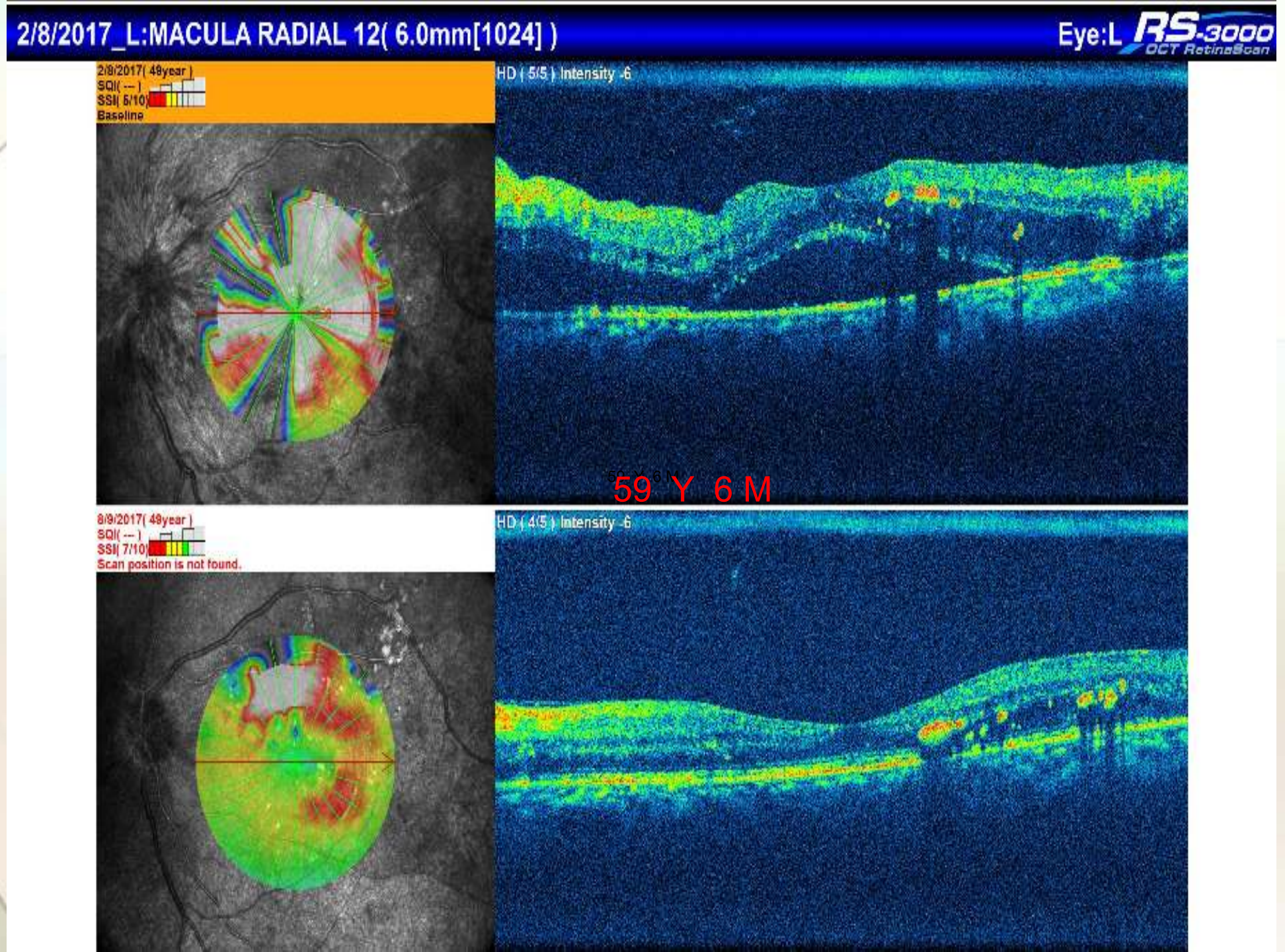
Eye:R
RS-3000
OCT RetinaScan
6/30/2019(61year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity -8
14 M
8/30/2020(62year)
SQI(---)
SSI(7/10)
Scan position is not found.
HD (4/5) Intensity -8

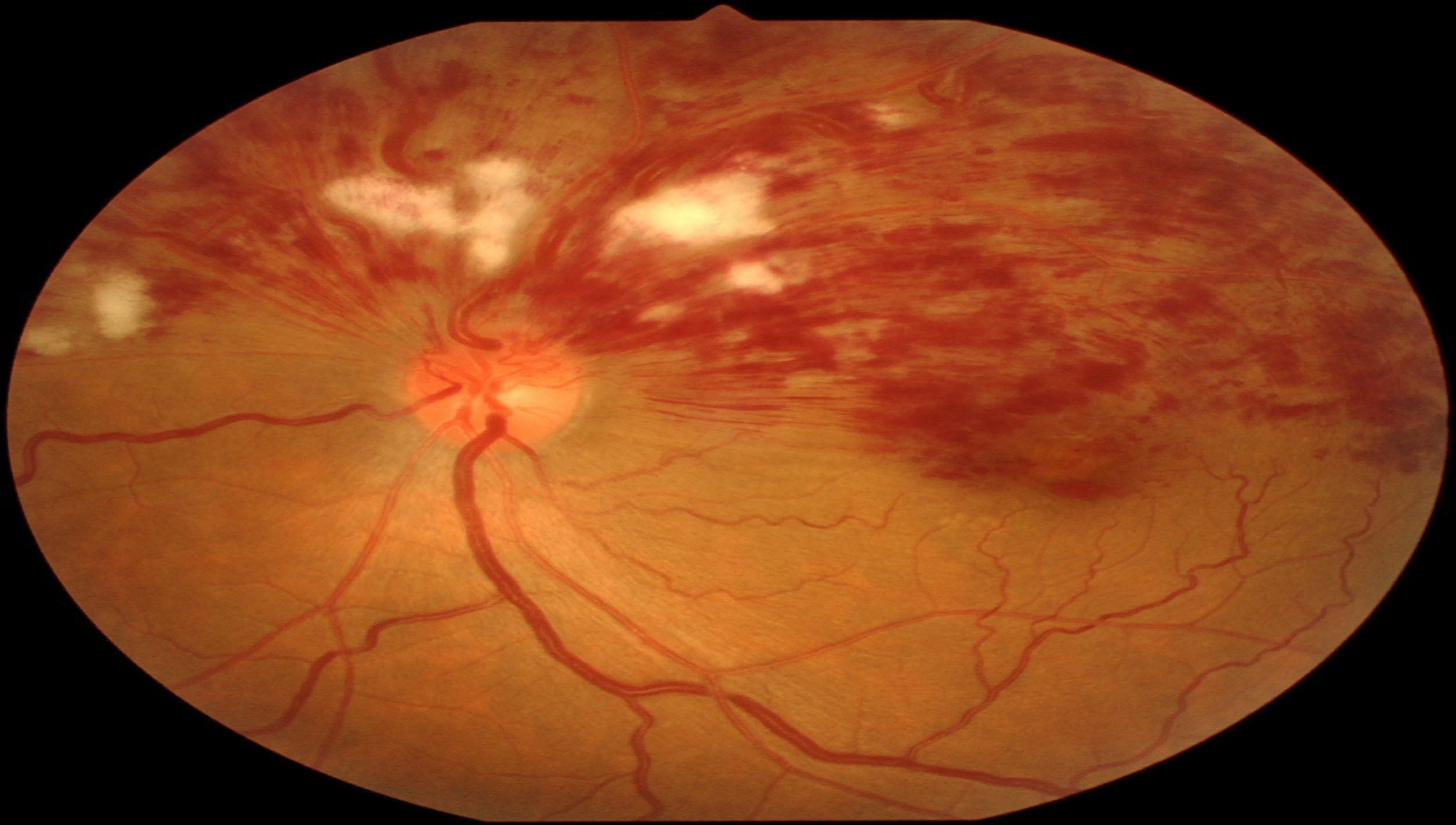

2/8/2017_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
49 ys male
Diabetic
Before
treatment
2/8/2017(49year)
SQI(---)
SSI(5/10)
Baseline
HD (5/5) Intensity +0
6 months
after
treatment
8/9/2017(49year)
SQI(---)
SSI(7/10)
Scan position is not found.
HD (4/5) Intensity +0

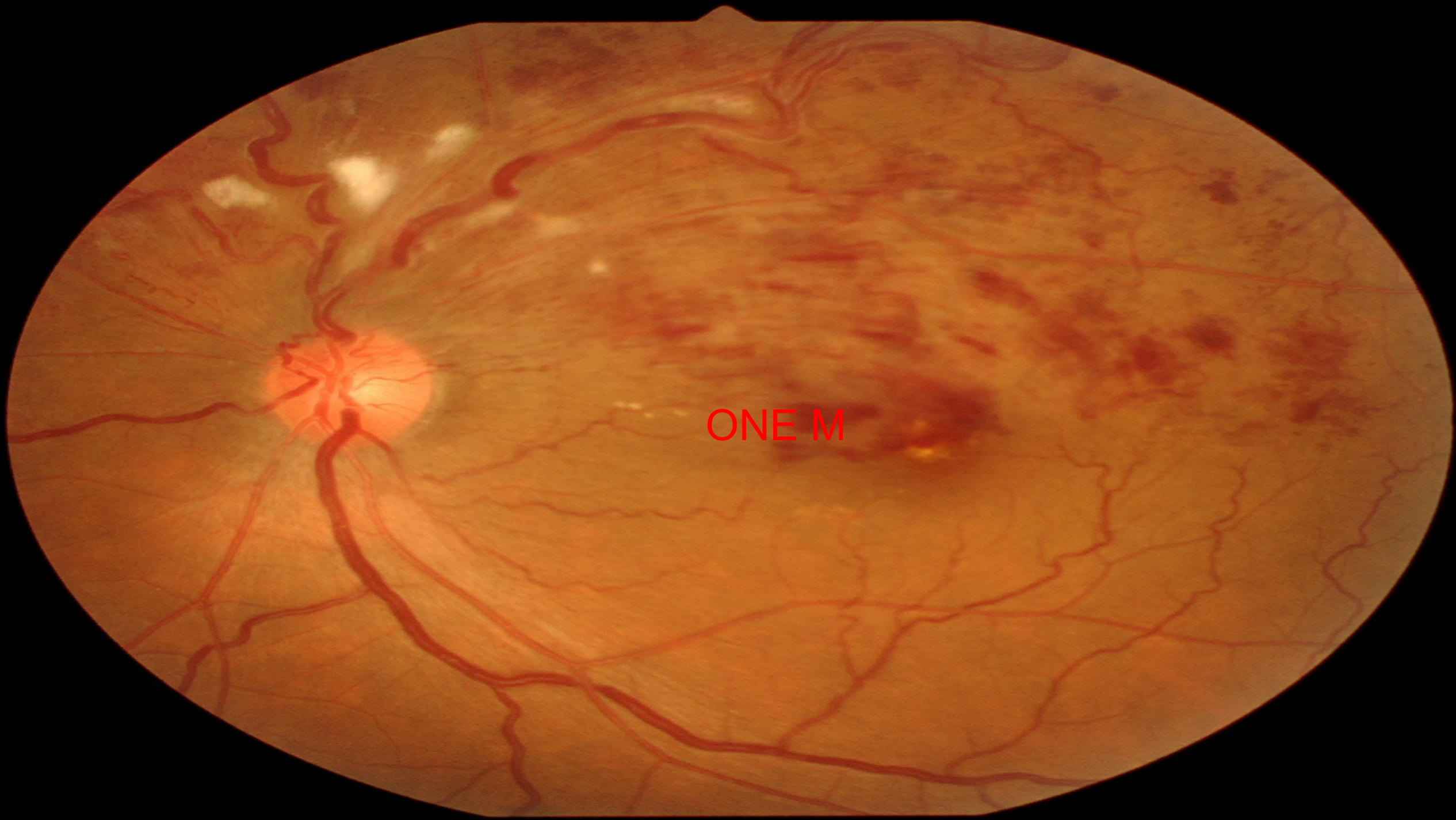

1/11/2017_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
1/11/2017(50year)
SQI(---)
SSI(8/10)
Baseline
HD (5/5) Intensity -10
ONE Y
2/21/2018(51year)
SQI(---)
SSI(9/10)
Follow-Up(1year1month)
HD (4/5) Intensity -10

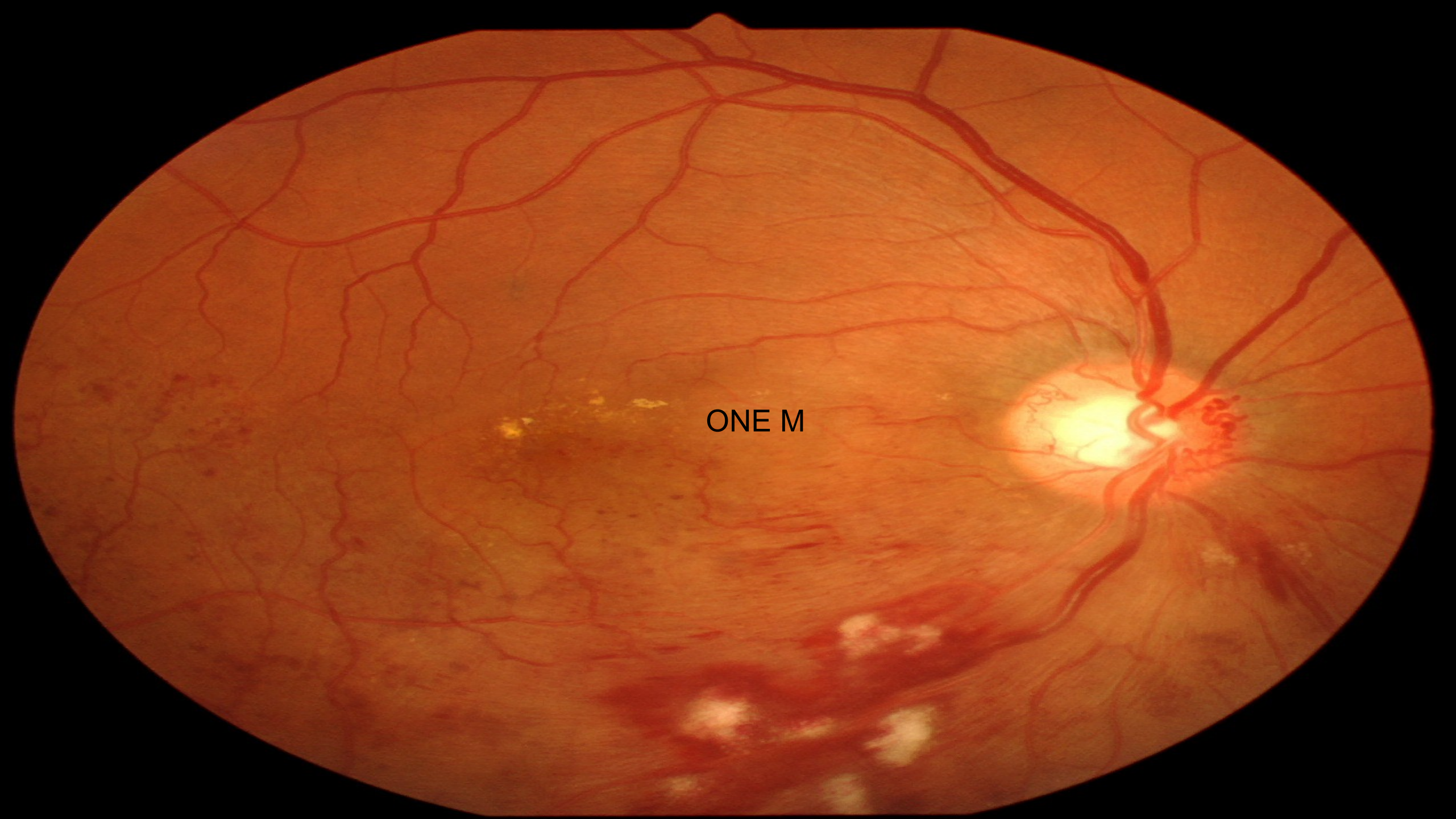

2017/01/23_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
1/23/2017(59year)
SQI(---)
SSI(9/10)
Baseline
HD (5/5) Intensity +0
ONE M
2/6/2017(59year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (5/5) Intensity +0
59 Y

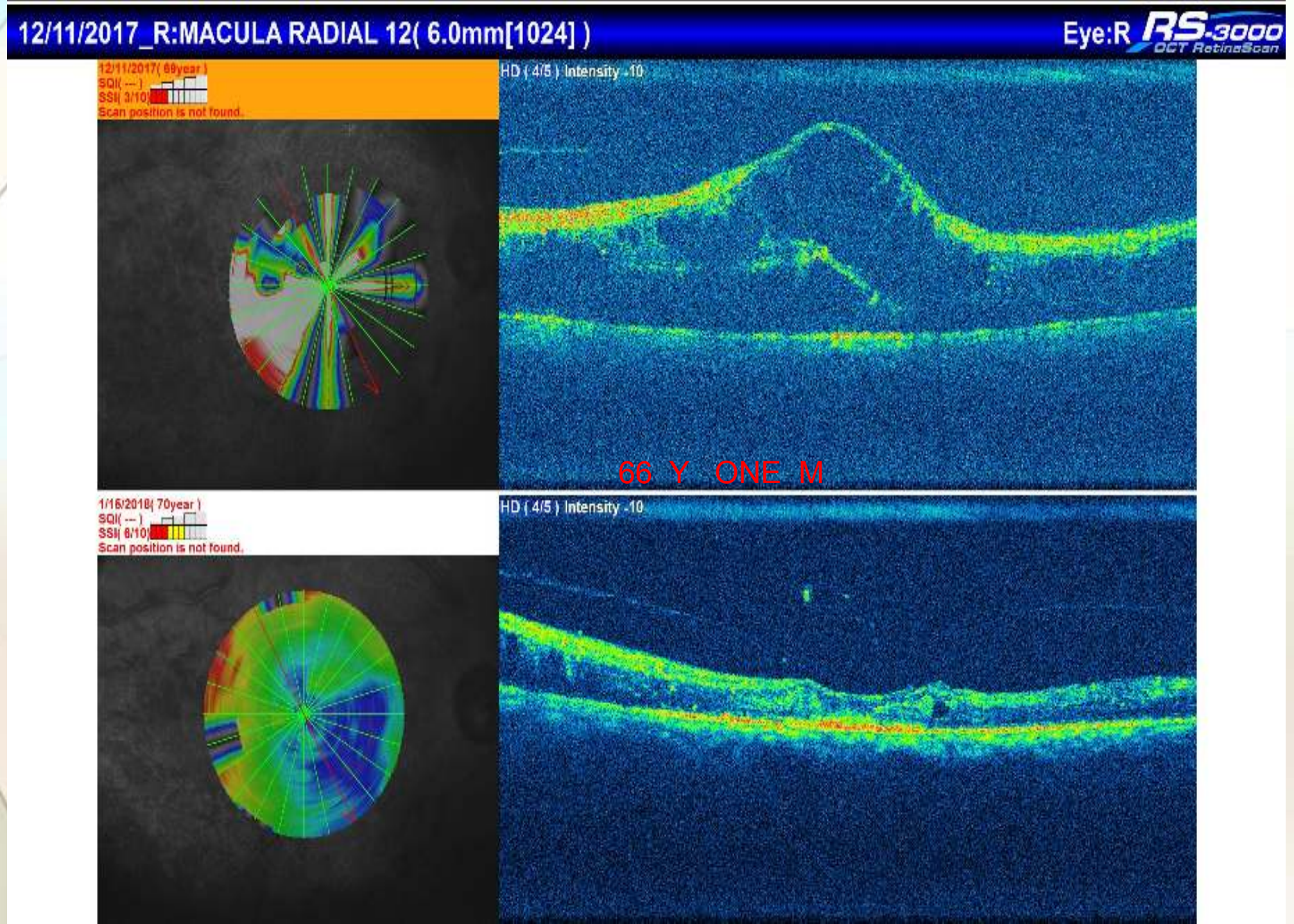

2/8/2017_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
2/8/2017(48year)
SQI(---)
SSI(5/10)
Baseline
HD (5/5) Intensity -6
59 Y 6 M
8/9/2017(48year)
SQI(---)
SSI(7/10)
Scan position is not found.
HD (4/5) Intensity -6

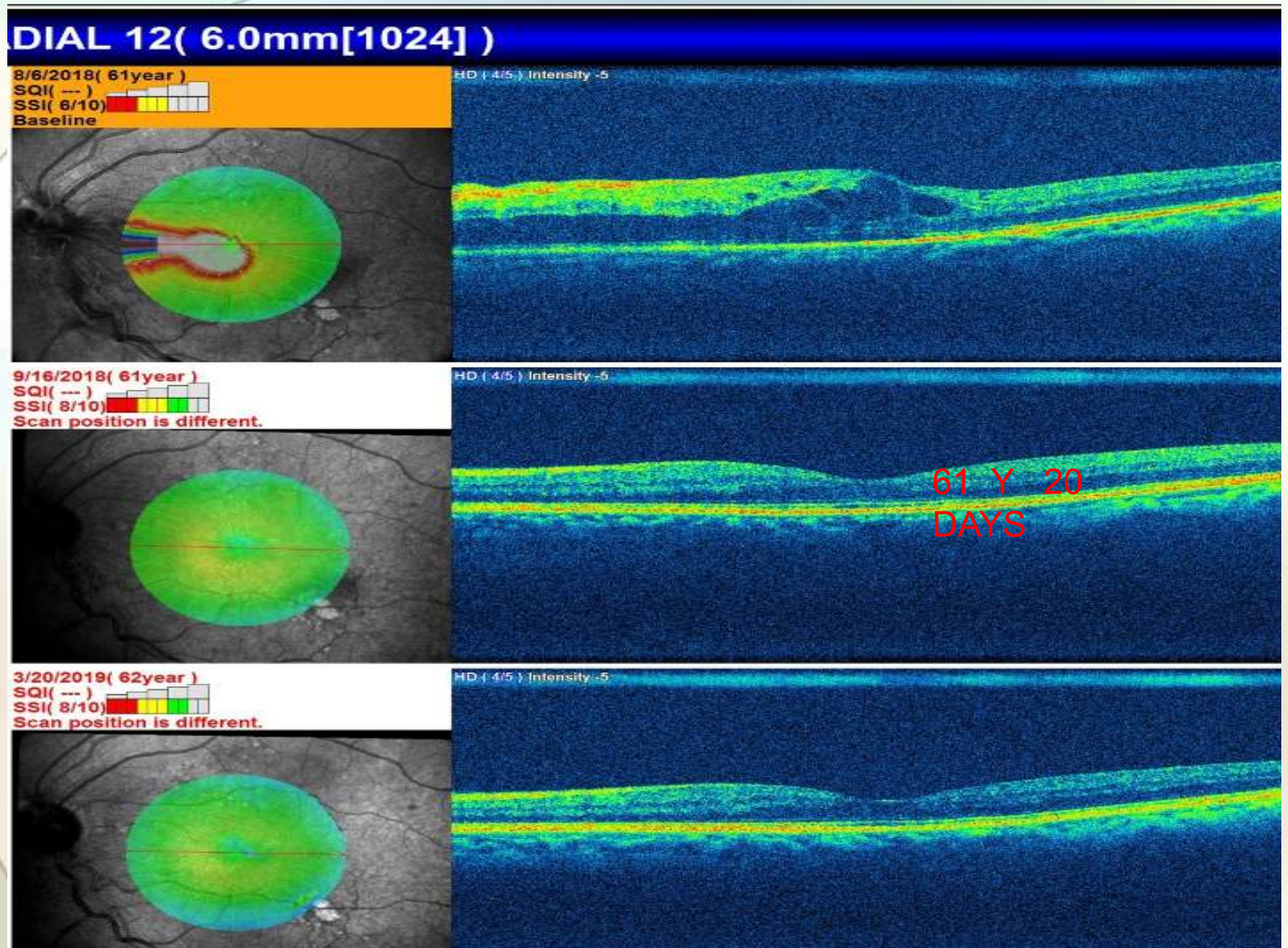
Retinal vein occlusion
(CRVO and BRVO)

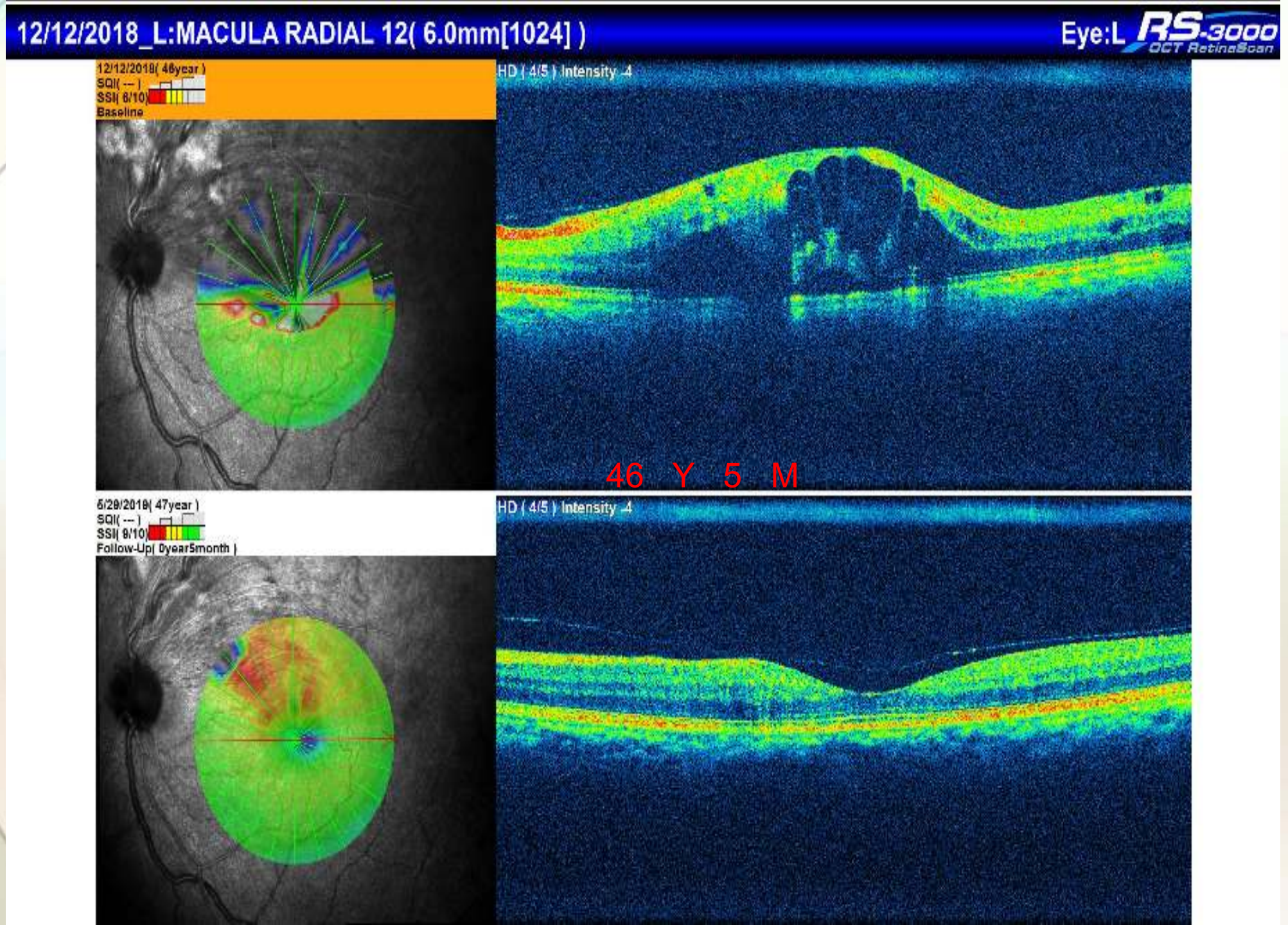


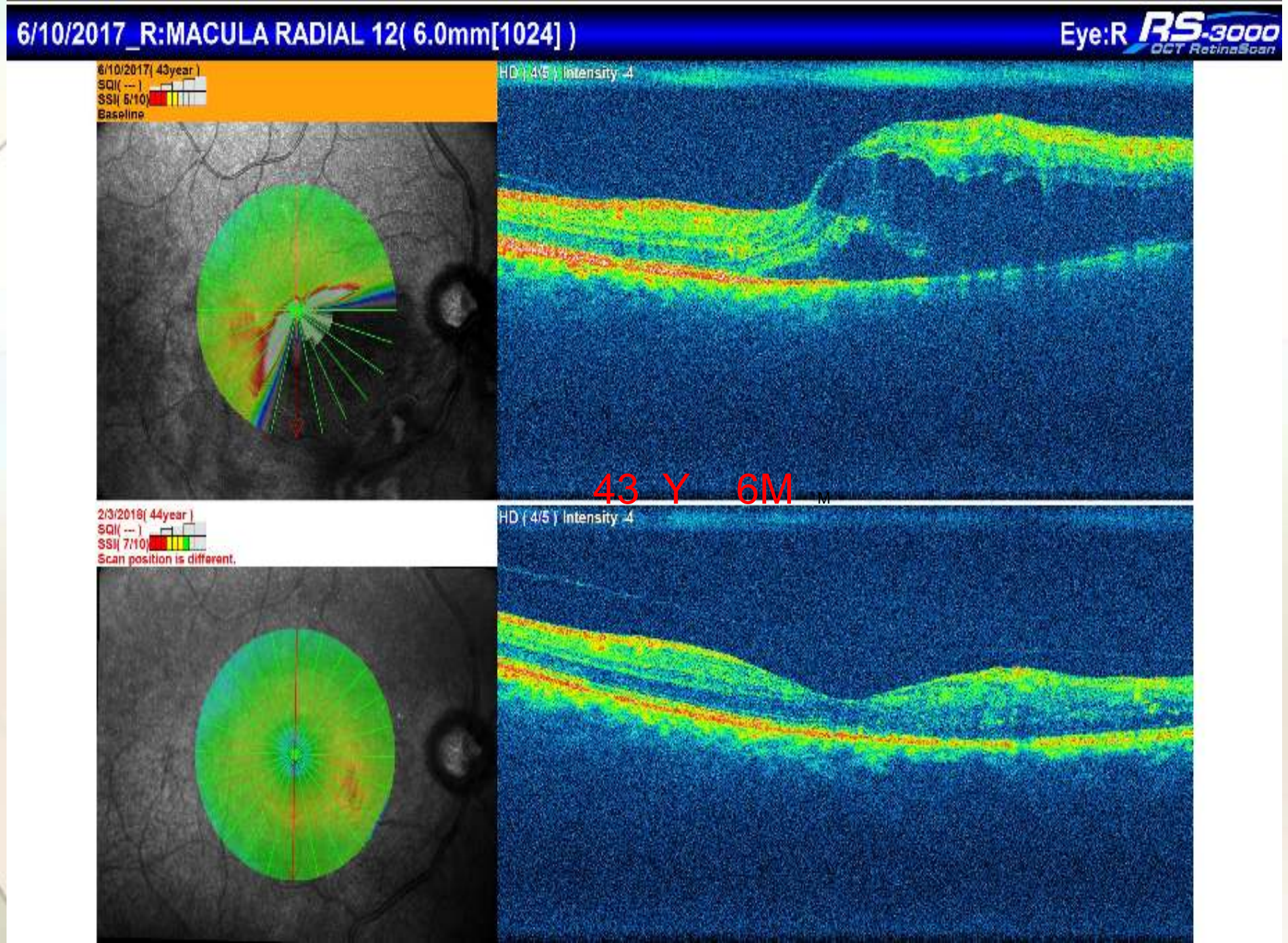

ONE M

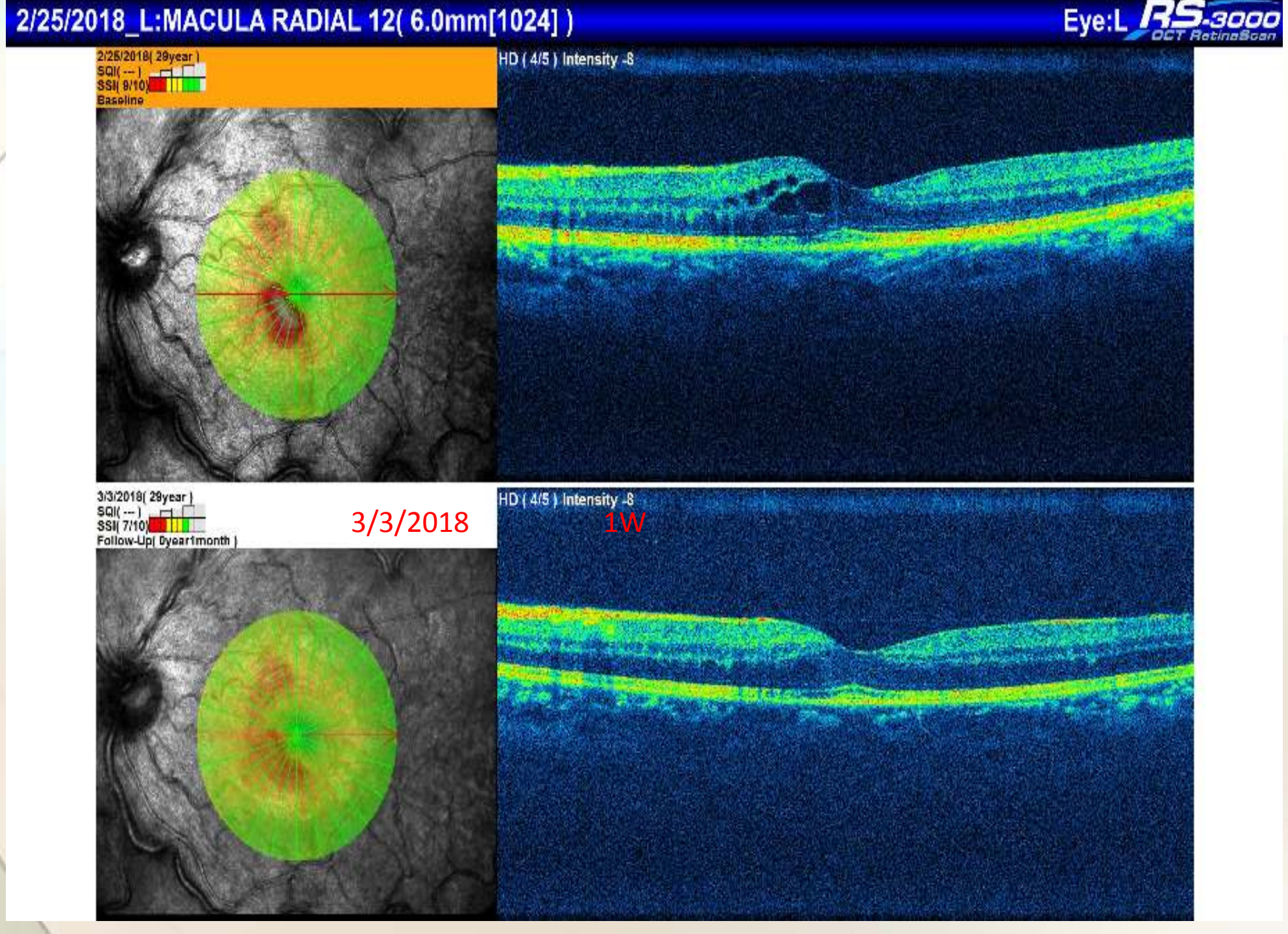

ONE M


12/11/2017_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
12/11/2017(69year)
SQI(---)
SSI(3/10)
Scan position is not found.
HD (4/5) Intensity -10
66 Y ONE M
1/16/2018(70year)
SQI(---)
SSI(6/10)
Scan position is not found.
HD (4/5) Intensity -10

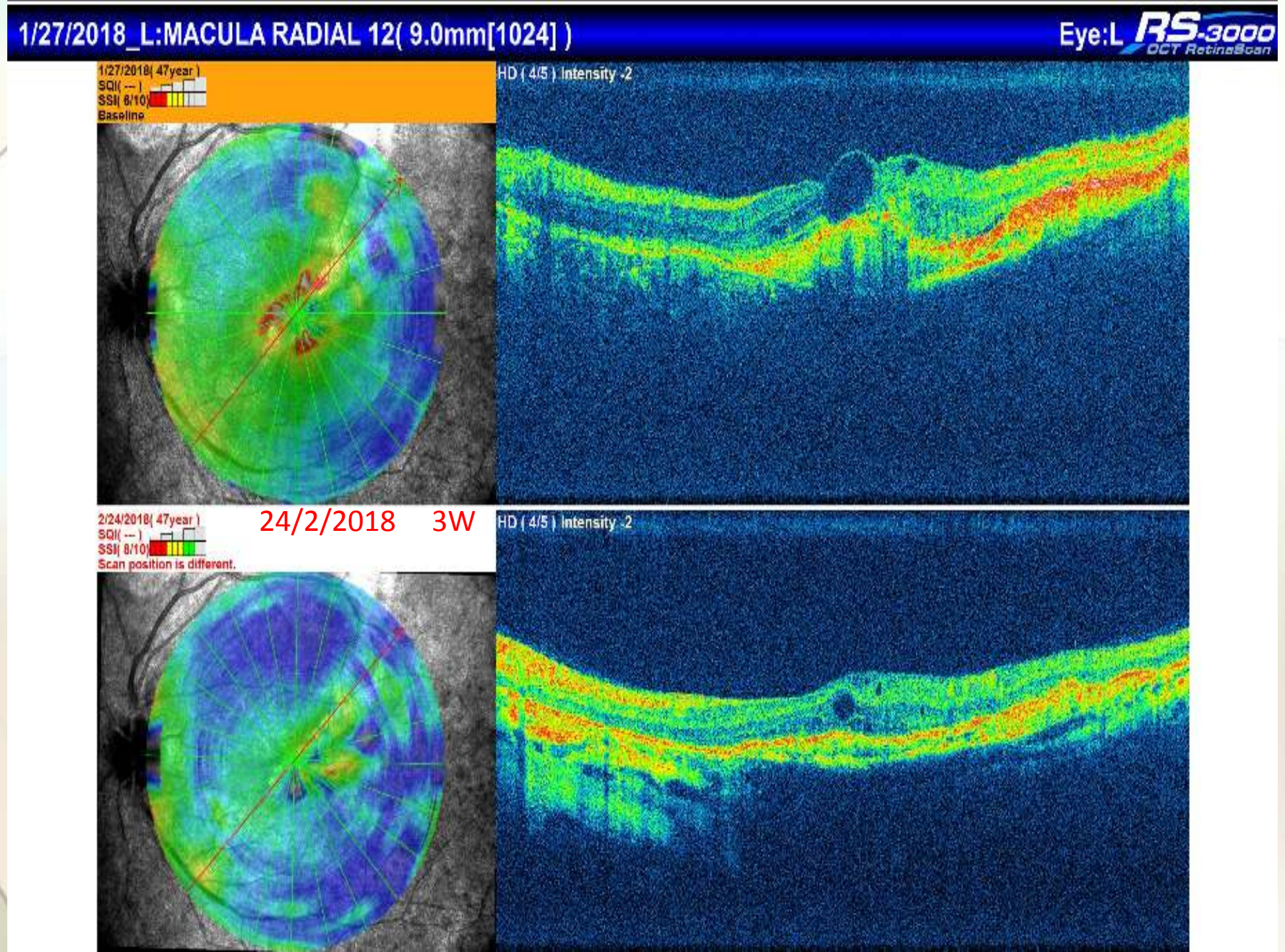

DIAL 12(6.0mm[1024])
8/6/2018(61year)
SQI(---)
SSI(6/10)
Baseline
HD (4/5) Intensity -5
9/16/2018(61year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -5
61 Y 20
DAYS
3/20/2019(62year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -5

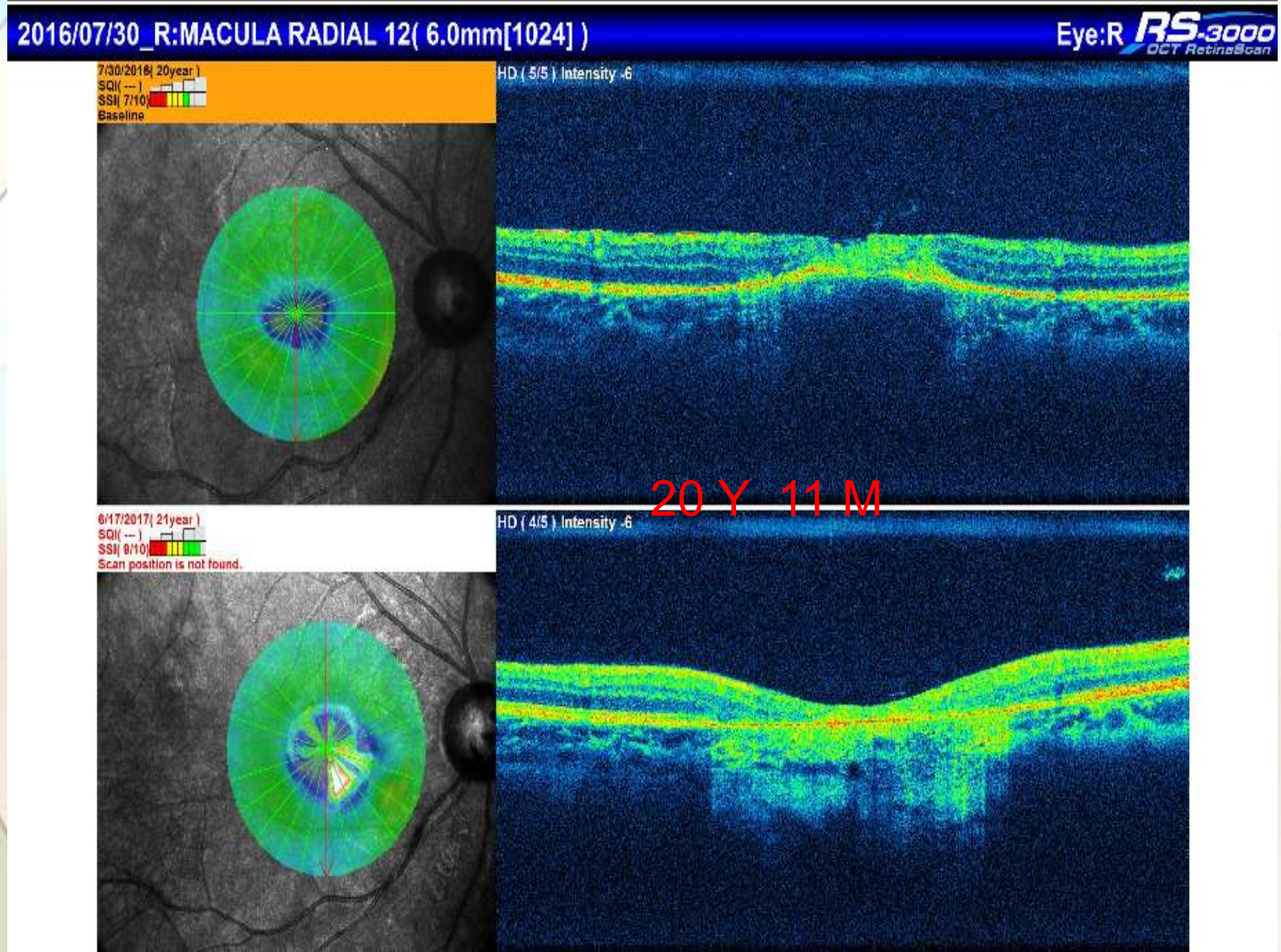

12/12/2018_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
12/12/2018(46year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity -4
46 Y 5 M
6/28/2019(47year)
SQI(---)
SSI(9/10)
Follow-Up(0year5month)
HD (4/5) Intensity -4

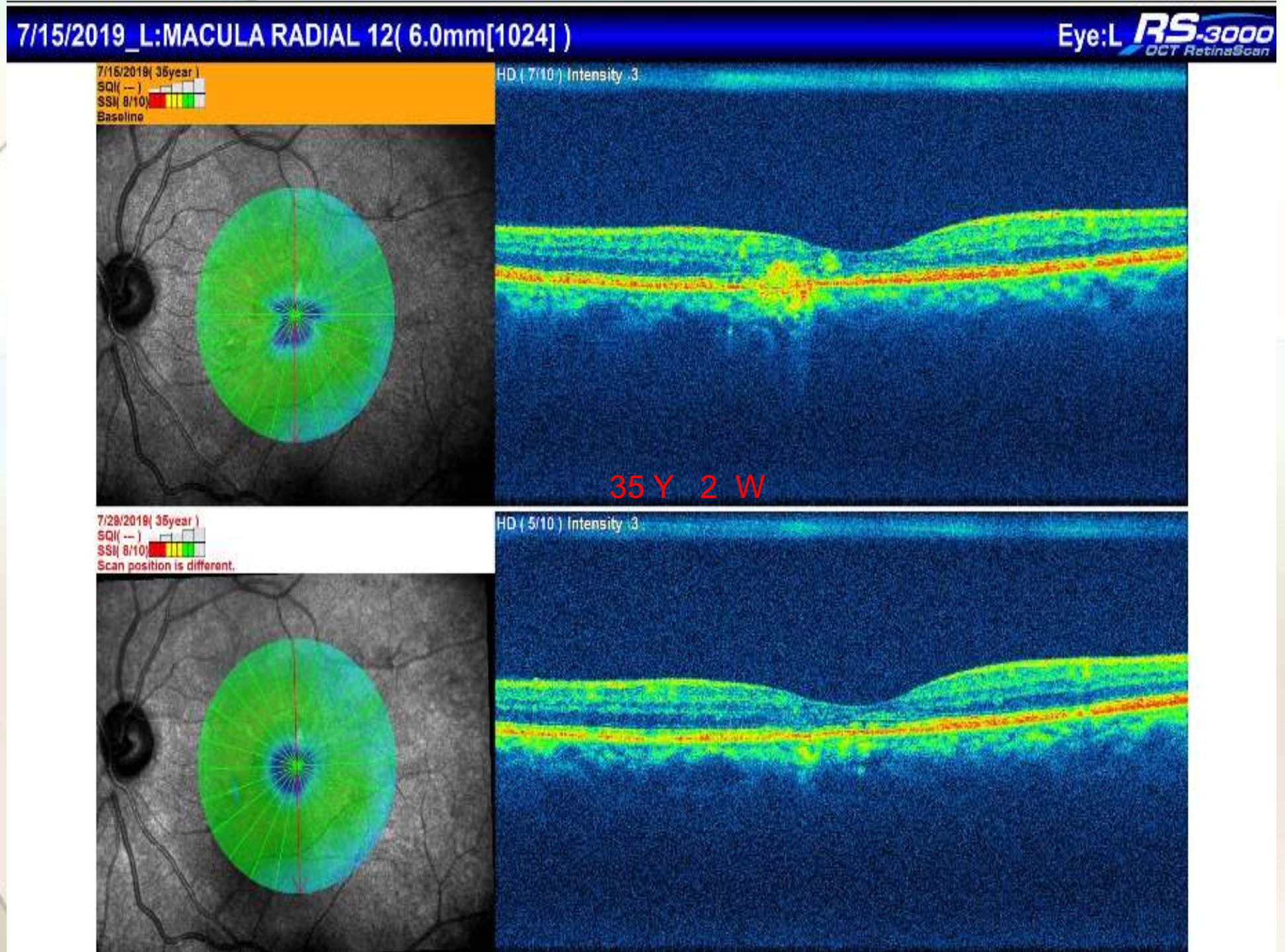

6/10/2017_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
6/10/2017(43year)
SQI(---)
SSI(5/10)
Baseline
HD (4/5) Intensity -4
43 Y 6M M
2/3/2018(44year)
SQI(---)
SSI(7/10)
Scan position is different.
HD (4/5) Intensity -4

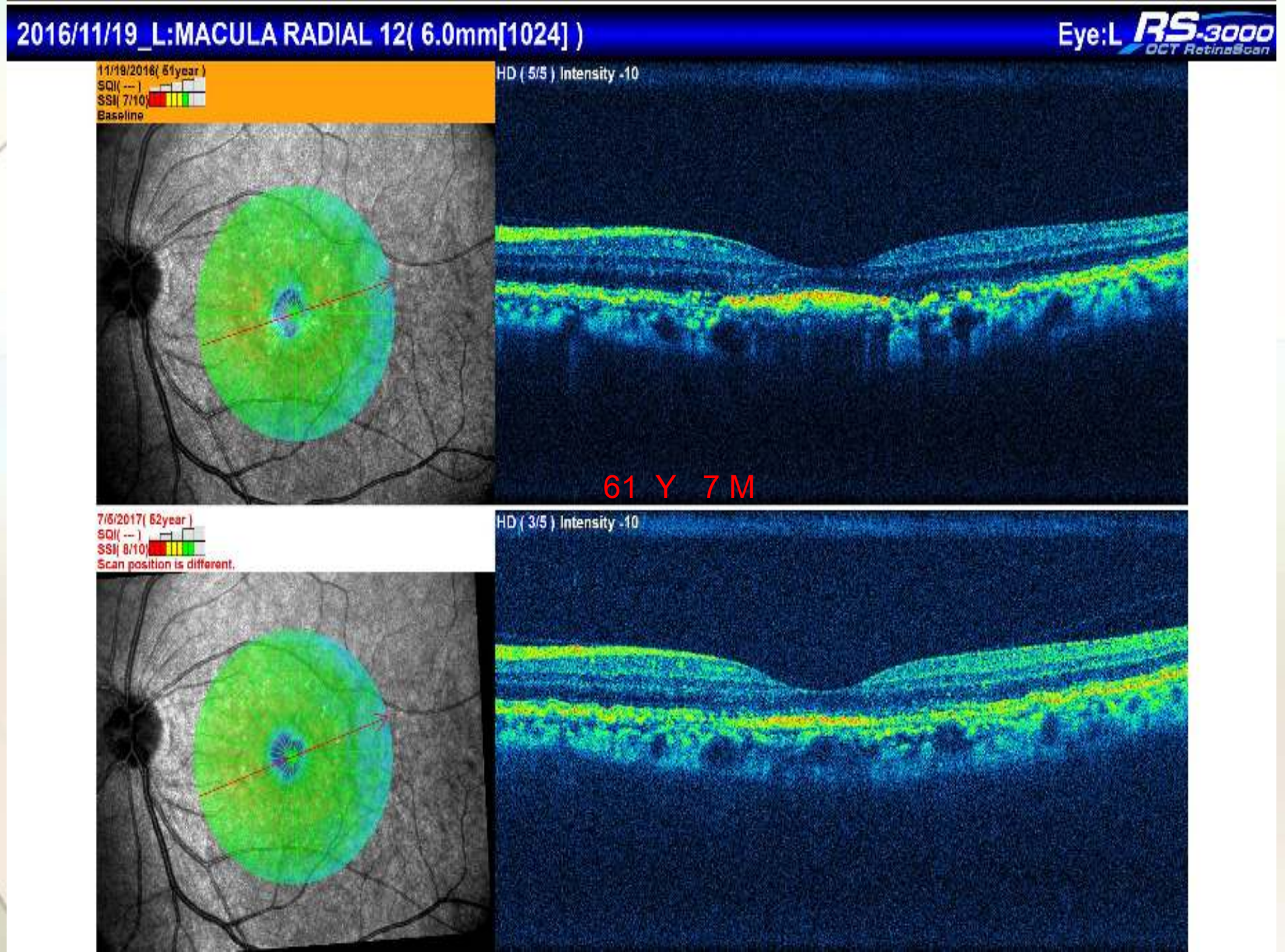

2/25/2018_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
2/25/2018(29year)
SQI(---)
SSI(9/10)
Baseline
HD (4/5) Intensity -8
3/3/2018(29year)
SQI(---)
SSI(7/10)
Follow-Up(0year1month)
3/3/2018
HD (4/5) Intensity -8
1W

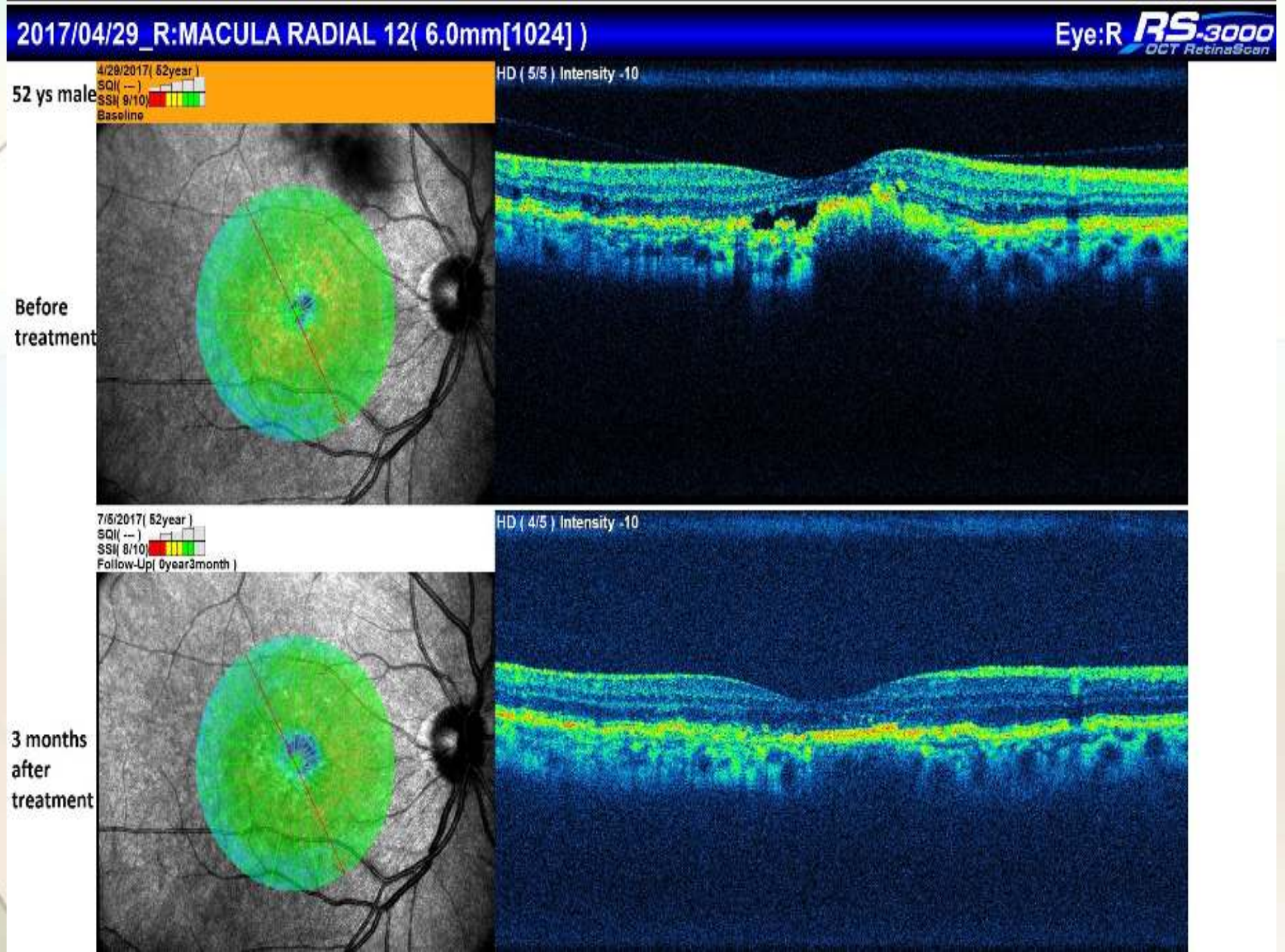
Macular Degeneration

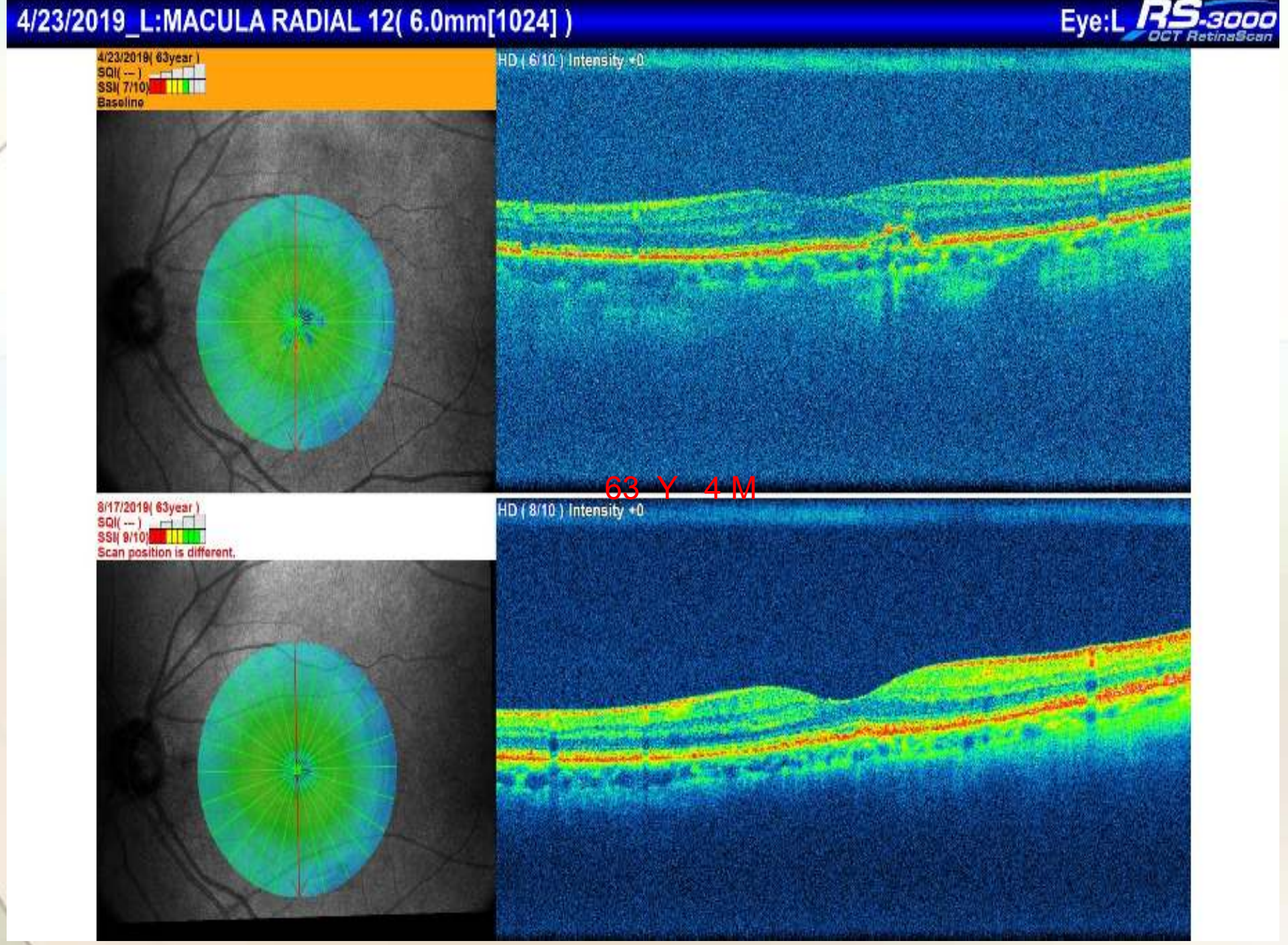

1/27/2018_L:MACULA RADIAL 12(9.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
1/27/2018(47year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity -2
24/2/2018 3W
2/24/2018(47year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -2


2016/07/30_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
7/30/2016(20year)
SQI(---)
SSI(7/10)
Baseline
HD (5/5) Intensity -6
20 Y 11 M
6/17/2017(21year)
SQI(---)
SSI(8/10)
Scan position is not found.
HD (4/5) Intensity -6

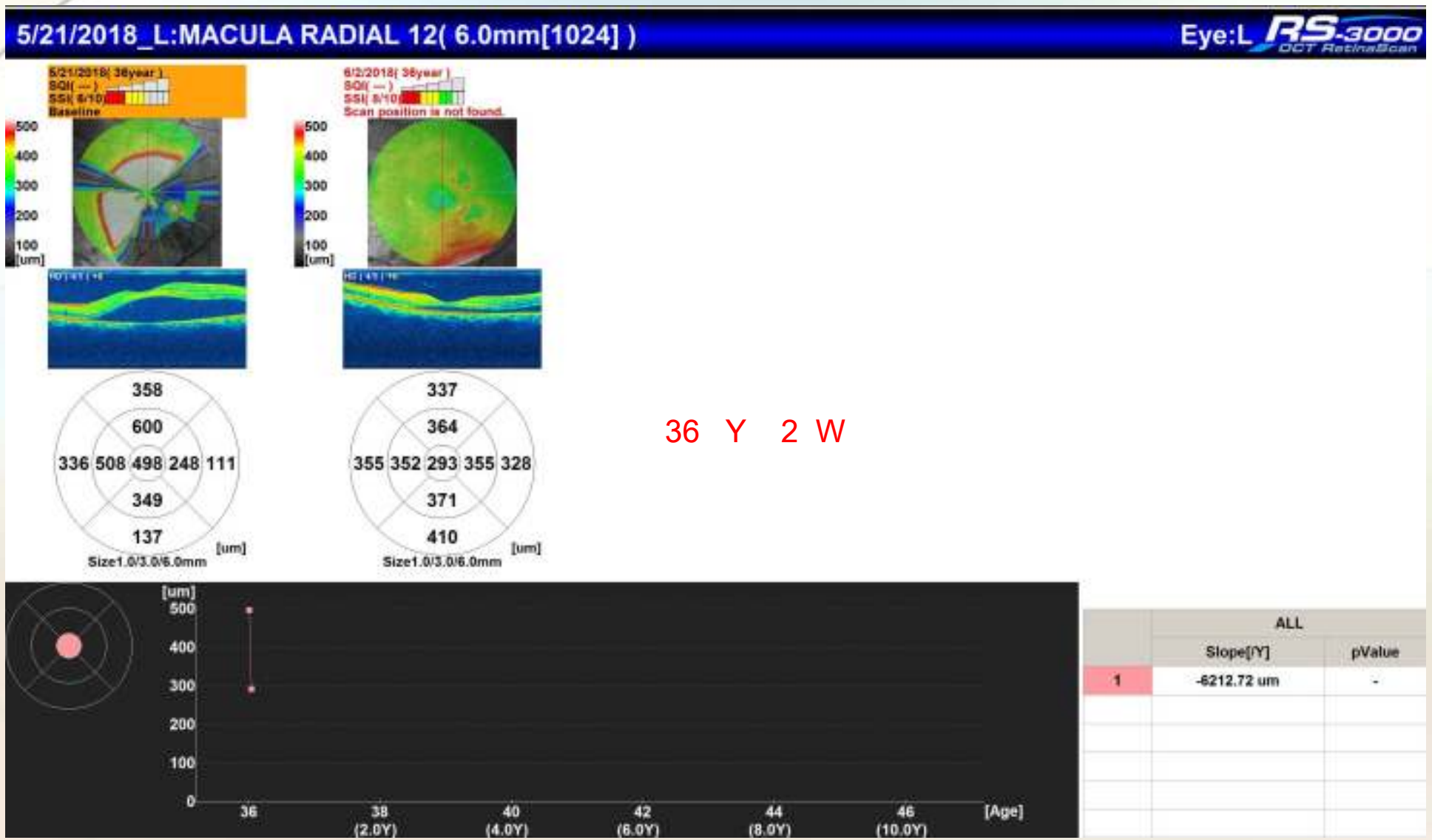

7/15/2019_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
7/15/2019(35year)
SQI(---)
SSI(8/10)
Baseline
HD (7/10) Intensity :3
35 Y 2 W
7/29/2019(35year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (5/10) Intensity :3

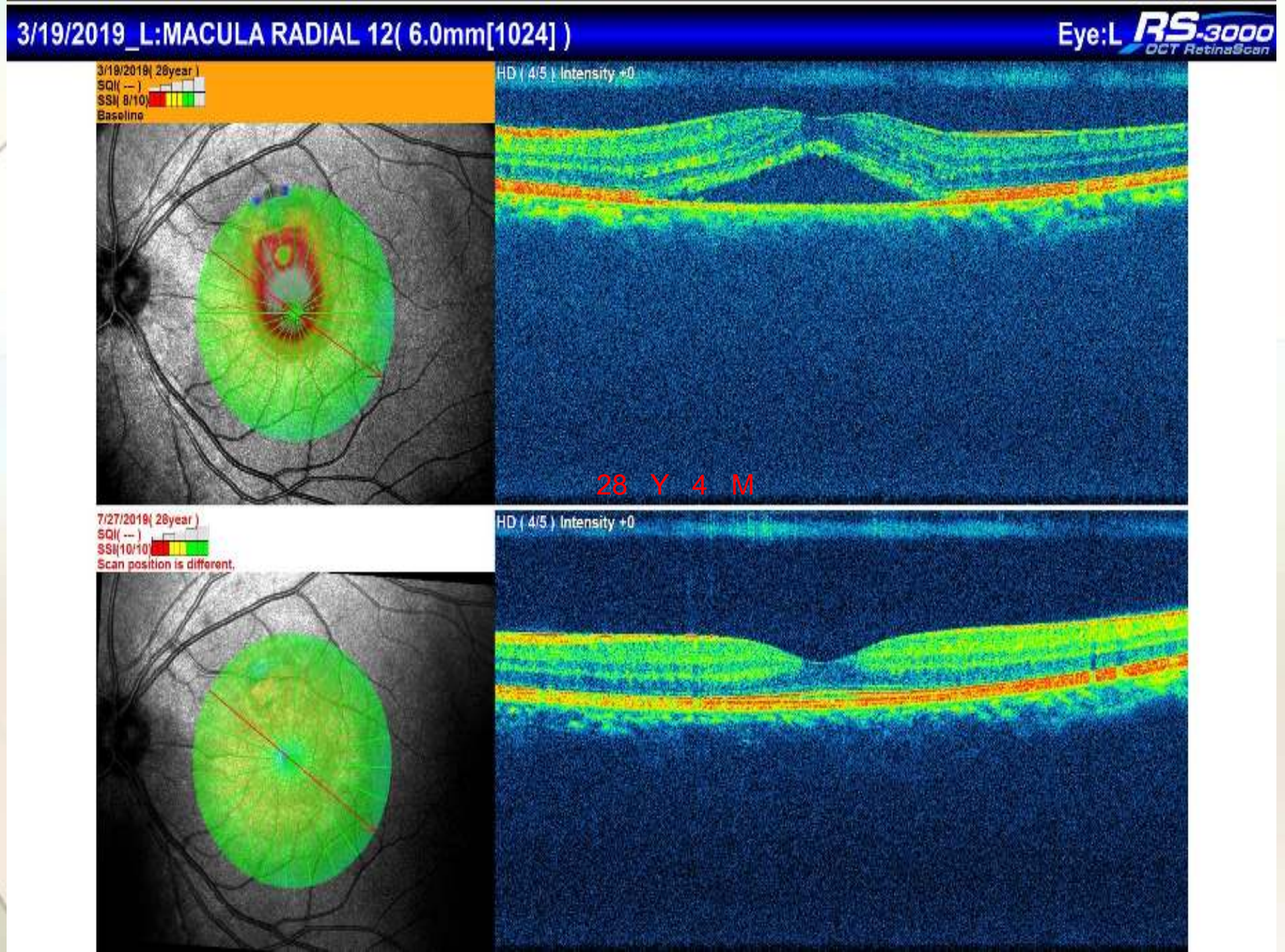

2016/11/19_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
11/19/2016(61year)
SQI(---)
SSI(7/10)
Baseline
HD (5/5) Intensity -10
61 Y 7 M
7/6/2017(62year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (3/5) Intensity -10

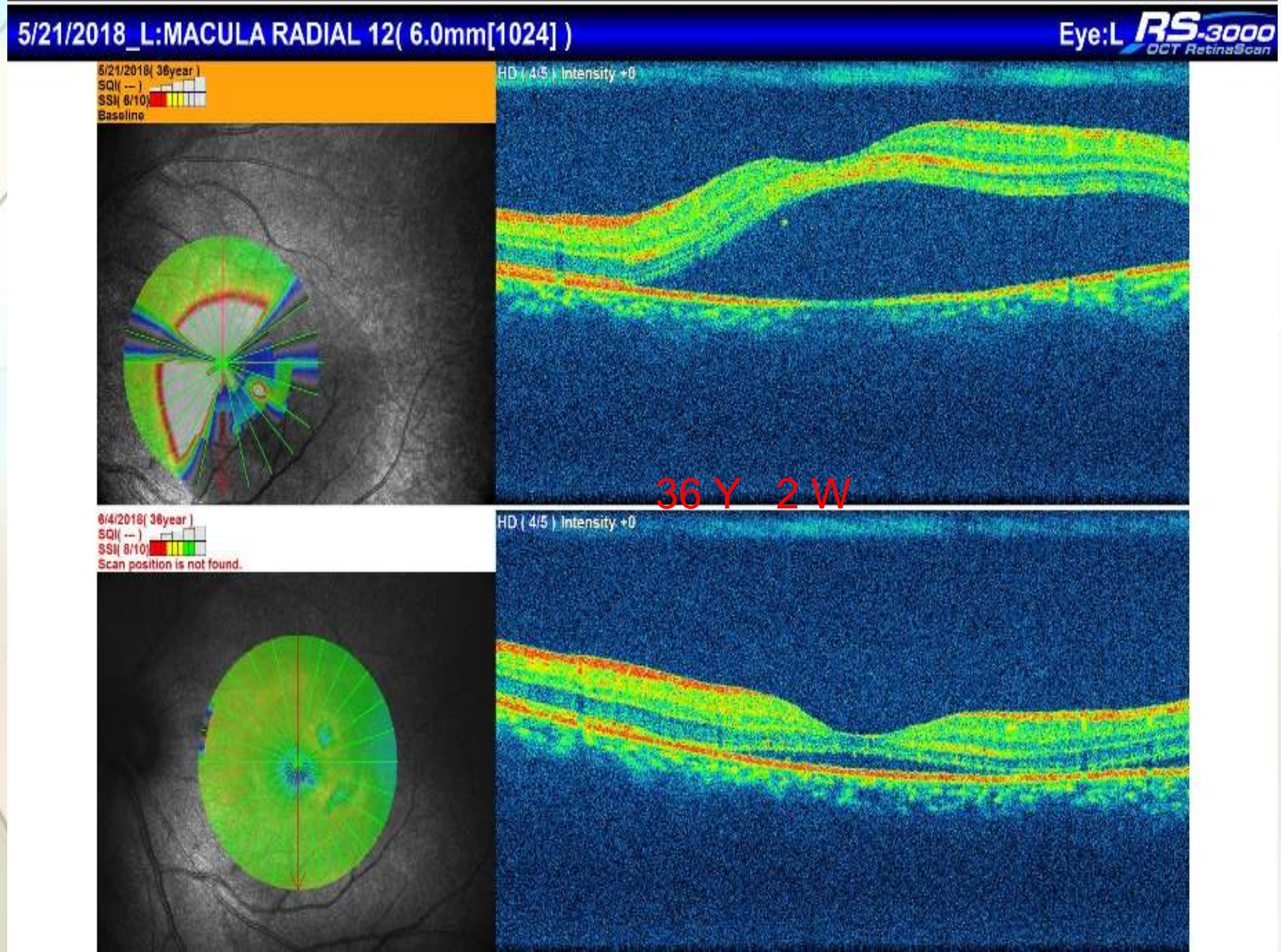

2017/04/29_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
52 ys male
4/29/2017(52year)
SQI(---)
SSI(9/10)
Baseline
HD (5/5) Intensity -10
Before treatment
7/5/2017(52year)
SQI(---)
SSI(8/10)
Follow-Up(0year3month)
HD (4/5) Intensity -10
3 months after treatment

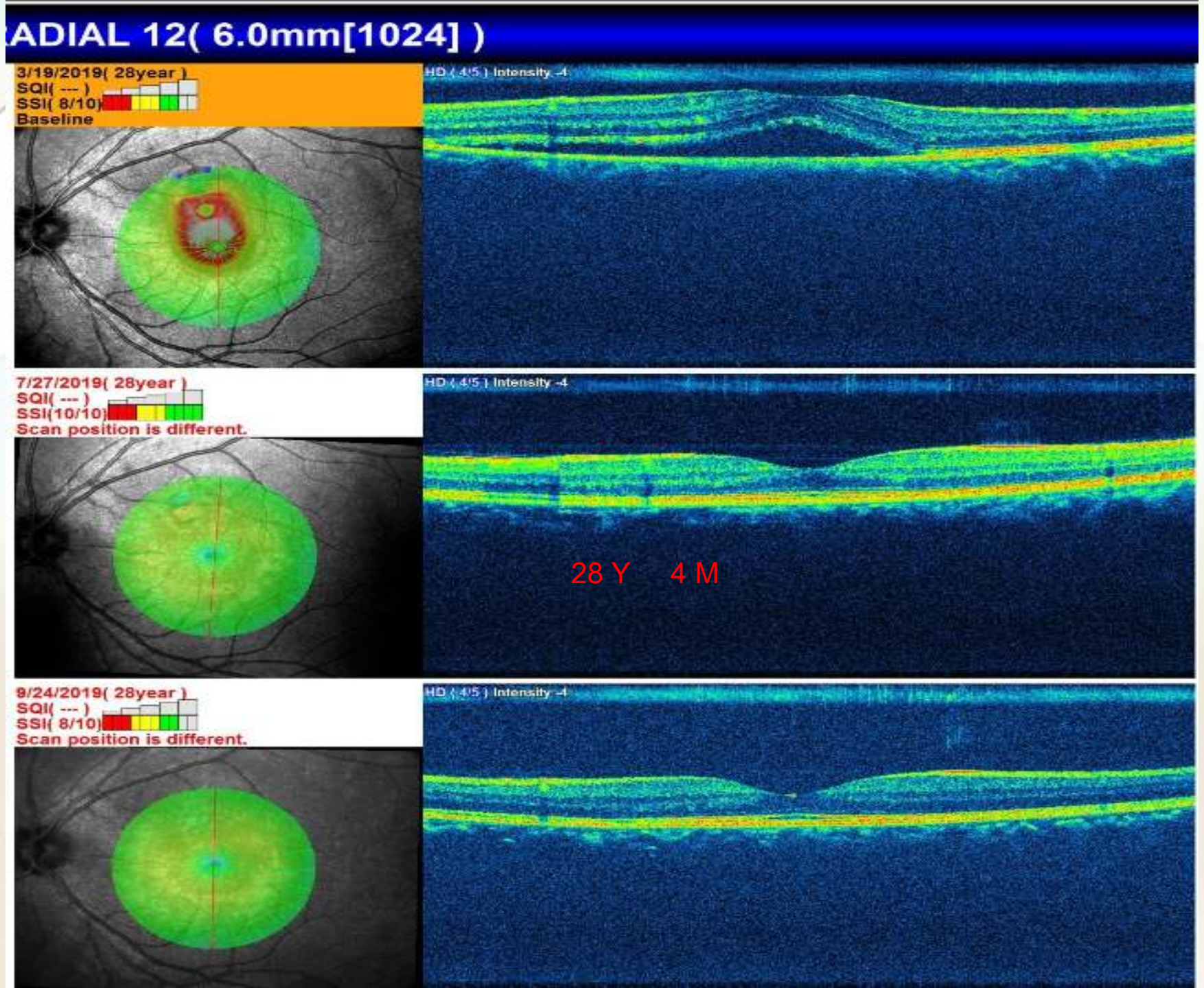

4/23/2019_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
4/23/2019(63year)
SQI(--)
SSI(7/10)
Baseline
HD (6/10) Intensity +0
63 Y 4 M
8/17/2019(63year)
SQI(--)
SSI(9/10)
Scan position is different.
HD (8/10) Intensity +0

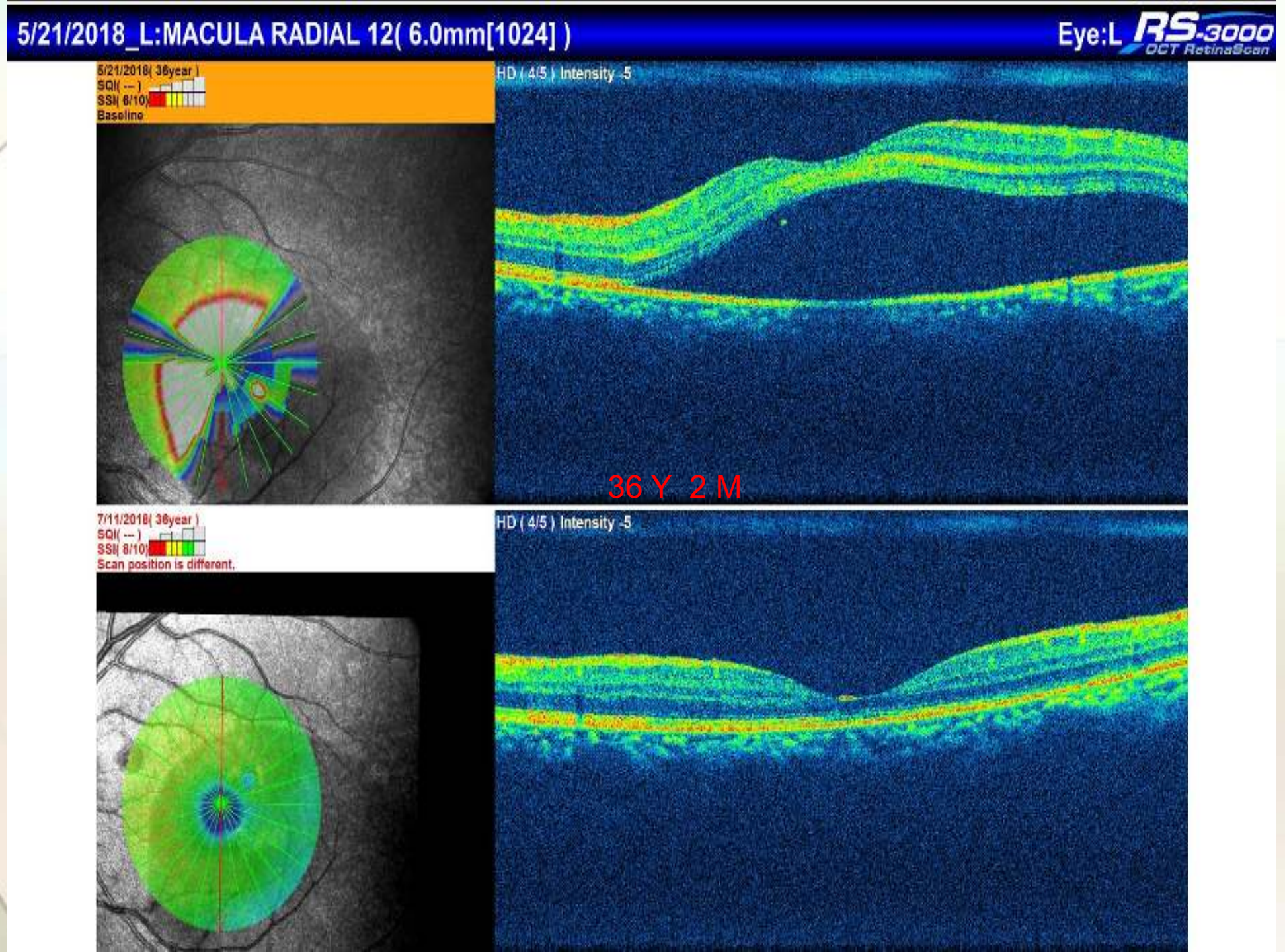
Central Serous Chorioretinopathy

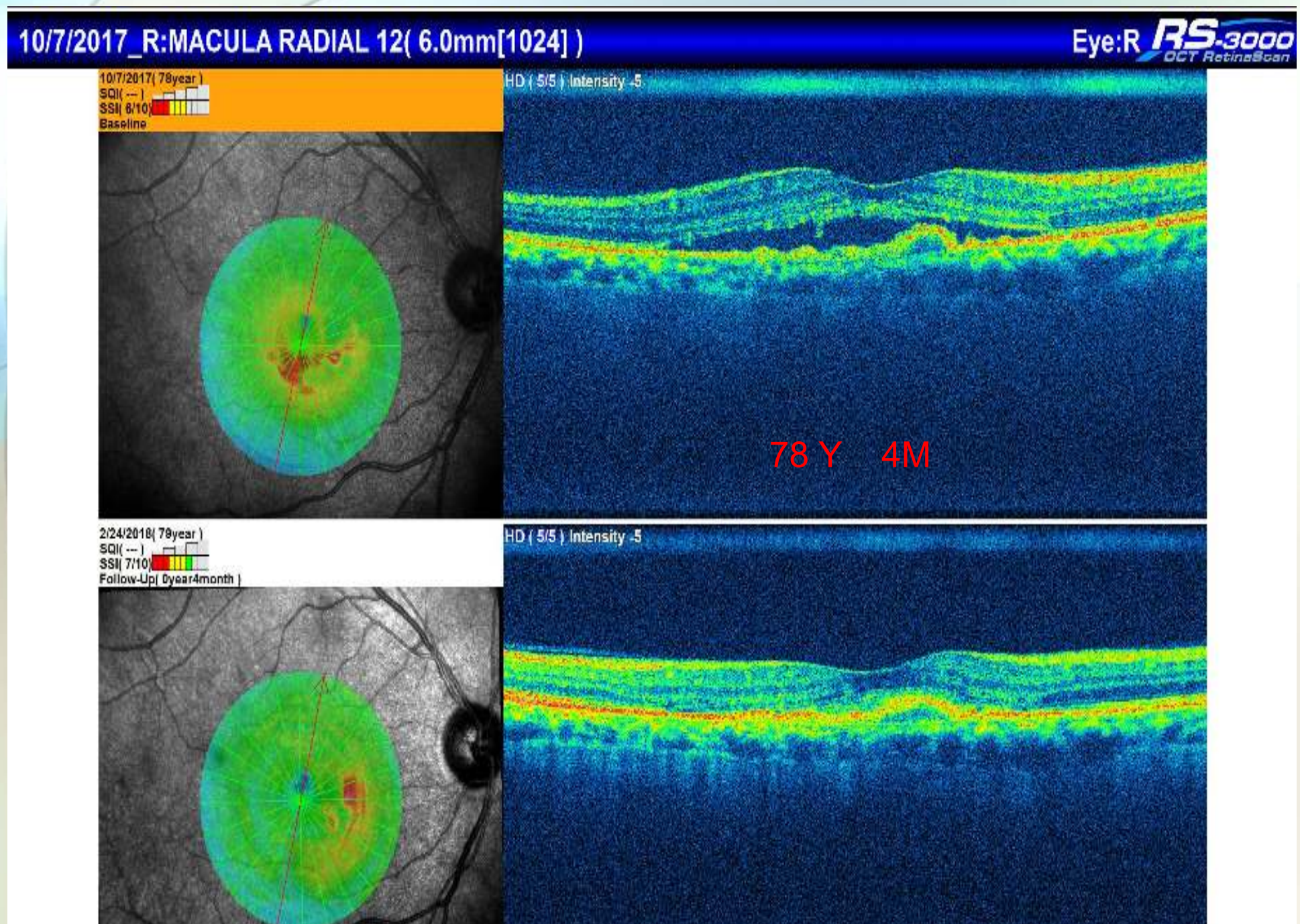

5/21/2018_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
5/21/2018(36year)
SQI(---)
SSI(6/10)
Baseline
6/2/2018(36year)
SQI(---)
SSI(5/10)
Scan position is not found.
500
400
300
200
100
[um]
358
600
336 508 498 248 111
349
137
[um]
Size1.0/3.0/6.0mm
337
364
355 352 293 355 328
371
410
[um]
Size1.0/3.0/6.0mm
36 Y 2 W
[um]
500
400
300
200
100
0
36
38
(2.0Y)
40
(4.0Y)
42
(6.0Y)
44
(8.0Y)
46
(10.0Y)
[Age]
ALL
Slope[/Y]
pValue
1
-6212.72 um
-


3/19/2019_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
3/19/2019(28year)
SQI(--)
SSI(8/10)
Baseline
HD (4/5) Intensity +0
28 Y 4 M
7/27/2019(28year)
SQI(--)
SSI(10/10)
Scan position is different.
HD (4/5) Intensity +0

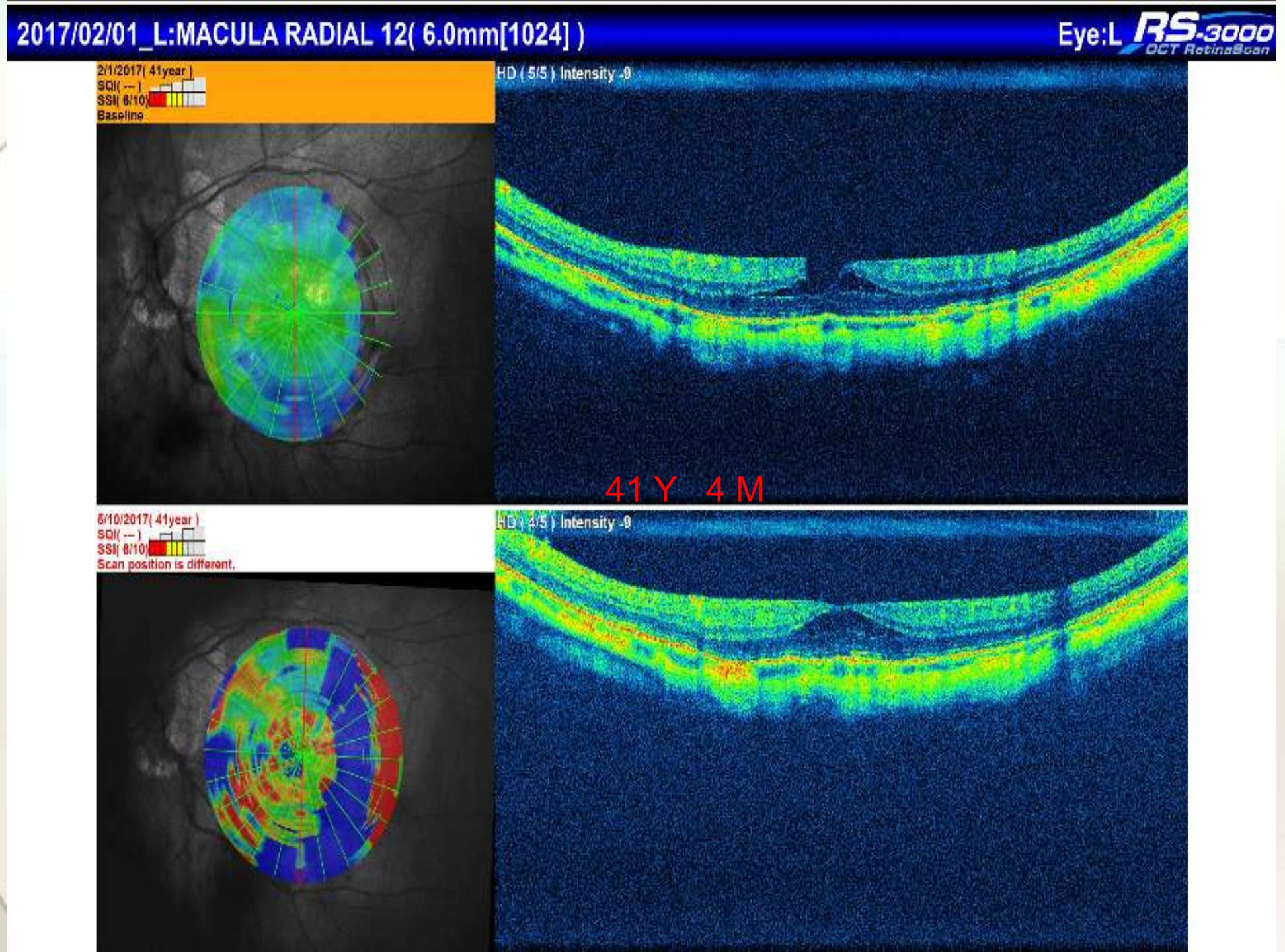

5/21/2018_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
5/21/2018(36year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity +0
36 Y 2 W
6/4/2018(36year)
SQI(---)
SSI(8/10)
Scan position is not found.
HD (4/5) Intensity +0

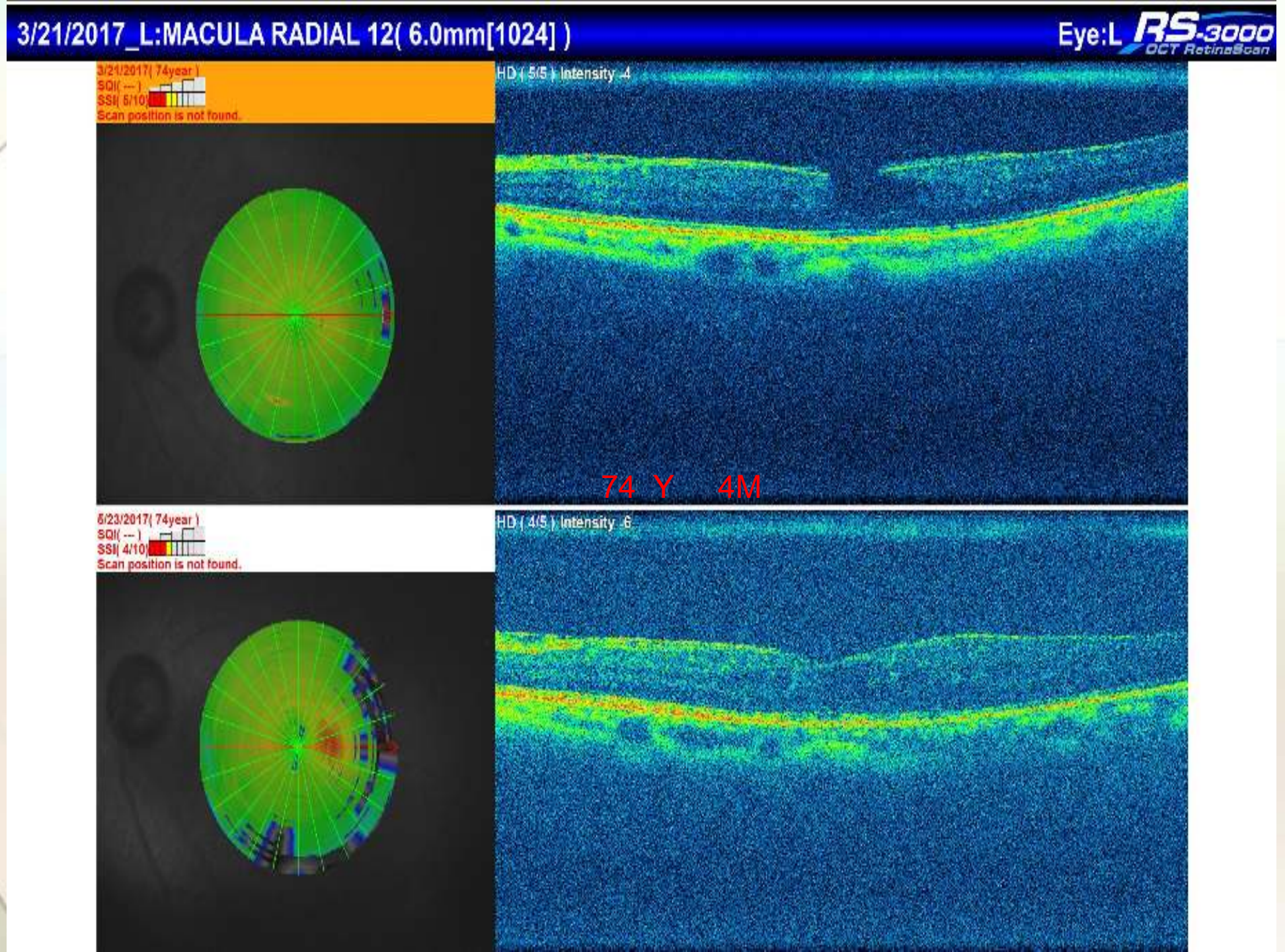

ADIAL 12(6.0mm[1024])
3/19/2019(28year)
SQI(---)
SSI(8/10)
Baseline
HD (4/5) Intensity -4
7/27/2019(28year)
SQI(---)
SSI(10/10)
Scan position is different.
HD (4/5) Intensity -4
28 Y 4 M
9/24/2019(28year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -4


5/21/2018_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
5/21/2018(36year)
SQI(--)
SSI(8/10)
Baseline
HD (4/5) Intensity -5
36 Y 2 M
7/11/2018(36year)
SQI(--)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -5

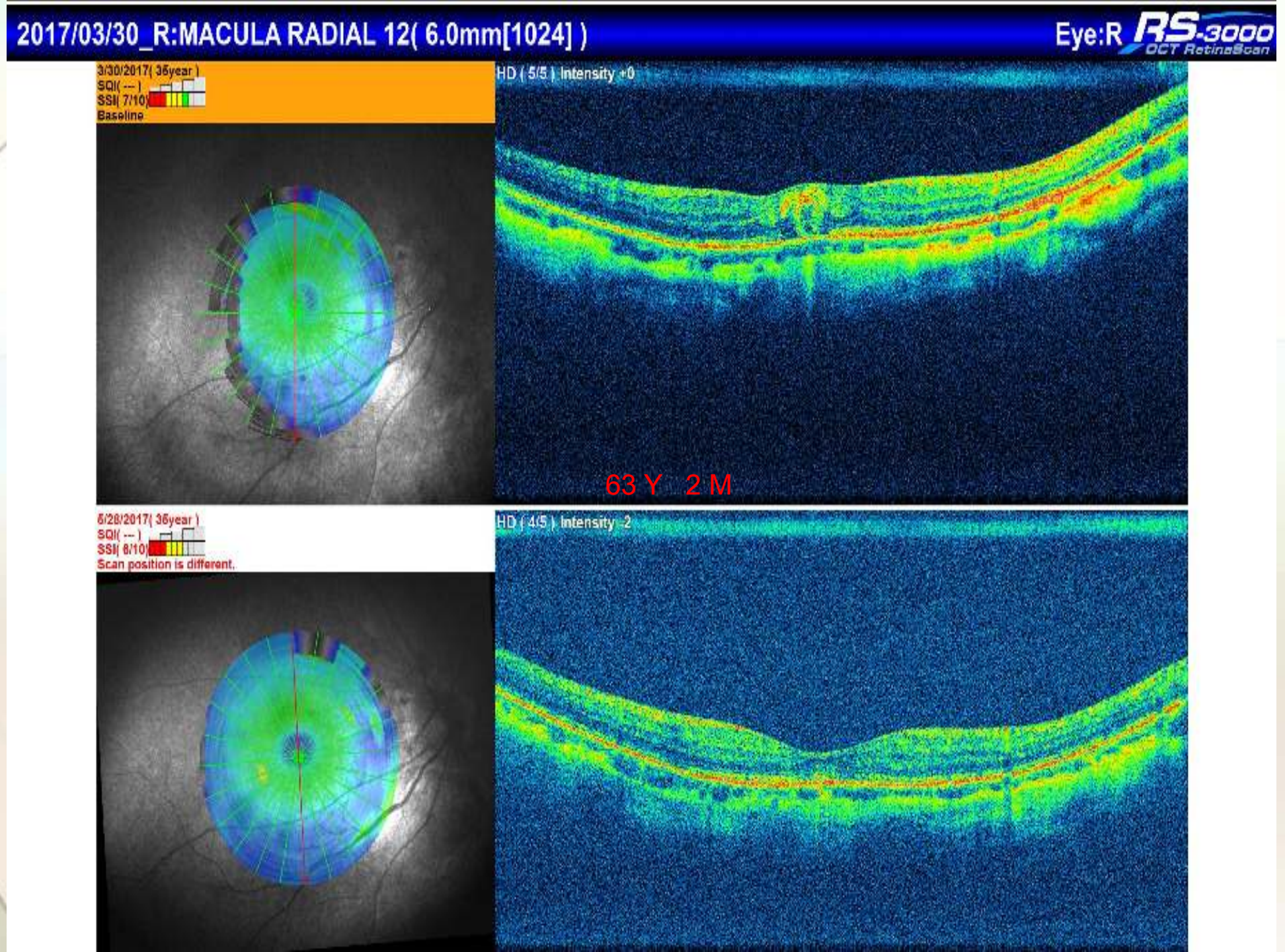

10/7/2017_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
10/7/2017(78year)
SQI(---)
SSI(8/10)
Baseline
HD (5/5) Intensity -5
78 Y 4M
2/24/2018(78year)
SQI(---)
SSI(7/10)
Follow-Up(0year4month)
HD (5/5) Intensity -5

Partial Thickness Macular Hole


2017/02/01_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
2/1/2017(41year)
SQI(---)
SSI(8/10)
Baseline
HD (5/5) Intensity -9
41 Y 4 M
6/10/2017(41year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -9

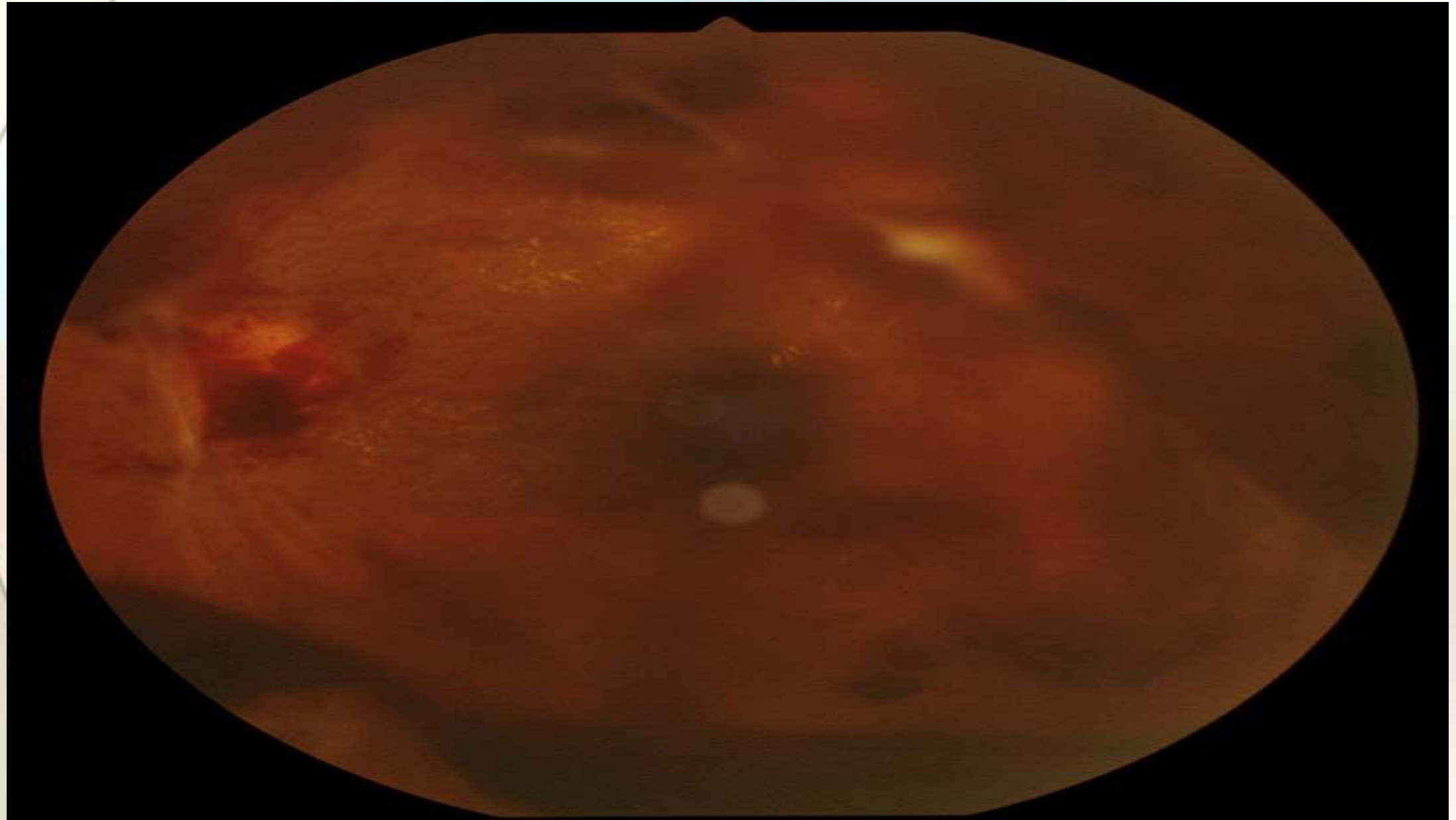

3/21/2017_L:MACULA RADIAL 12(6.0mm[1024])
Eye:L
RS-3000
OCT RetinaScan
3/21/2017(74year)
SQI(---)
SSI(5/10)
Scan position is not found.
HD (5/5) Intensity -4
74 Y 4M
6/23/2017(74year)
SQI(---)
SSI(4/10)
Scan position is not found.
HD (4/5) Intensity -6

Myobic Degeneration


2017/03/30_R:MACULA RADIAL 12(6.0mm[1024])
Eye:R
RS-3000
OCT RetinaScan
3/30/2017(35year)
SQI(---)
SSI(7/10)
Baseline
HD (5/5) Intensity +0
63 Y 2 M
6/28/2017(35year)
SQI(---)
SSI(8/10)
Scan position is different.
HD (4/5) Intensity -2

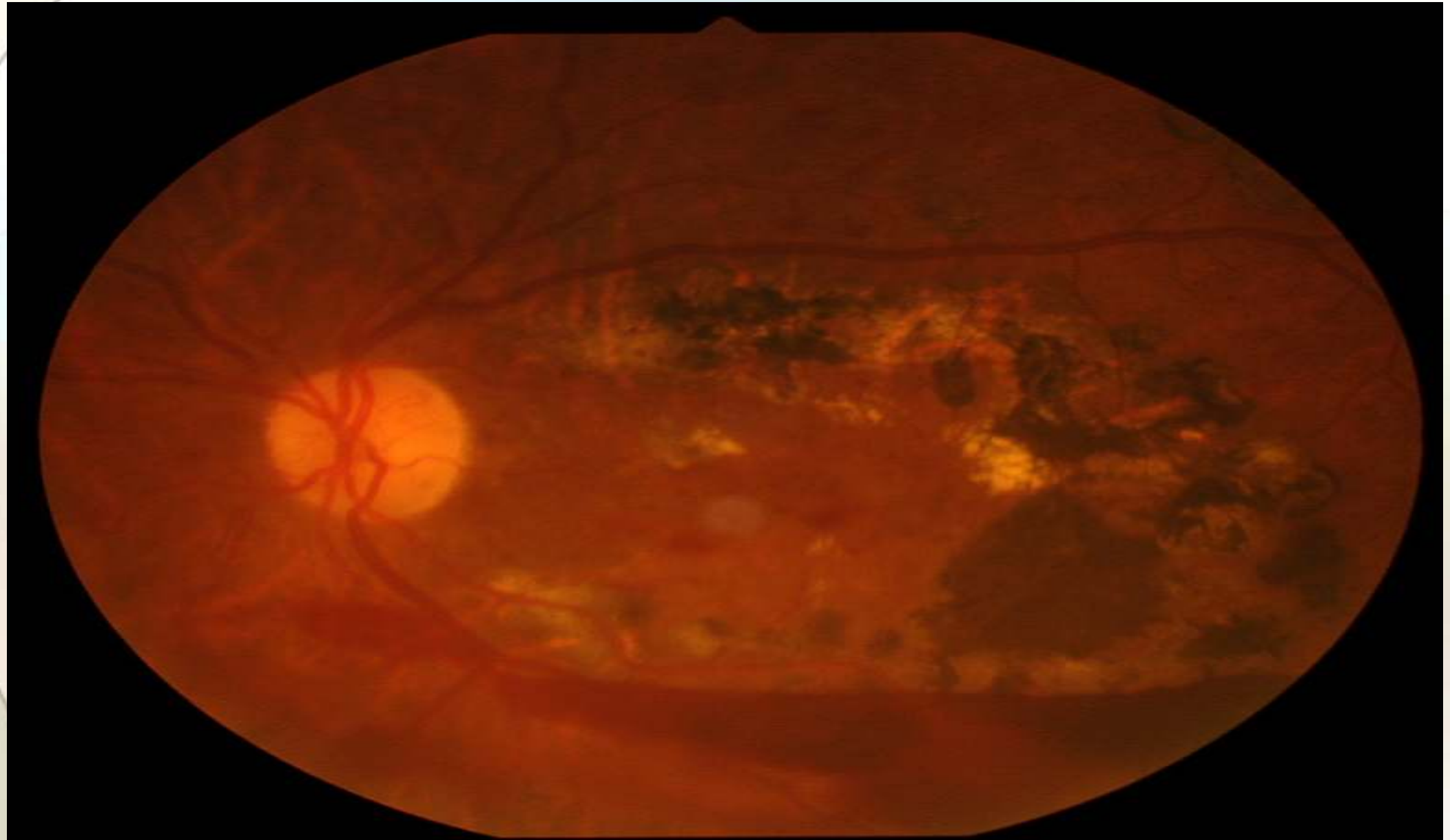
Proliferative Diabetic Retinopathy With Vitreous Hemorrhage

Case no.1: Before treatment

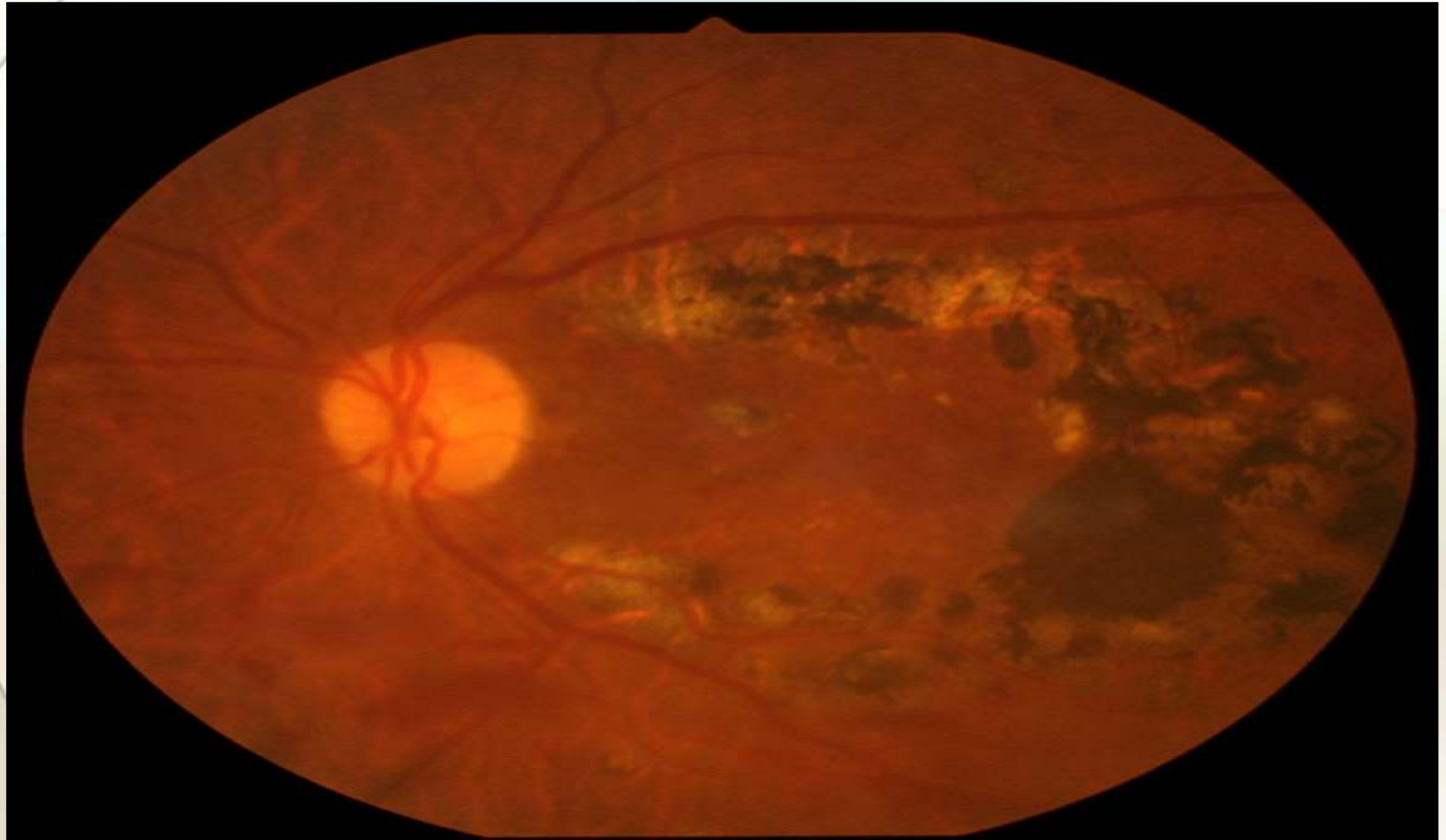


Case no.1: After treatment

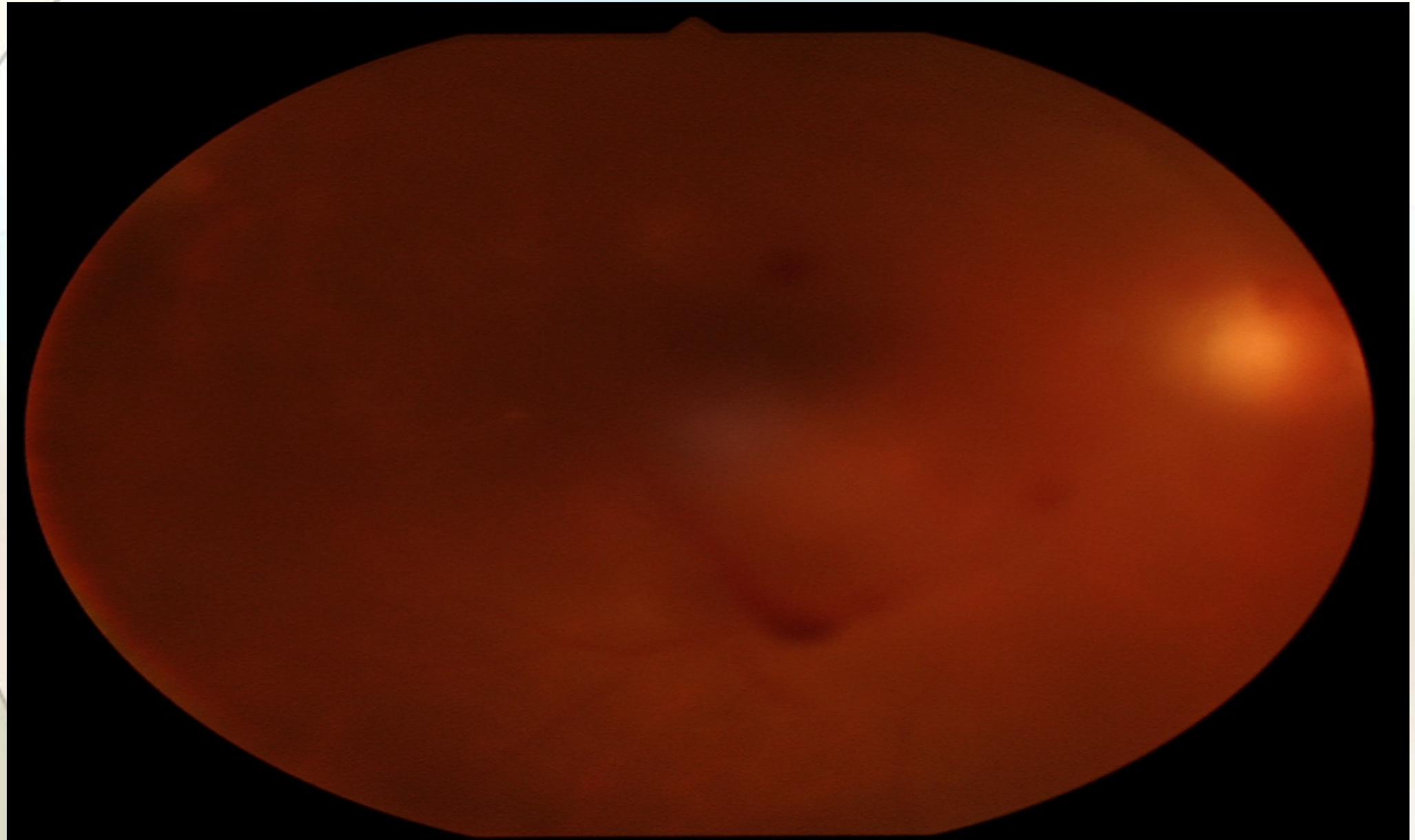
Case no.2: Before treatment



Case no.2: After treatment

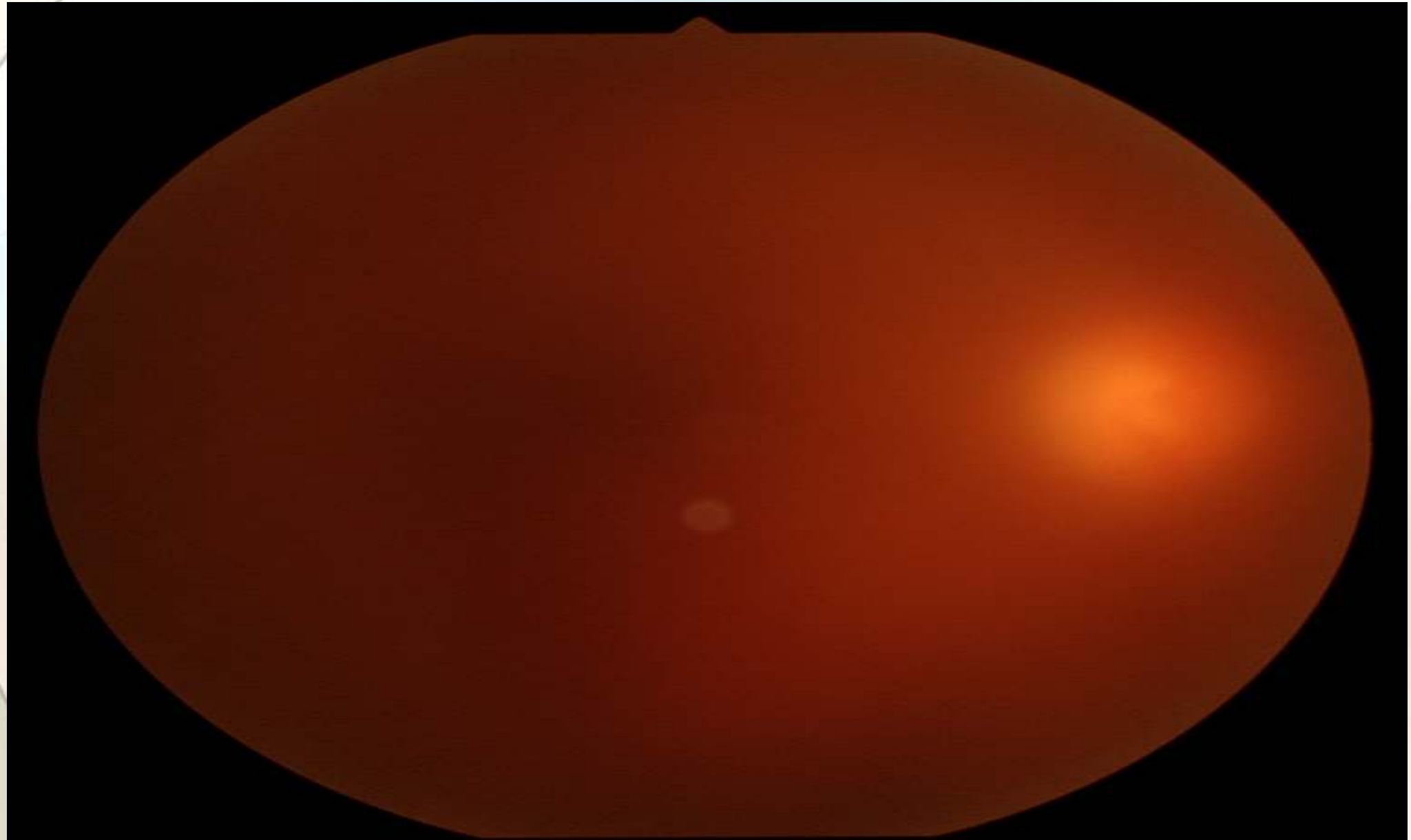


Case no.3: Before treatment

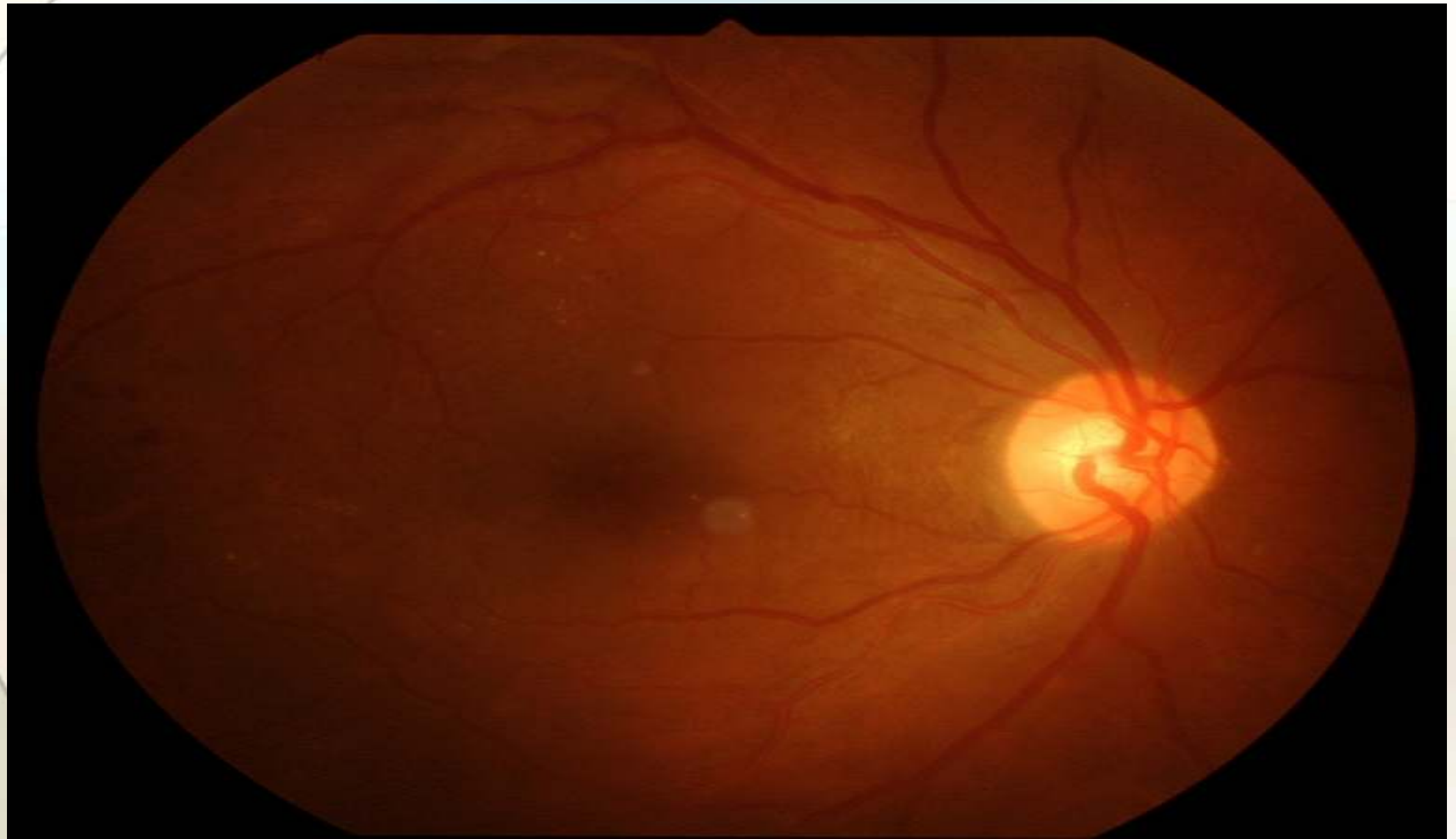


Case no.3: After treatment

Case no.4: Before treatment



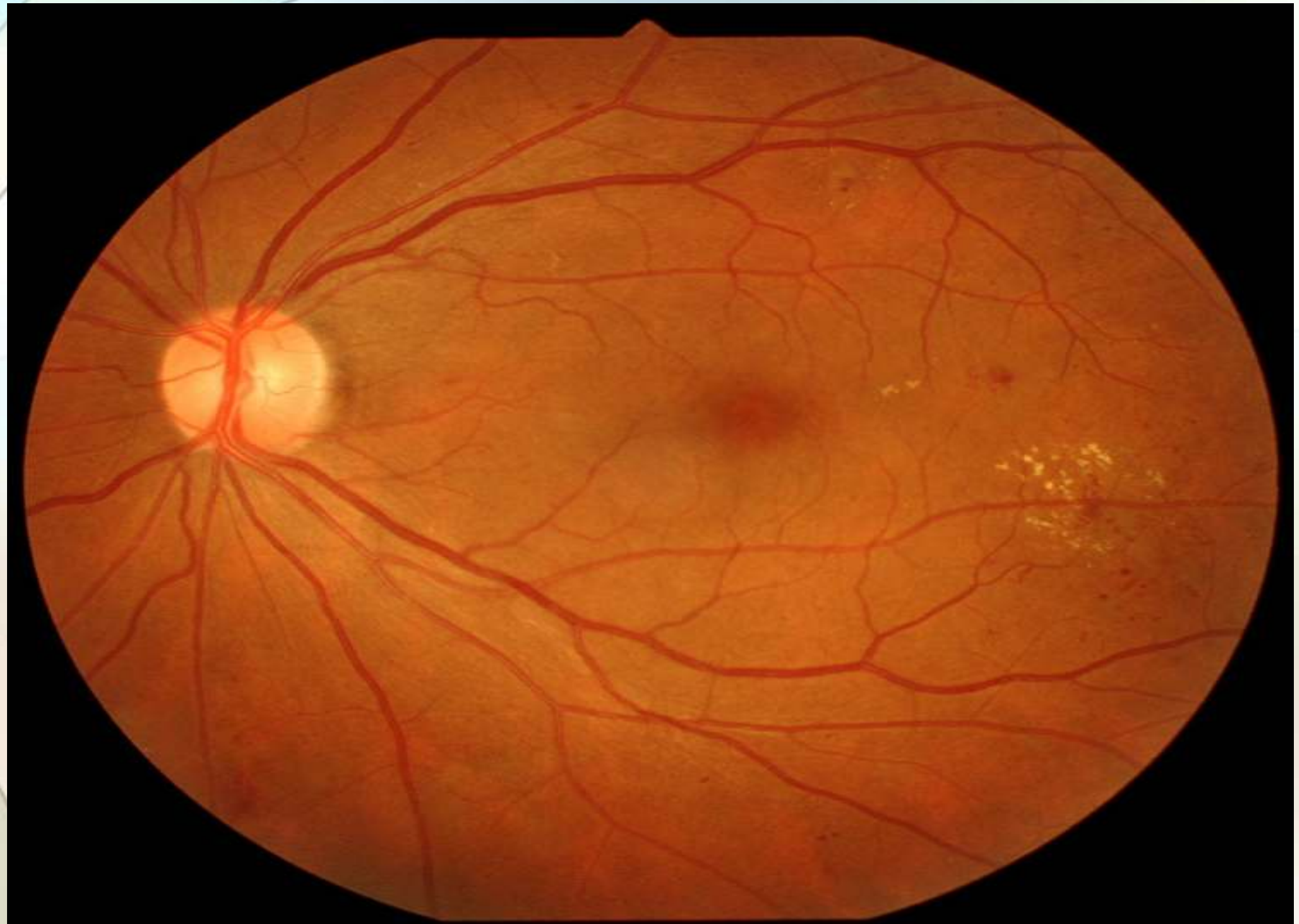
Case no.4: After treatment



Case no.5: Before treatment

Case no.5: After Treatment

Prophylactic



- TAKE HOME M.

We should expect a growth in the field of photobiomodulation and the sub threshould laser treatment applied to treat common retinal conditions such as age-related macular degeneration, retinopathy of prematurity, and diabetic retinopathy, as well as the many variants of retinitis pigmentosa and other retinal conditions.

- TAKE HOME M;

.Much more work will be needed in order to:

1) Better understand the underlying mechanisms of treatement of PBM and sub threshould laser treatment .
2) Establish treatment protocols for the various applications;
3) Identify the potential harms that may get during treatments

TAKE HOME M.

SMLT and, PBM would offer a non-invasive and inexpensive approach that is easy to deliver by medical providers, or even by patients themselves, to prevent or slow down the progress of retinal pathology.


thank
you