

TÜRK DÜNYASI MULTİPL SKLEROZ KONGRESİ
14-17 şubat 2019-Gülhane/ANKARA

MULTİPL SKLEROZDA
OPTİK KOHERANS TOMOGRAFİ (OKT) ve
OKT-ANJİOGRAFİ (OKT-A)

PROF.DR. FETHİ İDİMAN
DEÜTF Nöroloji Anabilim Dalı Emekli Öğretim Üyesi

6TH INTERNATIONAL CONGRESS ON OCT ANGIOGRAPHY AND ADVANCES IN OCT



Rome

December 14 and 15, 2018
Ergife Palace Hotel
Via Aurelia, 619

Preliminary Program May 29, 2018

FRIDAY DECEMBER 14

COURSES

8.00 - 8.45		12.00 - 12.45	
HALL A	HALL B	HALL A	HALL B
OPTOVUE	HEIDELBERG	ZEISS	NIDEK

RETINA: AMD AND MACULOPATHIES

SESSION AMD 1

Chairs: Daniel Pauleikhof, David Sarraf, Srinivas Sadda, Nadia Waheed, Yves Cohen

Daniel Pauleikhof - Pigment epithelial detachment in exudative AMD

Nadia Waheed - Evolutionary changes in wet AMD

Marco Lupidi, Felice Cardillo-Piccolino, Gabriel Coscas, Carlo Cagini - Hemodynamic variations in choroidal neovascular lesions

Aude Ambresin - Influence of structural OCT characteristics in the detection of CNV due to AMD using OCT Angiography

Yusuf Durlu - OCT and OCT Angiography findings in asymptomatic patients with exudative age-related macular degeneration

Key Note Lecture

David Sarraf - RAP: advanced retinal imaging of Type 3 NV

SESSION EXUDATIVE AMD 2

Chairs: David Sarraf, Eric Souied

CLASSIFICATION OF ATROPHY AND NEOVASCULARIZATION IN AMD

Srinivas Sadda OR Frank Holz - OCT Classification of Atrophy in AMD

David Sarraf - OCTA classification of NV in AMD

Florence Coscas, Diogo Reis Cabral, Gabriel Coscas, Eric Souied - OCT Angiography biomarkers in n AMD

SESSION EXUDATIVE AMD 3

ADVANCED RETINAL IMAGING OF PED

Chairs: David Sarraf, Daniel Pauleikhof

Adrian Au - OCTA volumetric analysis of the progression of vascularized serous PED

David Sarraf - OCT and OCTA Evaluation of the mechanism of RPE tears associated with PED

Daniel Pauleikhoff - OCTA analysis to assess the response of PED to Anti VEGF therapy

SESSION EXUDATIVE CNV AMD 4

Chair: Rufino Silva

Rosa Dolz-Marco - Checklist of neurodegenerative changes in patients with AMD

Roberto Gallego-Pinazo - Relevance of the tomographic classification of CNV in patients with AMD

Miguel Raimundo - Sensitivity and specificity of a fully non-invasive approach (OCT+OCTA) for the diagnosis

Chairs: Alain Gaudric, David Sarraf

Campbell - What is the right segmentation to isolate the 4 retinal capillary layers?

Alain Gaudric - Normal vessel density in the macula, using projection artifact removal

Amir Kashani - Normal vessel density in the macula, using projection artifact removal

Richard Rosen - FAZ metrics or vessel density: what are the best parameters to measure capillary non perfusion?

TBC - Factors influencing retinal vessel density measurements

TBC - Macular vascular density, FAZ and Visual Acuity in diabetic retinopathy without macular edema

Salas Matthias - Role of AO OCTA in the assessment of retinal capillary anatomy

OPTIC NERVE, NEUROLOGY, GLAUCOMA

SESSION NEUROOPHTHALMOLOGY 1

Chairs: Albert Augustin, Richard Rosen

Albert Augustin - OCT angiography and *en face* OCT in neuroophthalmology, update.

Richard Rosen - The role of OCT A in the diagnosis and management of Optic Neuropathies

Umur Kayabasi - Arteritic vs. Non Arteritic anterior ischemic optic neuropathy: vascular analysis of the optic nerve head

Gilda Cennamo - Assessment of the peripapillary vascular network in hereditary Optic Neuropathies

Marco Lupidi - OCTA in the evaluation of optic neuritis during the course of Multiple Sclerosis

Dilraj Grewal - Retinal microvasculature and neurodegenerative changes among Alzheimer's Disease, Mild cognitive impairment, and controls

SESSION NEUROOPHTHALMOLOGY 2

ANGIO-OCT AND OCT IN NEURO-OPHTHALMIC DISEASES

Chairs: Y. Joyce Liao, Randy Kardon, Quan Dong Nguyen

Shannon Beres - TBC

Isabella Grumbach - TBC

Randy Kardon - TBC

Mark Kupersmith - TBC

Y. Joyce Liao - TBC

Heather Moss - TBC

Min Wang - TBC

SESSION NEUROOPHTHALMOLOGY 3

Chairs: Albert Augustin, Amar Ailem, Gilda Cennamo

Amar Ailem - Neuropathies optiques inflammatoires et OCT

Umur Kayabashi - Novel SD-OCT and OCT-A findings in Alzheimer's, Parkinson's and MS

Gilda Cennamo - OCTA detects retinal vascular alterations in different phases of Multiple Sclerosis

João Pedro Marques - Peripapillary and macular neurovascular coupling in dominant Optic Atrophy

SESSION: OCTA IN GLAUCOMA 1

Chairs: David Huang, Natalia I. Kuryshva, Richard Rosen, Gabor Hollo

David Huang - Simulating visual field with OCTA

David Huang - Localizing glaucoma damage with OCTA

Linda Zangwill - Utility of OCTA from early to late Glaucoma

Natalia I. Kuryshva - OCTA in the prediction of Glaucoma

Richard Rosen - Quantitative OCTA for glaucoma assessment

Gabor Hollo - Detecting Glaucoma progression with OCTA

Goji Tomita - Focal macular ERG and OCTA in early Glaucoma

SESSION: OCTA IN GLAUCOMA 2

Chairs: David Huang, Natalia I. Kuryshva, Saja Sefic Kasumovic

Sanja Sefic Kasumović, Aida Kasumović, Tarik Halimić, Nesina Avdagić - Assessment of perfused peripapillary capillaries and PCD maps in Glaucoma patients

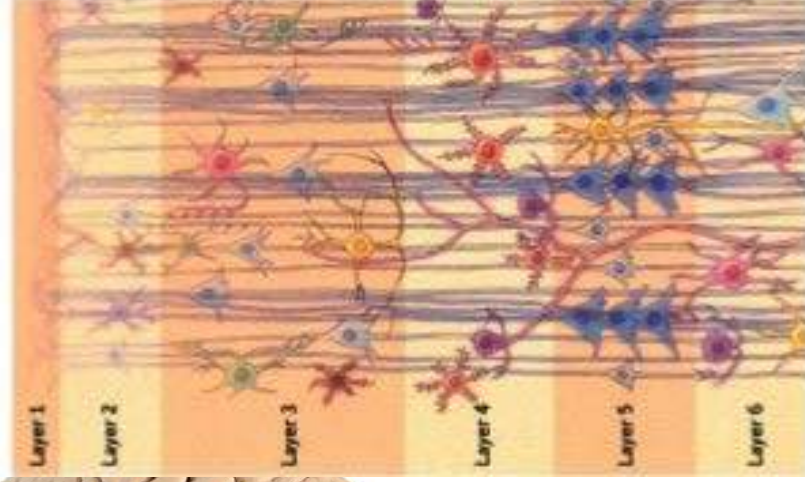
Umur Kayabashi - Detection of pre-perimetric POAG by OCT macular ganglion cell complex analysis and OCT-A of optic nerve fiber layer. A comparison of both methods

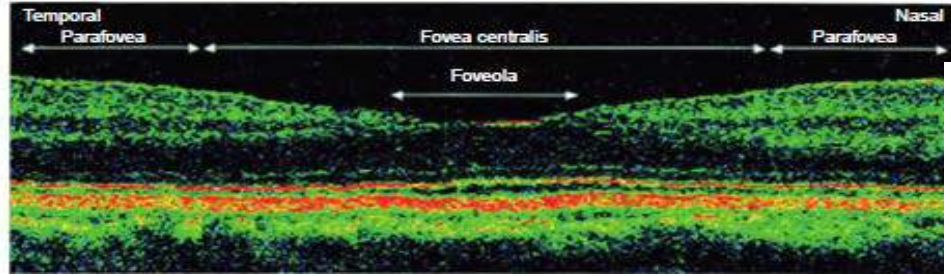
OPTİK KOHERANS TOMOGRAFİ “OKT”

OKT retinayı invivo kesitsel değerlendiren non-invaziv bir inceleme yöntemidir

Yöntem; nöro-retinanın farklı katmanlarının farklı içeriklerinden dolayı ışığı farklı kırma özelliğine dayanır.

Sonuçta retinanın histolojik katmanlarına benzer bir görüntü elde edilir.





İç limitan membran
Ganglion hücre tabakası
İç nükleer tabaka
Dış nükleer tabaka
Fotoreseptör tabaka
Retinal pigment epitelyum
Koriokapillaris
Koroid

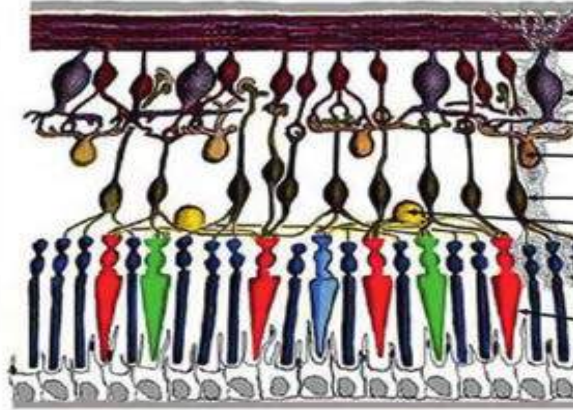
yüksek çözünürlüklü OKT

250 µm



İç limitan membran
Ganglion hücre tabakası
İç nükleer tabaka
Dış nükleer tabaka
Fotoreseptör tabaka
Retinal pigment epitelyum
Koroid

Nöroretina histolojik kesit



İç limitan membran
Sinir lifleri tabakası
Ganglion hücreleri
Amakrin hücreler(İç nükleer tabaka)
Bipolar hücreler (İç nükleer tabaka)
Horizontal hücreler(İç nükleer tabaka)
Müller hücreleri
Dış limitan membran
Konlar –
Rodlar
Retinal pigment epitelyum
Koriokapillaris

Nöroretina katmanlarının
şematik görünümü

Nörosensöriyel retinanın yapısı. Üstte yüksek çözünürlüklü OKT. Ortada histolojik kesit. Altta retina katmanlarının şematik görünümü Jaffe and Caprioli 2004 ve www.webvision.med.utah.edu'den

NÖRO-OFTALMOLOJİDE OKT HANGİ AMAÇLARLA KULLANILIYOR ?

- o ON'te aksonal kayıp ile nörodejenerasyonun değerlendirilmesinde,
- o MS-ON ile NMOSD-ON arasında ayırıcı tanısında
- o MS-ON ile NMOSD-ON patogenezezlerinin araştırılmasında
- o PMS ve RRMS ayırımında, hastalığın ağırlığı ve prognozunu (EDSS) değerlendirmede
- o Immunolojik parametrelerle klinik tip ve gidişlerinin ilişkilerini değerlendirmede (örn. NMO-IgG(+) ve (-) NMOSDli olgularla Anti MOG(+))ler)
- o İskemik optik nöropatilerin ayırıcı tanı ve prognozunun belirlenmesinde
- o Nörodejeneratif hastalıkların incelenme ve irdelenmesinde

- o Yapılan Meta-analizler (*Lancet Neurol* 2017) özetle

OKT'NİN TANI, MONİTORİZASYON VE ARAŞTIRMALARA DAHİL EDİLMESİ GEREKTİĞİNİ VURGULAMAKTA

Optical Coherence Tomograph Potentials for Detecting Visual in Patients with Neuromyelitis

Nam-Hee Kim^aHo Jin Kim^bCheol-Yong Park^cKyoung Sook Jeong^dJoong-Yang Cho^e^aDepartments of Neurology,^bOphthalmology, and ^cOccupational and Environmental Medicine, Dongguk University

Ilisan Hospital, Goyang, Korea

^dDepartment of Neurology, Research Institute and Hospital of National Cancer Center, Goyang, Korea^eDepartment of Neurology, Ilisan Paik Hospital, Inje University College of Medicine, Goyang, Korea

Background and Purpos tials (VEPs) can be used to c OCT and VEPs for detecting clear, and so we assessed the

Methods This cross-section itive NMOSD, and 101 eyes Disability Status Scale (EDSS) ness, and VEPs of the patient

Results OCT and VEPs w tively, and in 2% and 9% of of ON episodes: the OCT E eyes with first-ever ON epis tecting abnormalities in up t VEPs increased to 95% and ($p=0.06$), with the combinat RNFL thickness and VEP lat

Conclusions VEPs were better for detecting eyes with ical disability measures indi NMOSD.



High resolution retinal scanning reveals regional structural differences between MS and NMOSD optic neuritis regardless of antibody status

Marcel Bertsch-Gout^{a,*}, Richard Loeb^a, Ashley K. Finch^b, Adil Javed^a, Jacqueline Bernard^a^a Department of Neurology, University of Chicago Medical Center, Chicago, IL 60637, USA^b Gundersen Health System, LaCrosse, WI 54601, USA

ARTICLE INFO

Keywords:
Multiple sclerosis
Neuromyelitis optica

ABSTRACT

Background: There is a need for biomarkers that can classify optic neuritis (ON) attacks as belonging to either neuromyelitis optica spectrum disorder with optic neuritis (NMOSD-ON) or relapsing remitting multiple sclerosis with optic neuritis (MS-ON). This study uses spectral domain optical coherence tomography (SD-OCT) data to perform a preliminary contrast between NMOSD-ON and MS-ON by analyzing peripapillary retinal nerve fiber layer and intra-macular layer patterns of injury.

Methods: In this cross-sectional study, we used SD-OCT to obtain peripapillary retinal nerve fiber layer and intra-macular layer data for 26 NMOSD-ON, 25 MS-ON, and 26 healthy control (HC) age-matched eyes. Additionally, sub-comparisons compared 11 NMOSD-ON eyes that were seronegative for IgG antibodies against aquaporin 4 (NMOSD-ON (−)) and 16 NMOSD-ON eyes that were seropositive (NMOSD-ON (+)) to age-matched MS-ON eyes. Layer thicknesses were assessed using an automated algorithm and were then statistically compared using generalized estimating equations to account for inter-eye correlations.

Results: Selective thinning was found in the pRNFL, mRNFL, and GCL in NMOSD-ON compared to MS-ON. Thinning in the pRNFL nasal sector was found to persist in both NMOSD-ON (−) ($P = 0.017$) and NMOSD-ON (+) ($P = 0.021$) compared to MS-ON. Thinning in the mRNFL temporal sector was found to persist in NMOSD-ON (+) compared to MS-ON. Diffuse thinning was found in the pRNFL, mRNFL, GCL and IPL in NMOSD-ON compared to HC, and while diffuse thinning was also found in the GCL and IPL in MS-ON compared to HC, selective thinning was found in the pRNFL and mRNFL.

Conclusion: The nasal region of the pRNFL may be capable of distinguishing between NMOSD-ON and MS-ON regardless of antibody status. Additionally, NMOSD-ON may cause more profound nasal axonal and inferior arcuate neuronal degeneration compared to MS-ON.

The role of Optical Coherence Tomography in optic neuropathies

OPTİK NÖROPATİLERDE OKT'nin ROLÜ

Eugenia IR et al 2018

**MS'DE OKT OPTİK NÖRİTİ MAKÜLER HASTALIKTAN AYIRDIĞI
GİBİ TEDAVİ MONİTORİZASYONUNA YARDIMCI OLUR.**

neuritis and in monitoring the treatment. Multiple studies and clinical observations support the importance of optical coherence tomography in the diagnosis, treatment, and follow-up of optic neuropathies.



Contents lists available at ScienceDirect

Multiple Sclerosis and Related Disorders

journal homepage: www.elsevier.com/locate/msard



Case report

Unique characteristics of optical coherence tomography (OCT) results and visual acuity testing in myelin oligodendrocyte glycoprotein (MOG) antibody positive pediatric patients



Ram N. Narayan^{b,*}, Morgan McCreary^a, Darrel Conger^a, Cynthia Wang^a, Benjamin M. Greenberg^a

^a University of Texas Southwestern, Department of Neurology and Neurotherapeutics, United States

^b Department of Neurology, Barrow Neurological Institute, Phoenix, AZ 85013, United States

«MOG ANTİKOR SENDROMU» OPTİK NÖRİTİNDE OKT BULGULARI, KARAKTERİSTİKLERİ VE PROGNOZU ?

retinal segments. Within the lowest range of the RNFL (RNFL < 50 μ m) in most retinal segments, the MOG-ON cohort had a statistically significant greater visual acuity relative to the AQP4 cohort.

Conclusions: Patients with anti-MOG antibody mediated CNS disorders can suffer from subclinical ON events with significant reductions in RNFL. Despite equally significant damage to the optic nerve, MOG-Ab positive patients have relatively preserved visual acuity.

RESEARCH ARTICLE

Retinal Nerve Fiber Layer May Be Better Preserved in MOG-IgG versus AQP4-IgG Optic Neuritis: A Cohort Study

Hadas Stiebel-Kalish^{1,2*}, Itay Lotan^{1,3}, Judith Brody^{1,2}, Gabriel Chodick^{1,4}, Omer Bialer^{1,2}, Romain Marignier⁵, Michael Bach⁶, Mark Andrew Hellmann^{1,3}

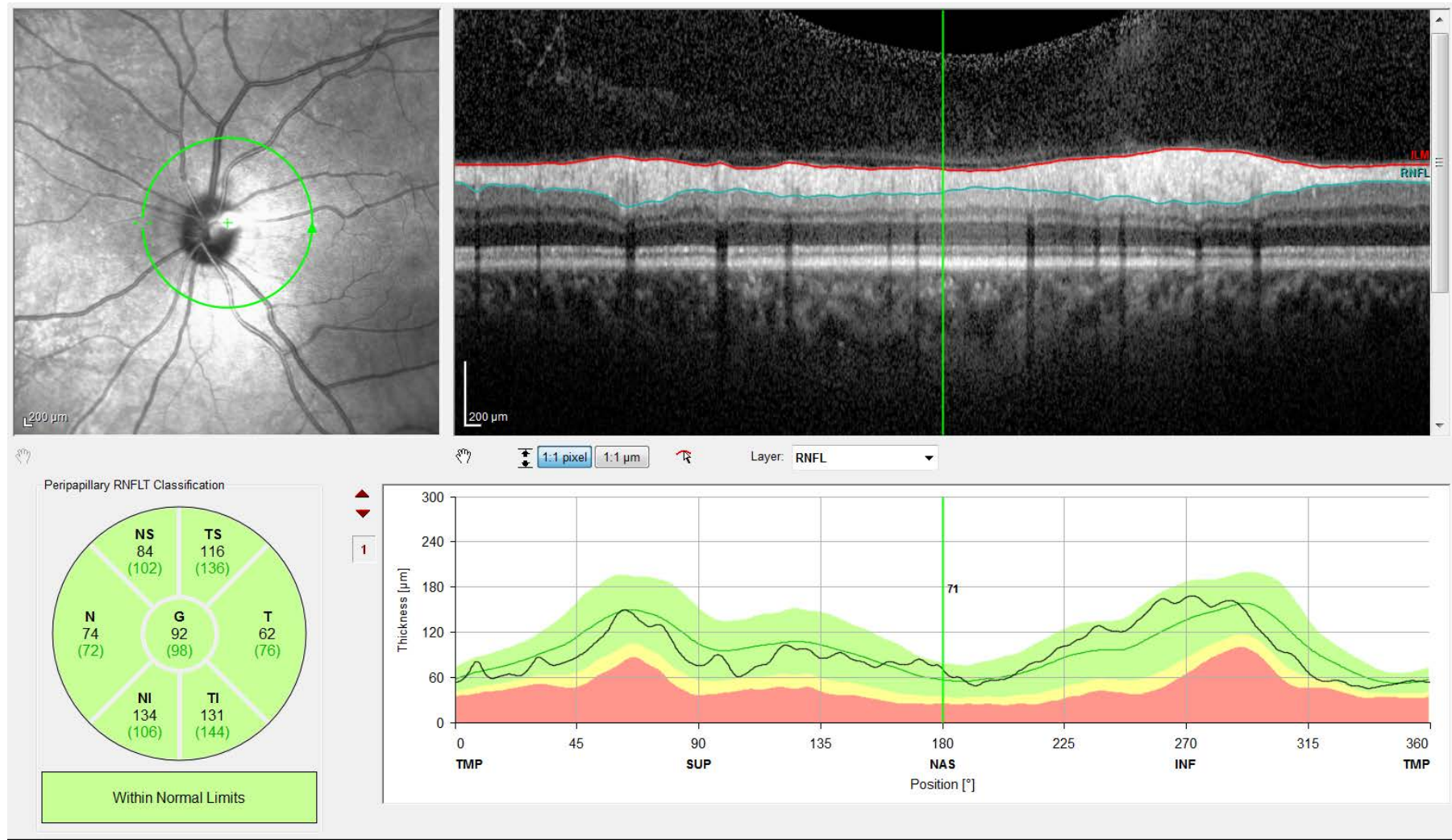
¹ Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel, ² Neuro-Ophthalmology Unit, Department

Retinal Nerve Fiber Layer May Be Better Preserved in MOG-IgG versus AQP4_IgG Optic Neuritis: A Cohort Study. *Stiebel-Kalish H, Lotan I, Brody J et al 2017*

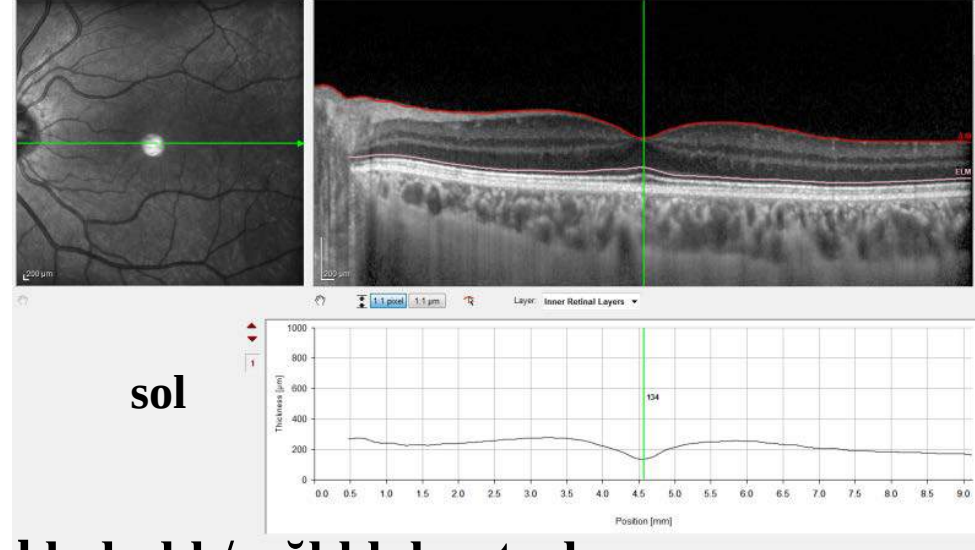
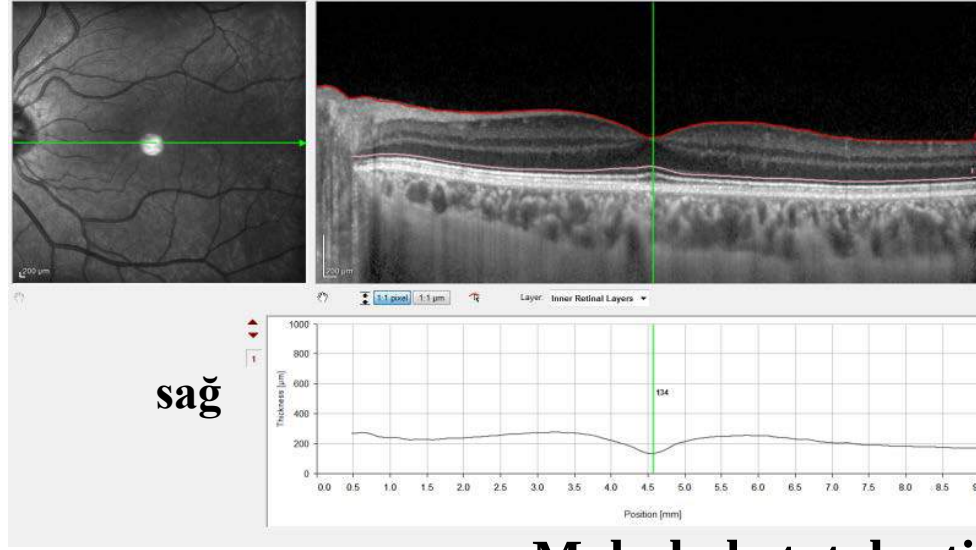
MOG-IgG (+) hastaların gözlerinde Retinal Sinir Lifi Tabakası «RSLT», AQP4_IgG (+) hastaların gözlerine göre daha iyi korunmuştur.

Competing Interests: Dr. Marignier serves on the scientific advisory board for MedImmune and has received honoraria from Biogen Idec, MerckSerono, Novartis, and Sanofi-Genzyme. This

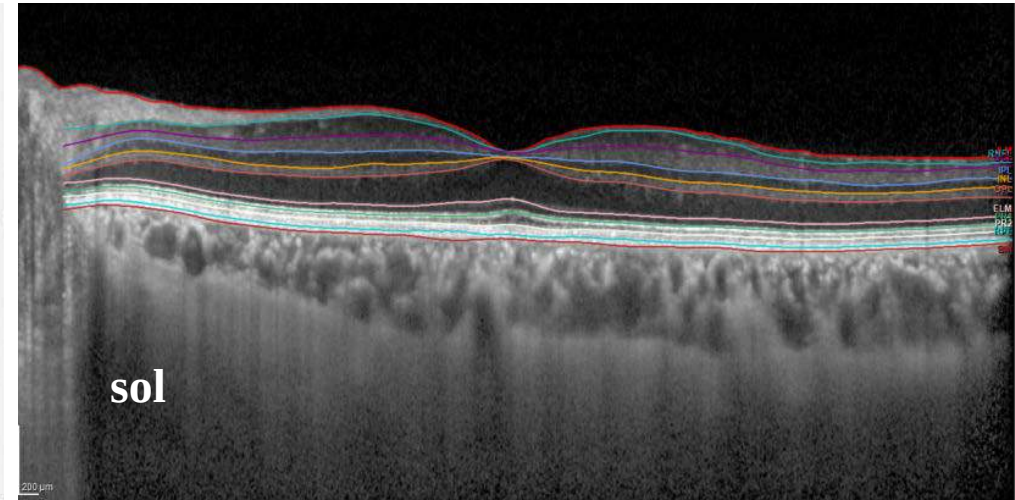
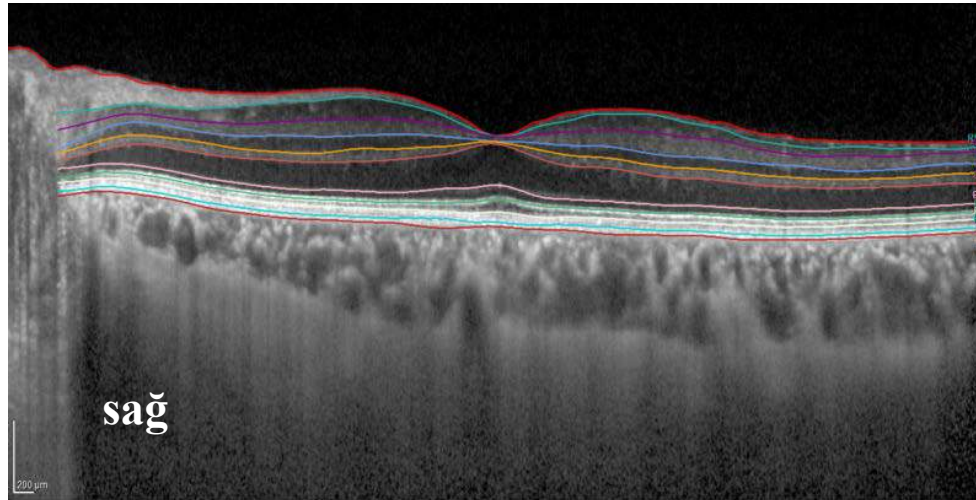
Sixteen patients were analyzed; ten AQP4-IgG-positive and six MOG-IgG-positive. The six patients with MOG-IgG had ten ON events with disc edema, five of which were bilateral. In the AQP4-IgG-positive ON events, 1/10 patients had disc edema. Final average RNFL was



“Normal kontrol”de peripapiller RSLT/pRSLT



Makulada total retinal kalınlık/sağlıklı kontrol



Makuler segmentasyon/ sağlıklı kontrol

AÖ 30 y E

Yakınmaları ve öyküsü:

Sağ gözde bulanık görme

α 1 hafta önce baş ve boyun ağrısı

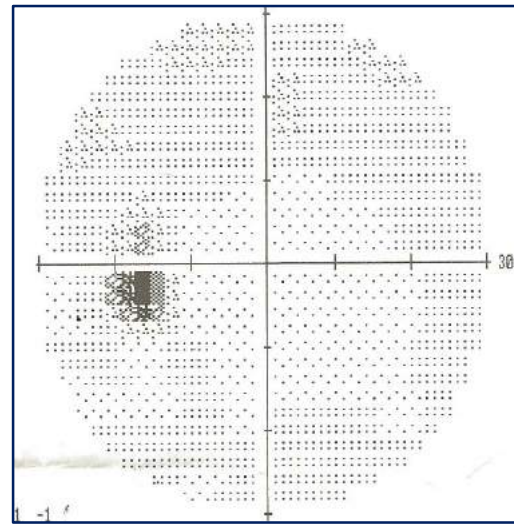
Ertesi sabah sağ gözde görme kaybı(α % 60↓)

MS ön tanısı ile incelemeler:

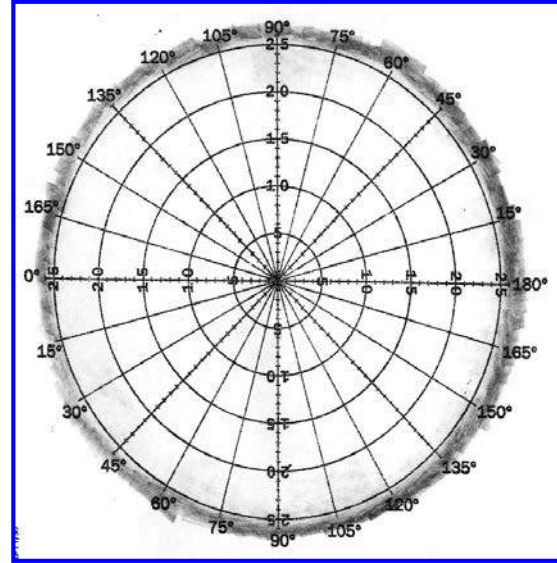
GK: Ğ 0.5/0.1 RG:19/21

L tam RG:20/21

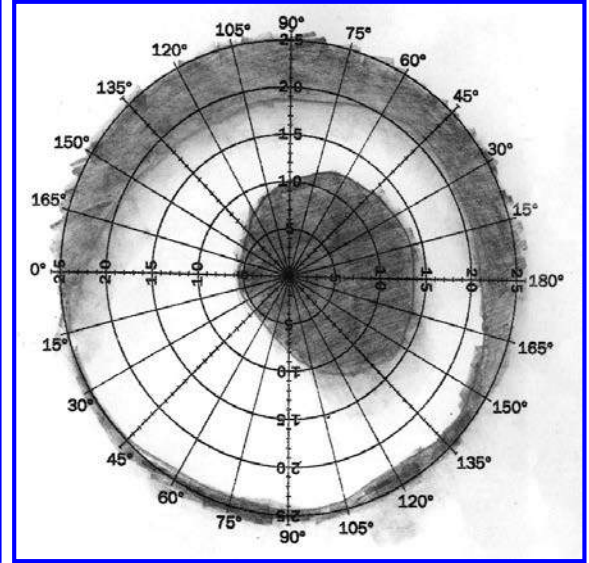
GA: **sağda santral skotoma**

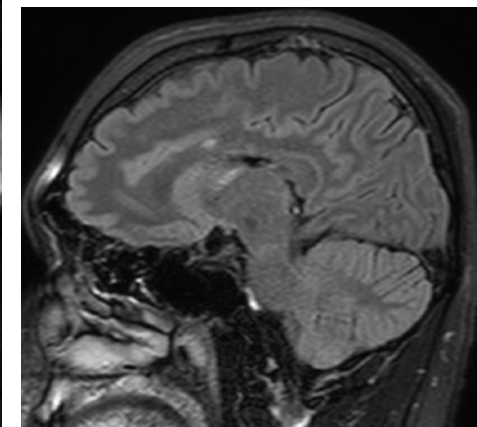
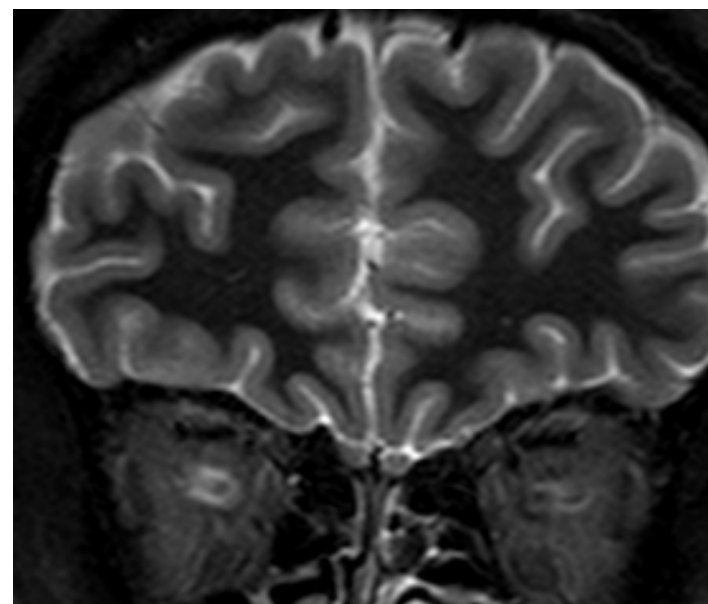
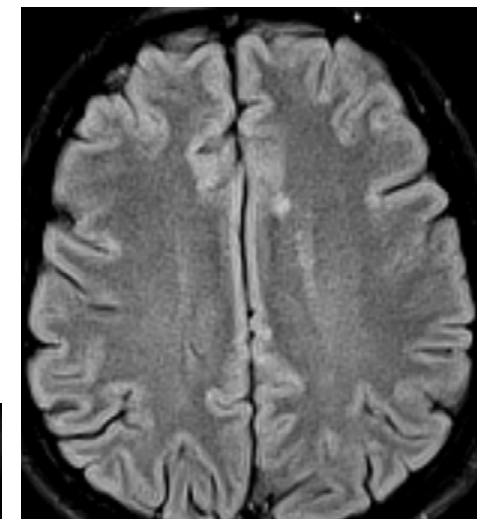
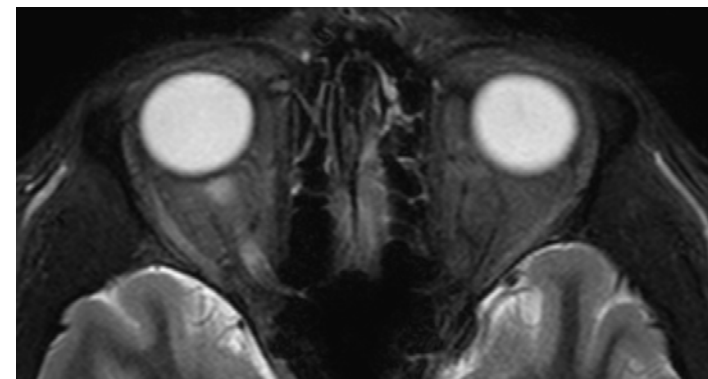
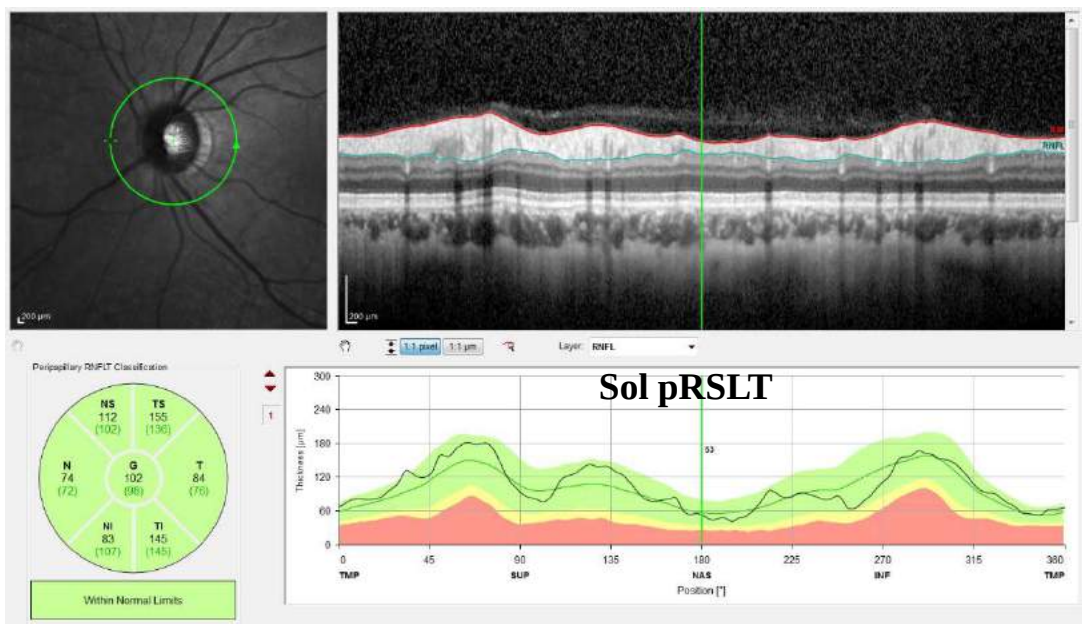
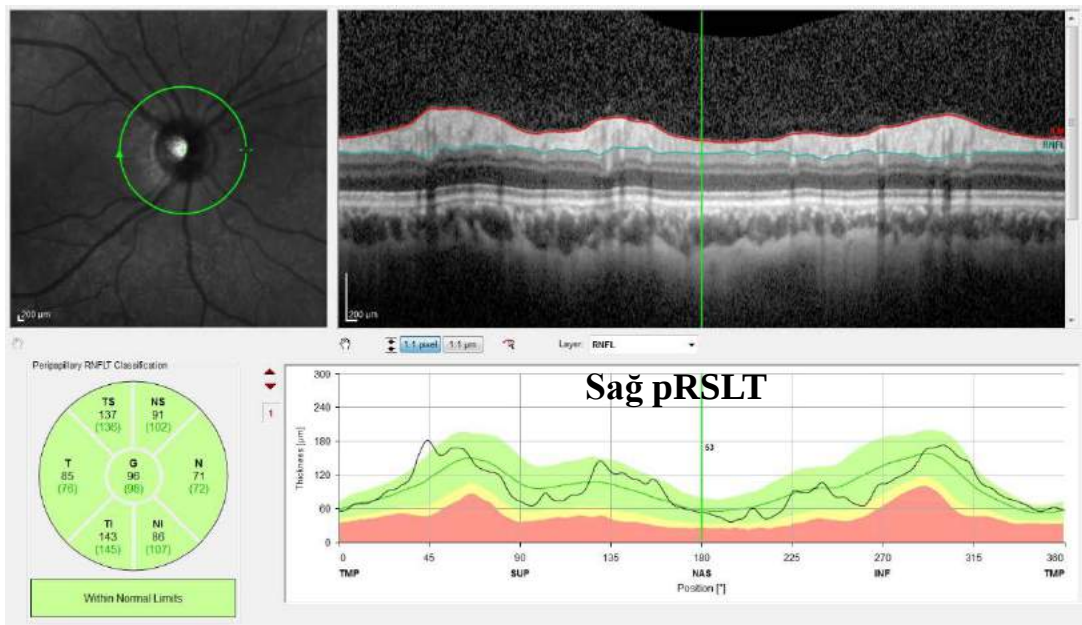


GA: sağda santral skotoma/otomatik perimetri



GA/ sağda santral skotoma ve periferik daralma
tangent screen/kampimetri





Sağda optik sinir etkilenmesi-MSON

HA 19 y E

1 haftadır sol gözde ağırlı görme kaybı

GK: Ğ:tam- RG:21/21 L:1 m PS RG:0/21

GA: solda çizilemiyor

Pupillalar: Solda RAPD(+)

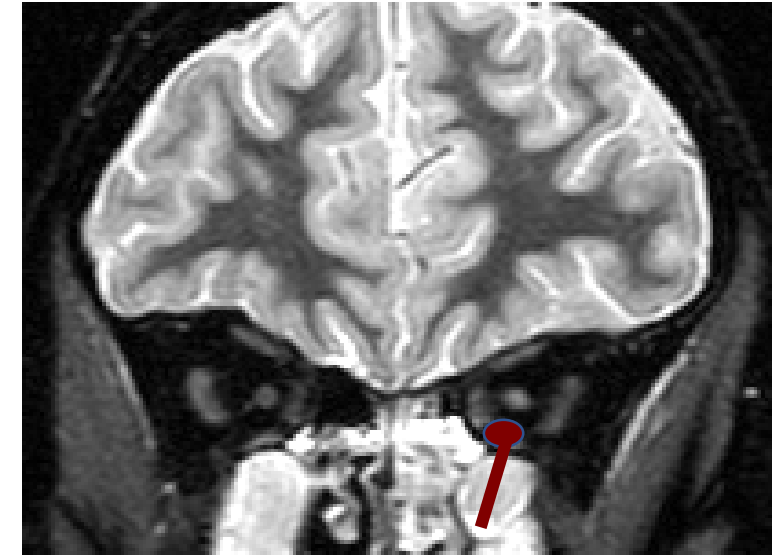
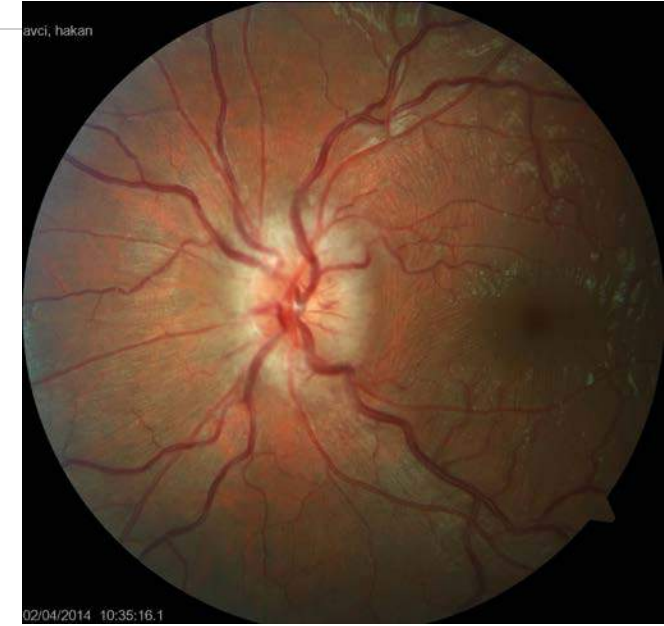
Göz Dibi: solda papilla/optik disk ödemi

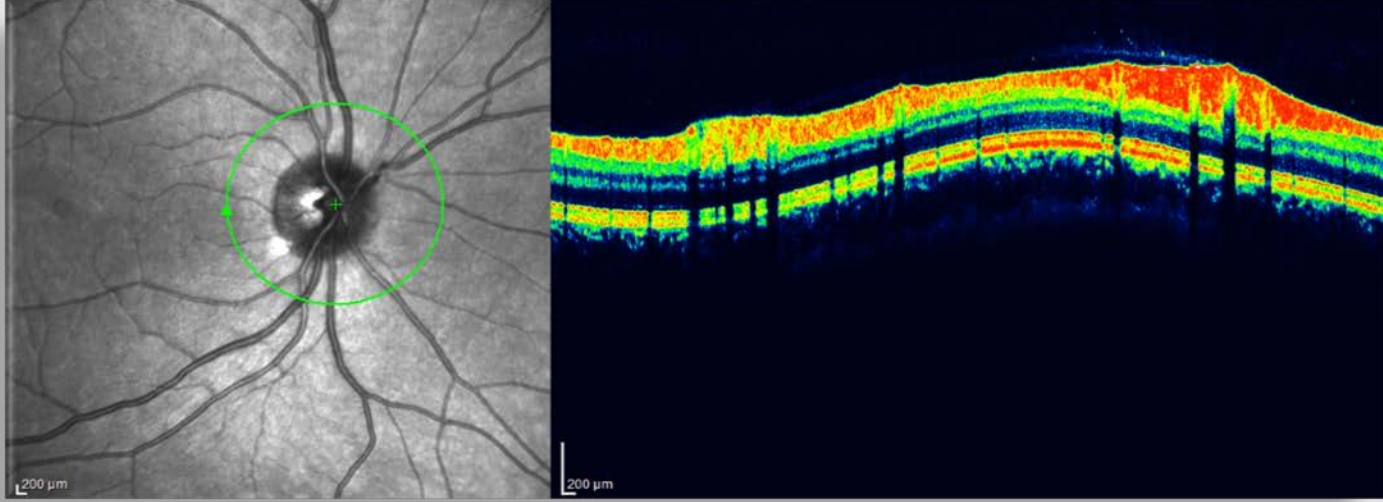
SOL OPTİK NEVRİT/anterior/akut dönem

GUP: bilateral solda ağır görsel ileti defekti

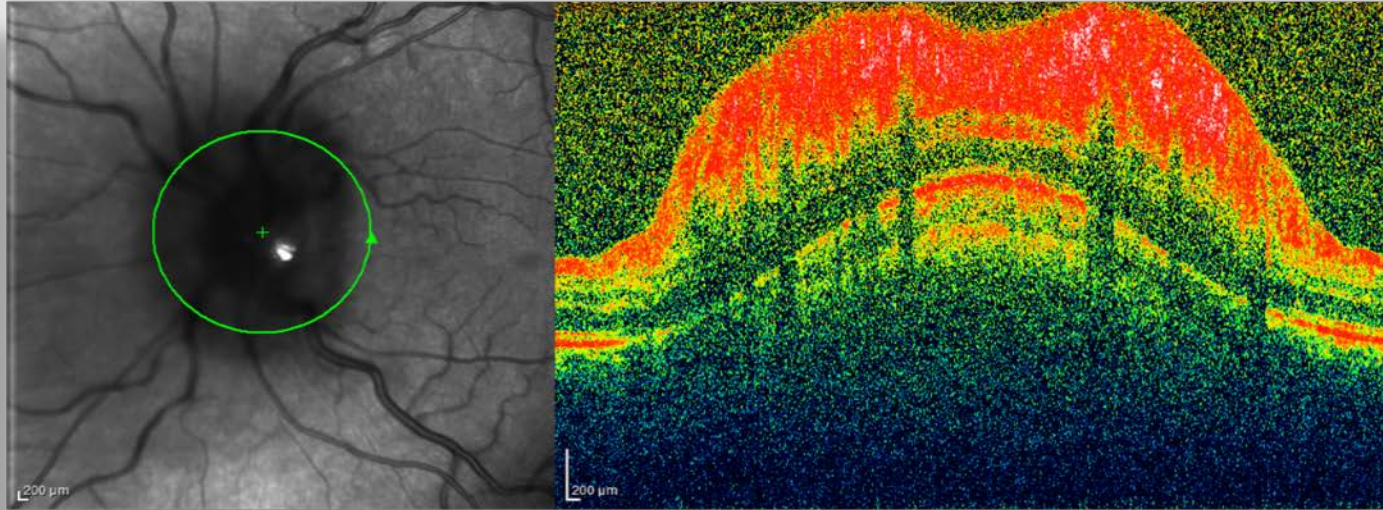
SUP: bilateral duysal ileti defekti

MRG: T2 hiperintens tümefaktif lezyonlar





SAĞ



SOL

Sol optik nevrit akut dönem OKT (RSLT kalınlık artışı)

GM 22y E

YAKINMALARI VE ÖYKÜSÜ

Sol Gözde görme yitimi

3 gün önce, sol göz de bulanık görme.

1gün sonra tam görme yitimi

Göz hekimi Nöroloji'ye yönlendirmiş.

NÖROOFTALMOLOJİK BAKI

GK : Ğ tam L 50 cm'den PS

Renkli Görme Ğ 21/21 L 0/21

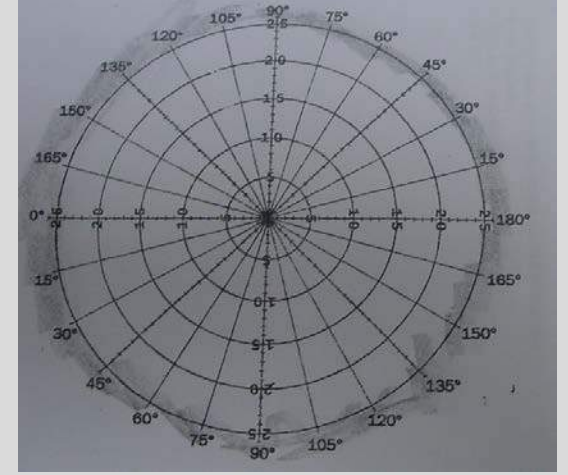
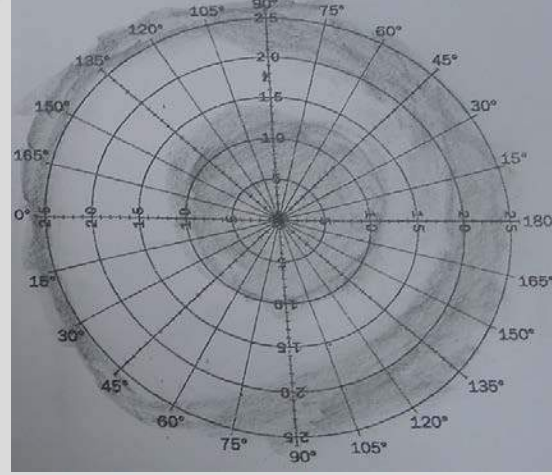
Görme Alanı : Santral skotom

Pupillalar : Anizokori /L RAPD (+)

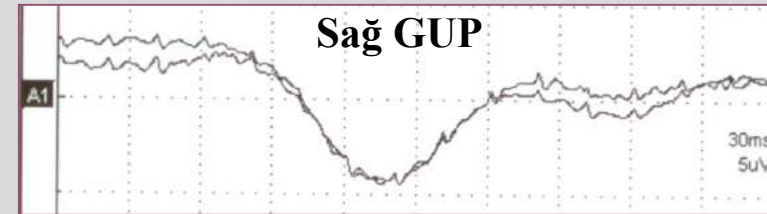
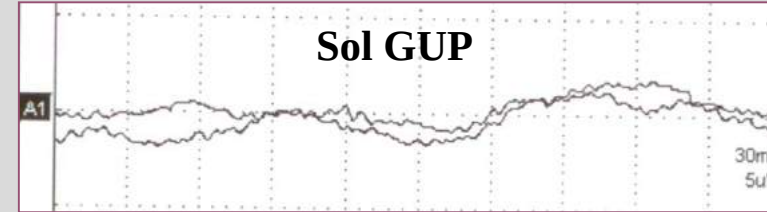
Göz Dibi: Fizyolojik

YORUM

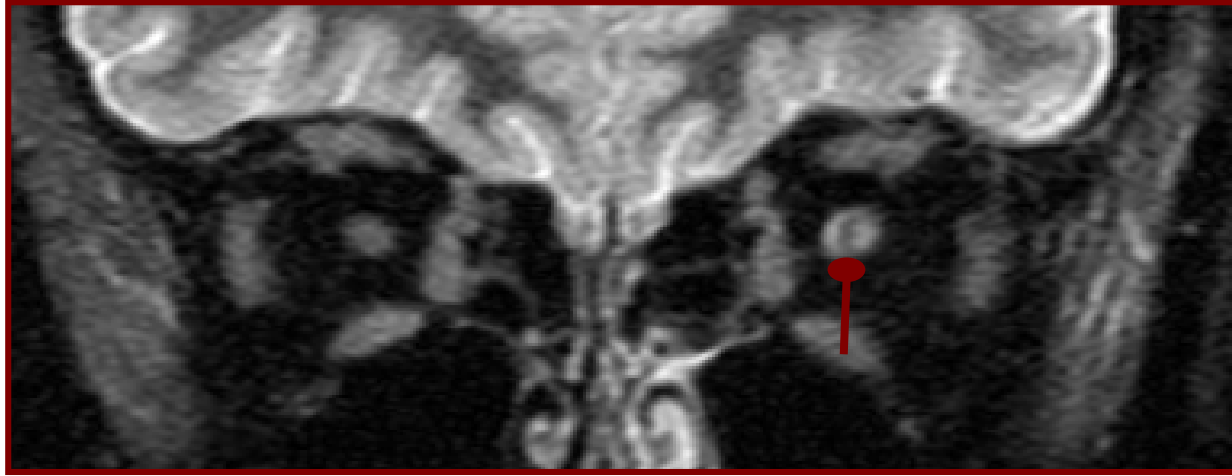
Solda posterior optik nörit (PON).



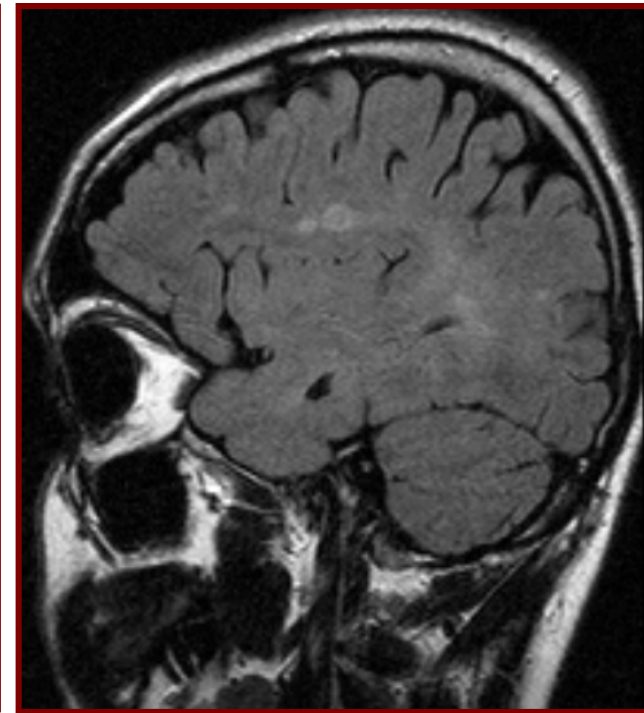
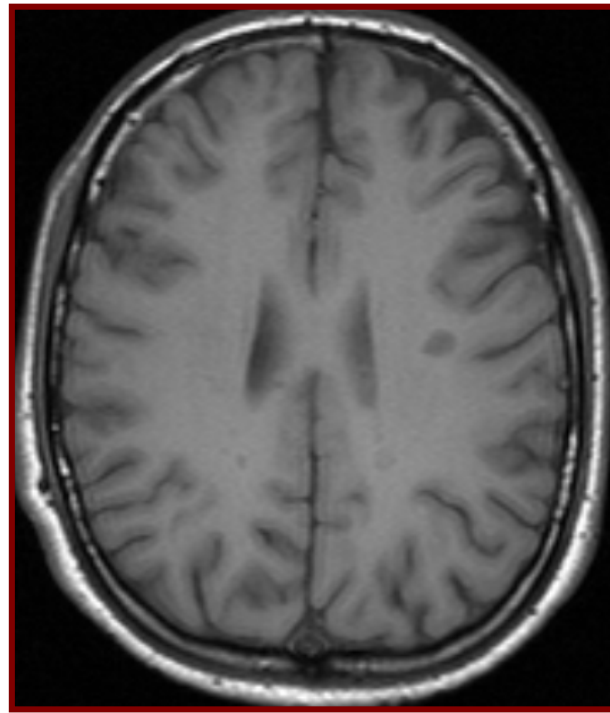
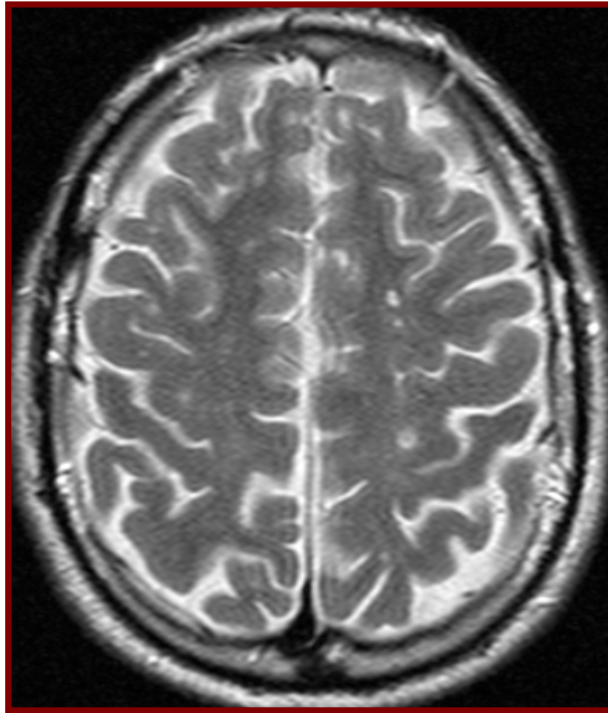
Görme Alanı : solda santral skotom



GUP- solda uzun latanslı, küçük amplitüdlü P100 dalgası



Sol Optik Nörit



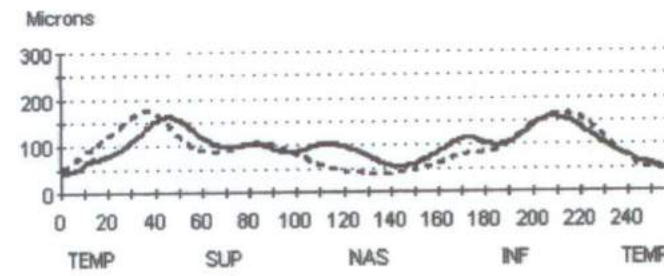
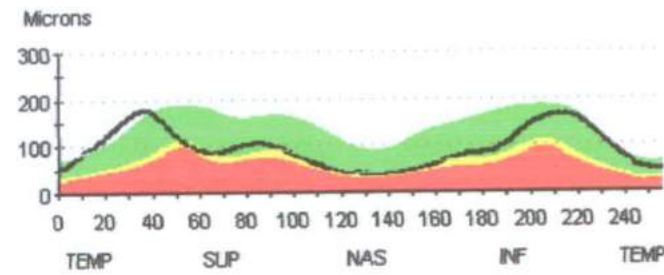
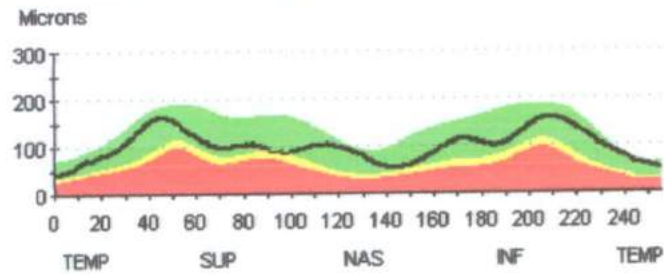
mekikler, gorkem

DOB: 7/5/1985, ID: 318269, Male

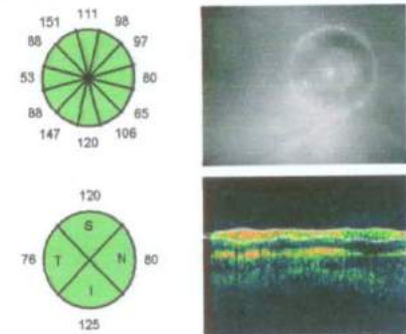
Scan Type: Fast RNFL Thickness (3.4)

Scan Date: 7/5/2007

Scan Length: 10.87 mm



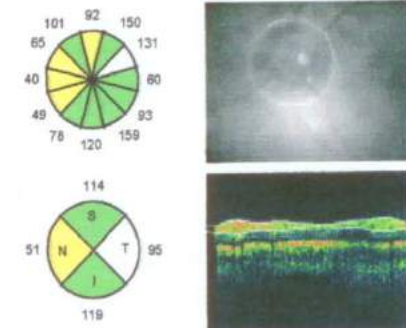
— OD - - - - OS



Signal Strength (Max 10)

4

Missing Data



Signal Strength (Max 10)

4

Missing Data

	OD (N=3)	OS (N=3)	OD-OS
	100	100	0.05

OKT/pRSLT
(GM 22 y E)
MS-ON

ID : 160924

Ethnicity :

Technician :

Gender : Female

Fixation : OD(R) Disc / OS(L) Disc

Name:serap ozlen

DOB : 25/12/1972

Age : 41

Scan : 3D(6.0 x 6.0mm - 512 x 128)

OD(R)

Image Quality : 78 Analysis mode : Fine
Capture Date : 22/04/2014

Analysis mode : Fine Image Quality : 88
Capture Date : 22/04/2014

OS(L)

Significance Map

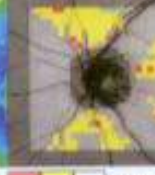
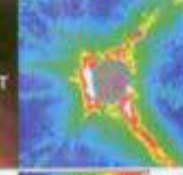
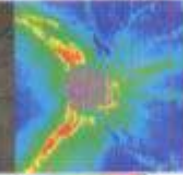
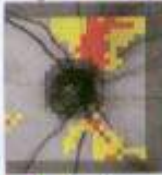
Thickness Map RNFL

Color photo

Color photo

Thickness Map RNFL

Significance Map



1 5 (%)

0 100 200µm

0 100 200µm

0 100 200µm

0 100 200µm

1 5 (%)

RNFL Circular Tomogram

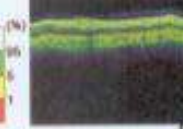
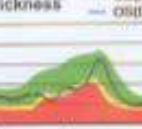
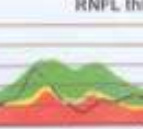
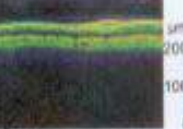
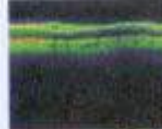
RNFL Circular Tomogram

RNFL Circular Tomogram

RNFL Circular Tomogram

RNFL Circular Tomogram

RNFL Circular Tomogram



Red-free

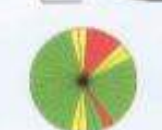
Red-free

Red-free

Red-free

Red-free

Red-free



122 62 48

68 59 68

57 65 70

85 57 68

73 71 111

66 44 60

52 52 136

96 69

100

101

77 90 135

77 90 135

Disc Topography

Disc Topography

Disc Topography

Disc Topography

Disc Topography

Disc Topography

1.95 Disc Area (mm²)

1.56 Disc Area (mm²)

1.95 Disc Area (mm²)

1.56 Disc Area (mm²)

1.95 Disc Area (mm²)

1.56 Disc Area (mm²)

0.19 Cup Area (mm²)

0.10 Cup Area (mm²)

0.19 Cup Area (mm²)

0.10 Cup Area (mm²)

0.19 Cup Area (mm²)

0.10 Cup Area (mm²)

1.76 Rim Area (mm²)

1.47 Rim Area (mm²)

1.76 Rim Area (mm²)

1.47 Rim Area (mm²)

1.76 Rim Area (mm²)

1.47 Rim Area (mm²)

0.10 C/D Area Ratio

0.06 C/D Area Ratio

0.10 C/D Area Ratio

0.06 C/D Area Ratio

0.10 C/D Area Ratio

0.06 C/D Area Ratio

0.31 Linear CDR

0.25 Linear CDR

0.31 Linear CDR

0.25 Linear CDR

0.31 Linear CDR

0.25 Linear CDR

0.29 Vertical CDR

0.22 Vertical CDR

0.29 Vertical CDR

0.22 Vertical CDR

0.29 Vertical CDR

0.22 Vertical CDR

0.02 Cup Volume (mm³)

0.01 Cup Volume (mm³)

0.02 Cup Volume (mm³)

0.01 Cup Volume (mm³)

0.02 Cup Volume (mm³)

0.01 Cup Volume (mm³)

0.12 Rim Volume (mm³)

0.10 Rim Volume (mm³)

0.12 Rim Volume (mm³)

0.10 Rim Volume (mm³)

0.12 Rim Volume (mm³)

0.10 Rim Volume (mm³)

1.51 Horizontal D.D. (mm)

1.31 Horizontal D.D. (mm)

1.51 Horizontal D.D. (mm)

1.31 Horizontal D.D. (mm)

1.51 Horizontal D.D. (mm)

1.31 Horizontal D.D. (mm)

1.64 Vertical D.D. (mm)

1.55 Vertical D.D. (mm)

1.64 Vertical D.D. (mm)

1.55 Vertical D.D. (mm)

1.64 Vertical D.D. (mm)

1.55 Vertical D.D. (mm)

R/D Ratio

R/D Ratio

R/D Ratio

R/D Ratio

R/D Ratio

R/D Ratio

Can not calculate

Can not calculate

Can not calculate

Can not calculate

Can not calculate

Can not calculate

Disc margin

Cup margin

Disc margin

Cup margin

Disc margin

Cup margin

Horizontal Tomogram

Horizontal Tomogram

Horizontal Tomogram

Horizontal Tomogram

Horizontal Tomogram

Horizontal Tomogram

Disc margin

Cup margin

Disc margin

Cup margin

Disc margin

Cup margin

Disc margin

Cup margin

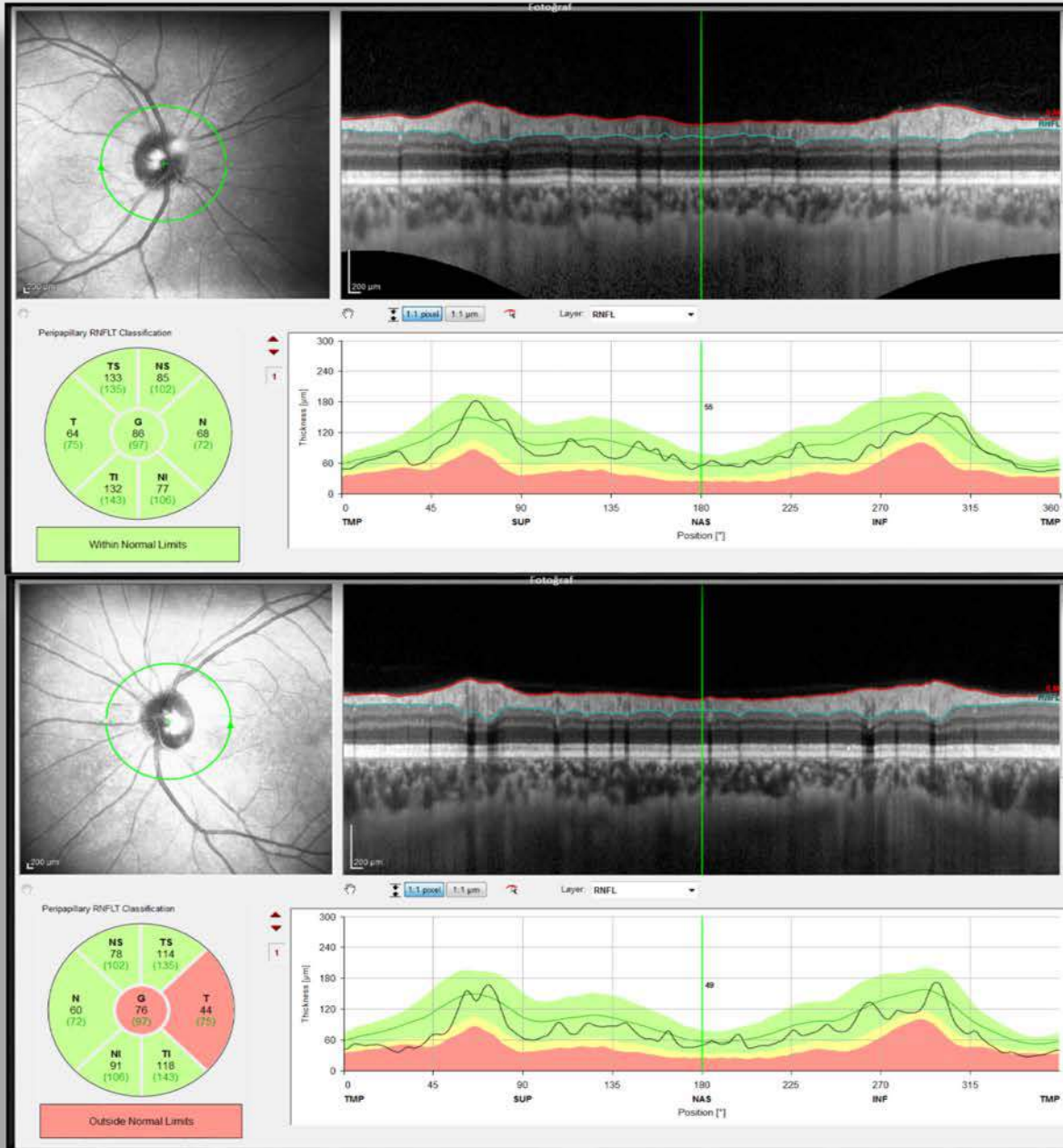
Disc margin

Cup margin

Disc margin

Cup margin

MSON-kronik dönem

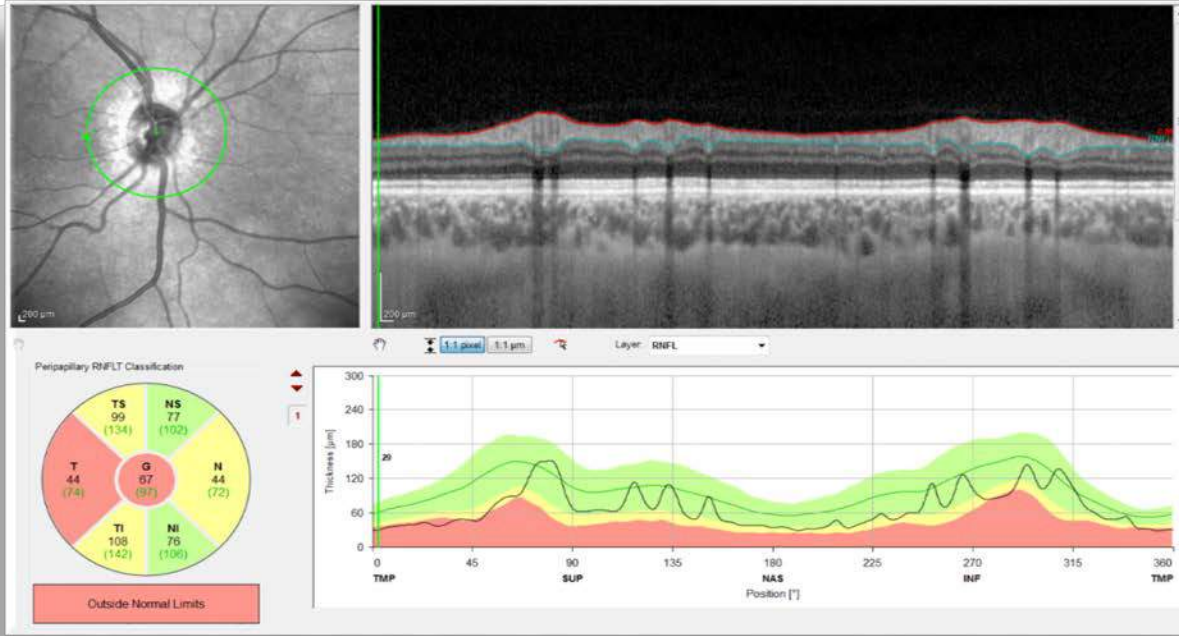


R göz

37 y K MS (12 yıllık RRMS)
Sol MS-ON (kronik dönem)

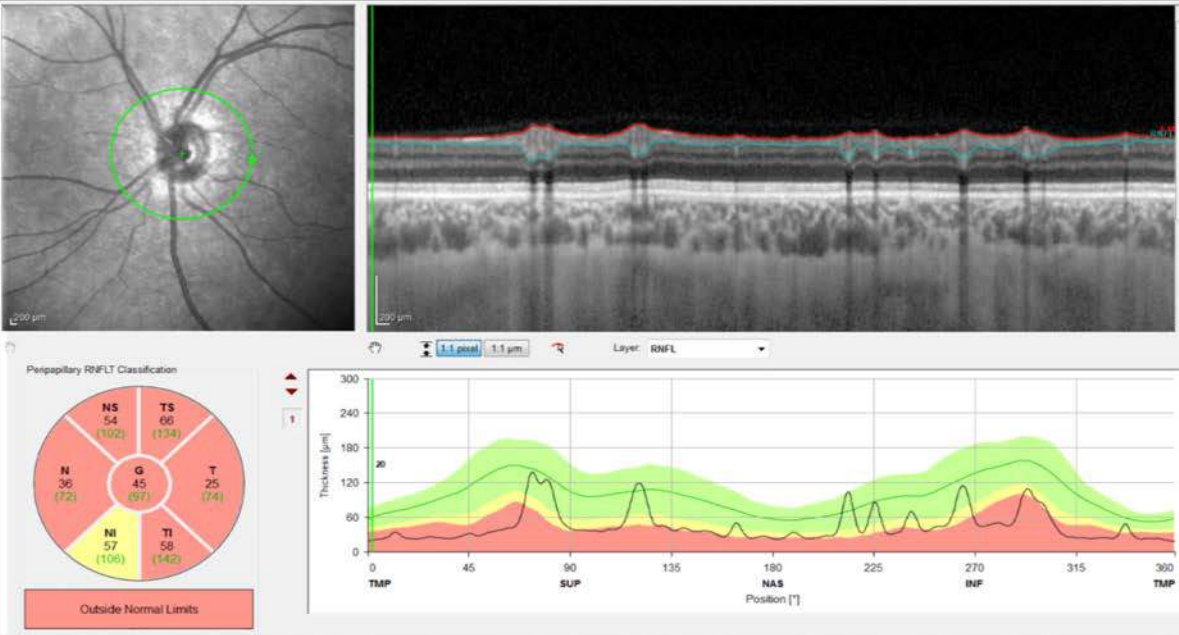
L göz

pRSLT: sol temporalde incelleme



sağ

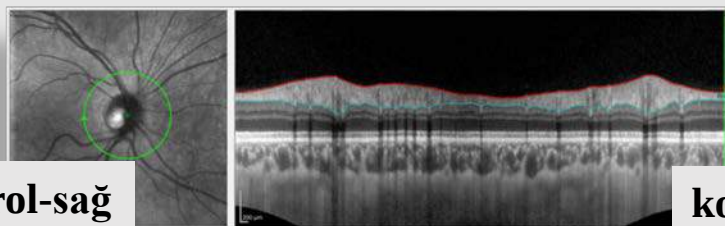
ED 32 y E NMO (3 yıl)
Bilateral NMO-ON
(kronik dönem)



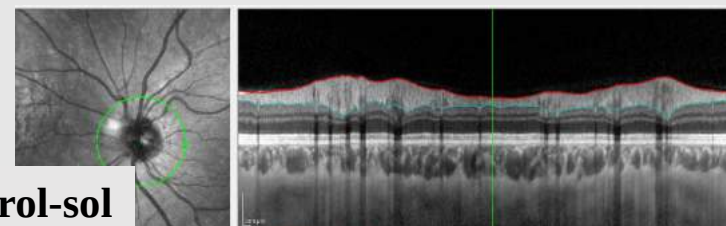
sol

Bilateral, solda daha ağır
pRSLT incelmesi

kontrol-sağ



kontrol-sol



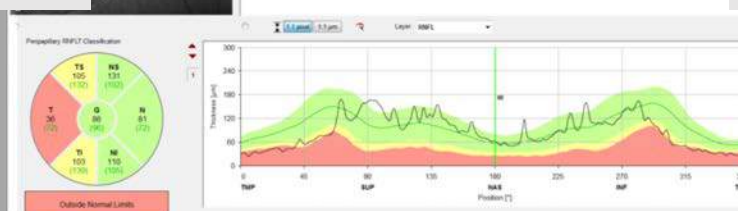
NMO-sağ



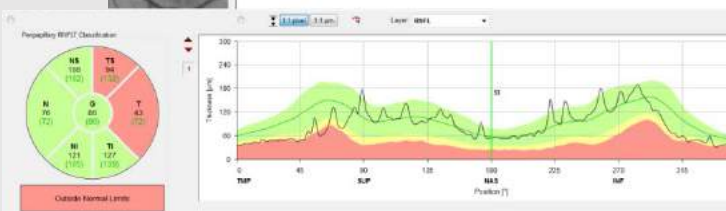
NMO-sol



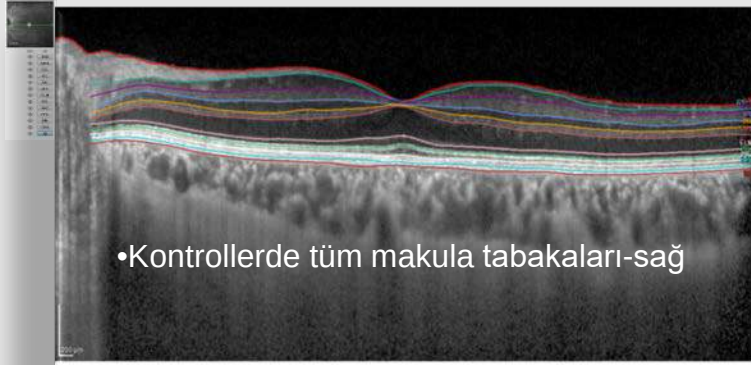
MS-sağ



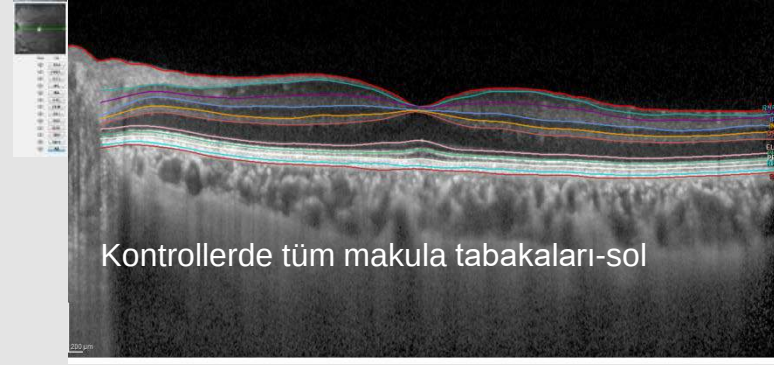
MS-sol



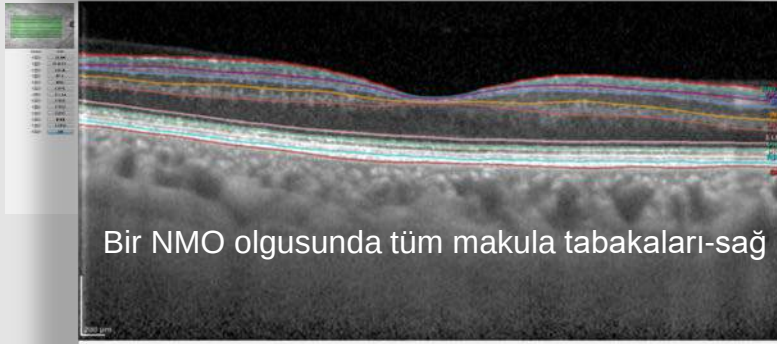
Peripapiller RSLT/pRSLT



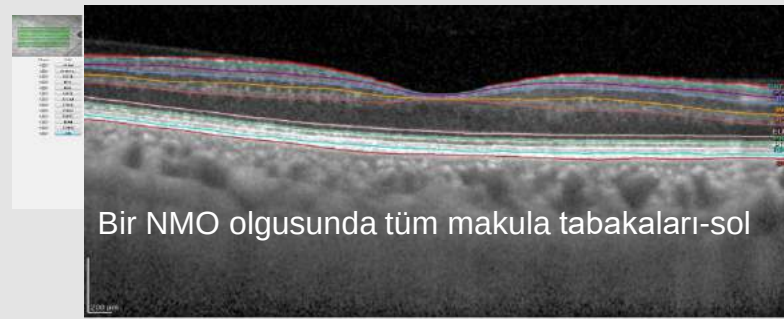
•Kontrollerde tüm makula tabakaları-sağ



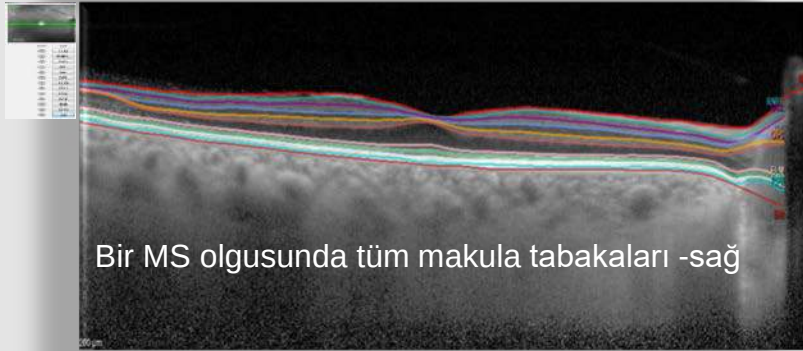
Kontrollerde tüm makula tabakaları-sol



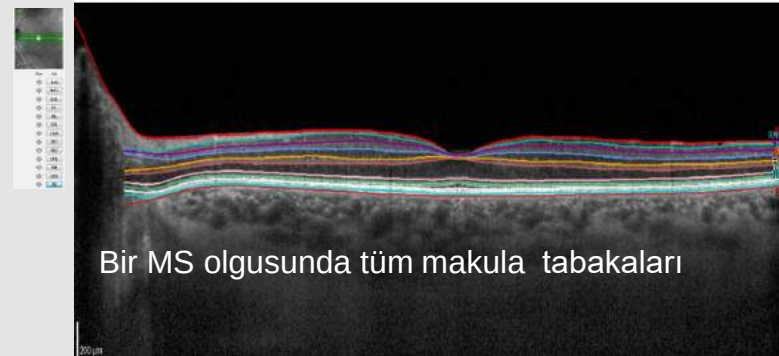
Bir NMO olgusunda tüm makula tabakaları-sağ



Bir NMO olgusunda tüm makula tabakaları-sol

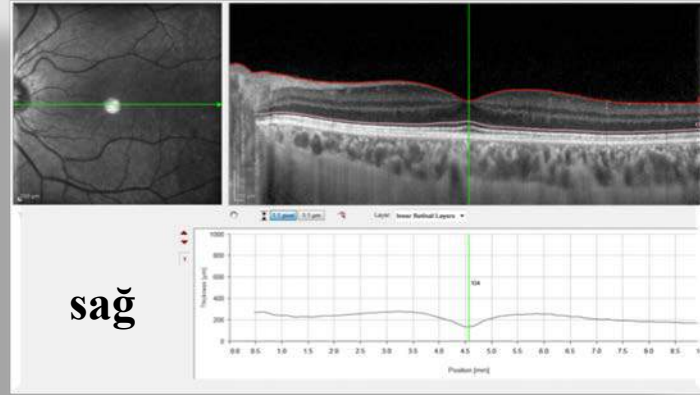


Bir MS olgusunda tüm makula tabakaları -sağ



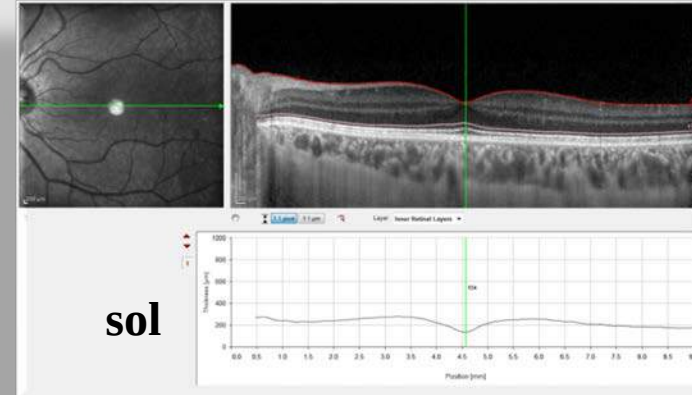
Bir MS olgusunda tüm makula tabakaları

Makulada retinal tabakaların segmentasyonu

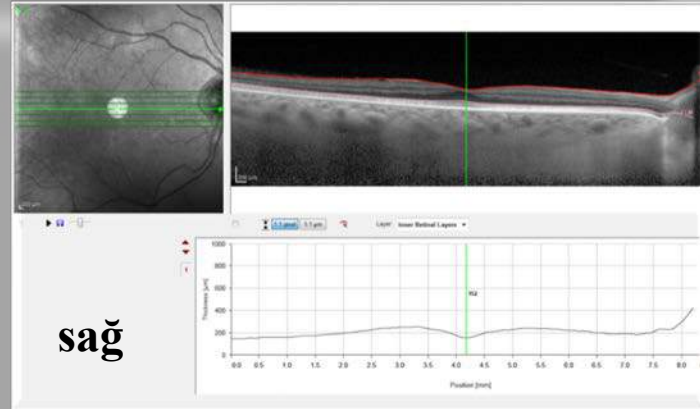


sağ

kontrol

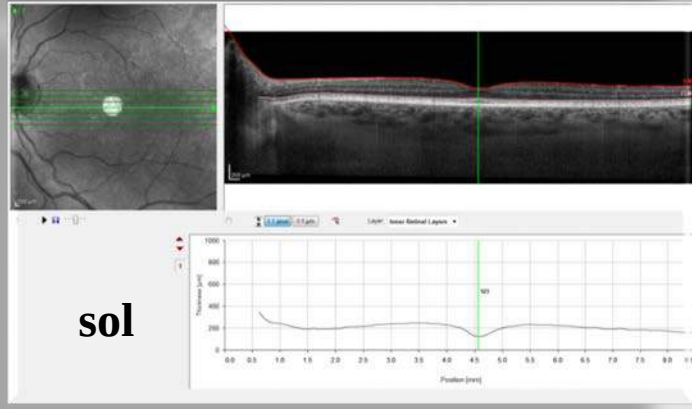


sol

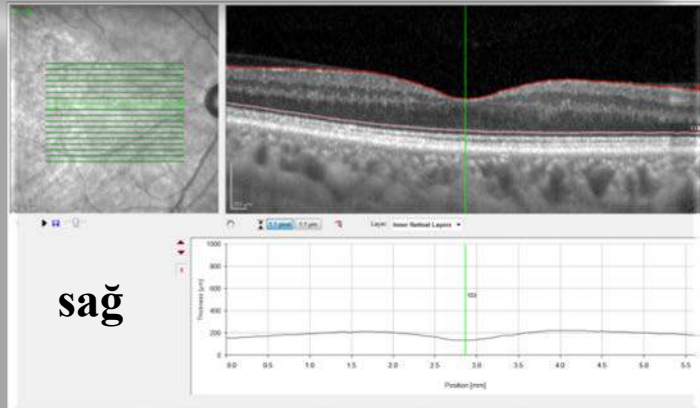


sağ

NMO

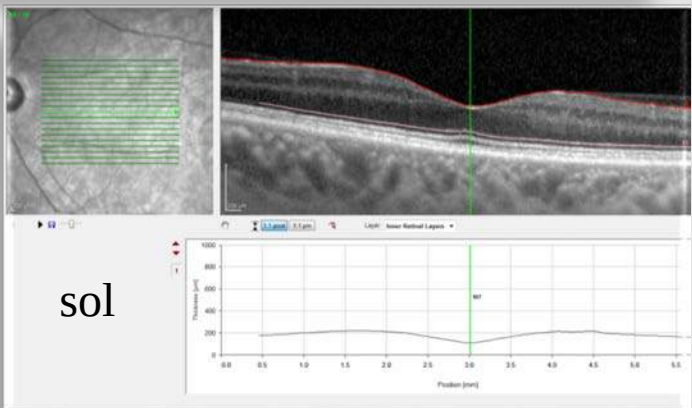


sol



sağ

MS



sol

mRSLT segmentasyon: MS'de normal, NMO'da ağır iç retinal tabakalarda incelme

Temmuz 2015

Ağustos 2016

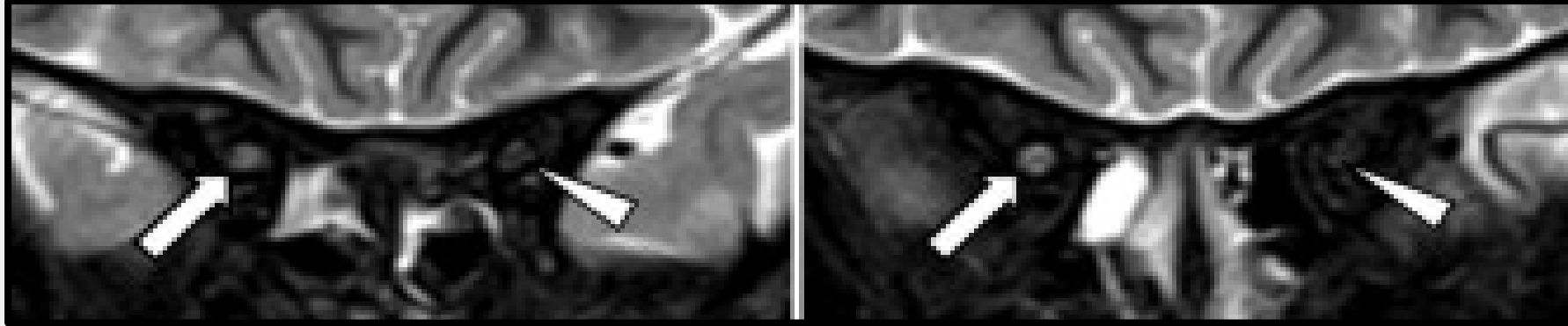
ARALIK 2016

Eylül 2017

Aralık 2017

24 Ocak 2018

Yineleyen sağ optik nöritli bir olguda sol gözde yakınma ve/ya da tutuluş bulgusu olmaksızın, aylar hatta yıllar öncesinde Sloan Letter KD testi ve OKT ile sol optik sinirin de etkilendiğinin belirlenmesi...



NMO-IgG antikor:Negatif
Anti-MOG: 1/100 (++)
Tanı:RON-Anti-MOG Send.
AZA önerildi!!!16 mg/g Pred

10 gün 1 g/gün
IVMP Kısmi Düzelme
Gebelik İsteği ile ART uygulaması
Ovum dondurma işlemi
AZA 150 mg/gün başlandı

atrofisi
kta

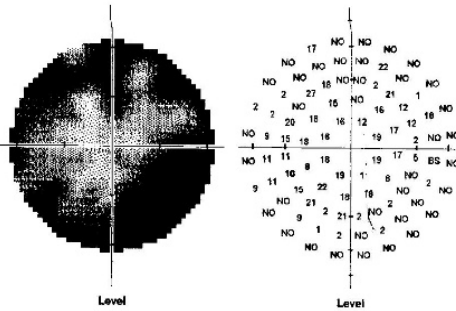
sayhan, emine [10-Tem-2018 4:46:50 - Central Test]

Test: Central Test
Eye: Right
Age: 22 Years 6 Months

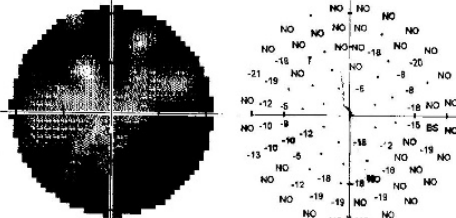
Date of Birth: 01.01.1996
Trials: 333/99+3.4
Test Duration: 8 Min 9 Sec

Strategy: Fast Threshold
Flicker: OFF
Lens: +0.00/+0.00x0

Right Eye



Difference From Baseline



There is no baseline for this exam

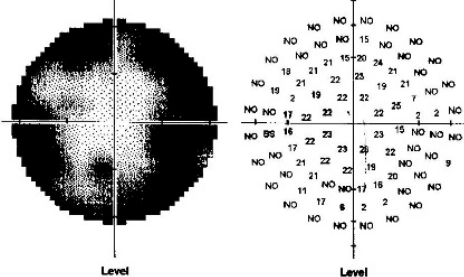
sayhan, emine [10-Tem-2018 4:54:11 - Central Test]

Test: Central Test
Eye: Left
Age: 22 Years 6 Months

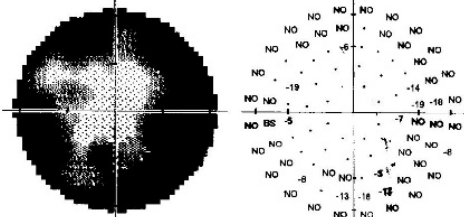
Date of Birth: 01.01.1996
Trials: 269/99+2.9
Test Duration: 8 Min 53 Sec

Strategy: Fast Threshold
Flicker: OFF
Lens: +0.00/+0.00x0

Left Eye



Difference From Baseline



There is no baseline for this exam

Güvenilir perimetrik GA çizilemeyen bir ON olgusunda pRSLT

3D Disc Report OU w/ Topography

ID : 9864497

Name : emine sayhan

3D OCT-1(Ver.8.20)

Print Date : 10.07.2018



Ethnicity : Caucasian

Technician :

Gender : Female

Fixation : OD(R) Disc / OS(L) Disc

DOB : 01.01.1996 Age : 22

Scan : 3D(6.0 x 6.0mm - 512 x 128)

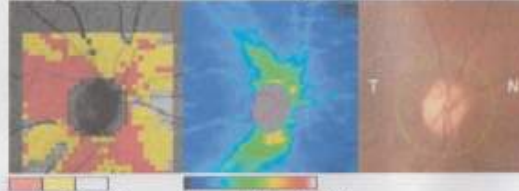
OD(R)

Image Quality : 38 mode : Fine(2.0.0)

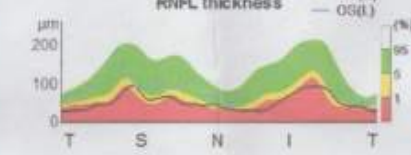
Capture Date : 10.07.2018

mode : Fine(2.0.0) Image Quality : 45 OS(L)

SuperPixel-200 Thickness Map RNFL Color photo



RNFL thickness

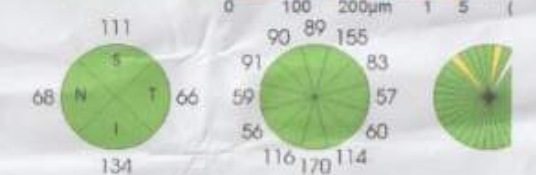
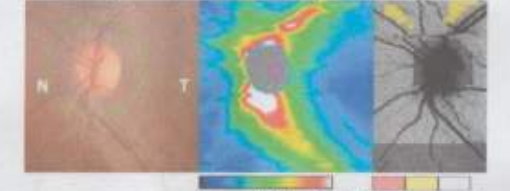


RNFL Symmetry 66%

Average thickness RNFL(µm)

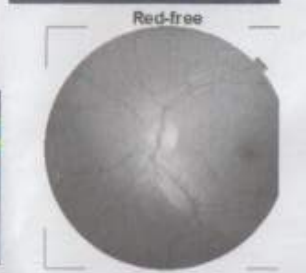
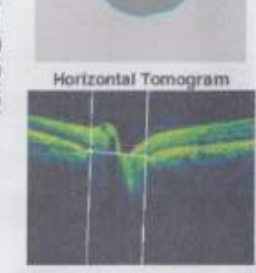
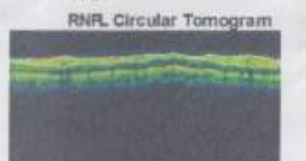
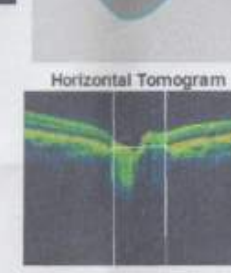
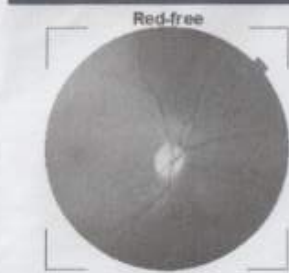
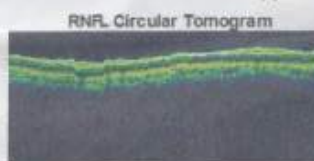
51	Total Thickness	95
63	Superior	111
66	Inferior	134

Color photo Thickness Map RNFL SuperPixel



Disc Topography

1.85	Disc Area	(mm ²)	2.01
0.59	Cup Area	(mm ²)	0.19
1.26	Rim Area	(mm ²)	1.82
0.32	C/D Area Ratio		0.10
0.57	Linear CDR		0.31
0.57	Vertical CDR		0.31
0.05	Cup Volume	(mm ³)	0.01
0.22	Rim Volume	(mm ³)	0.70
1.38	Horizontal D.D	(mm)	1.49
1.76	Vertical D.D	(mm)	1.65



Disc margin Cup margin R/D Ratio



Disc parameters are determined at the reference plane height of (OD(R) 120/OS(L) 120) µm from the RPE plane in this version.

Comments :

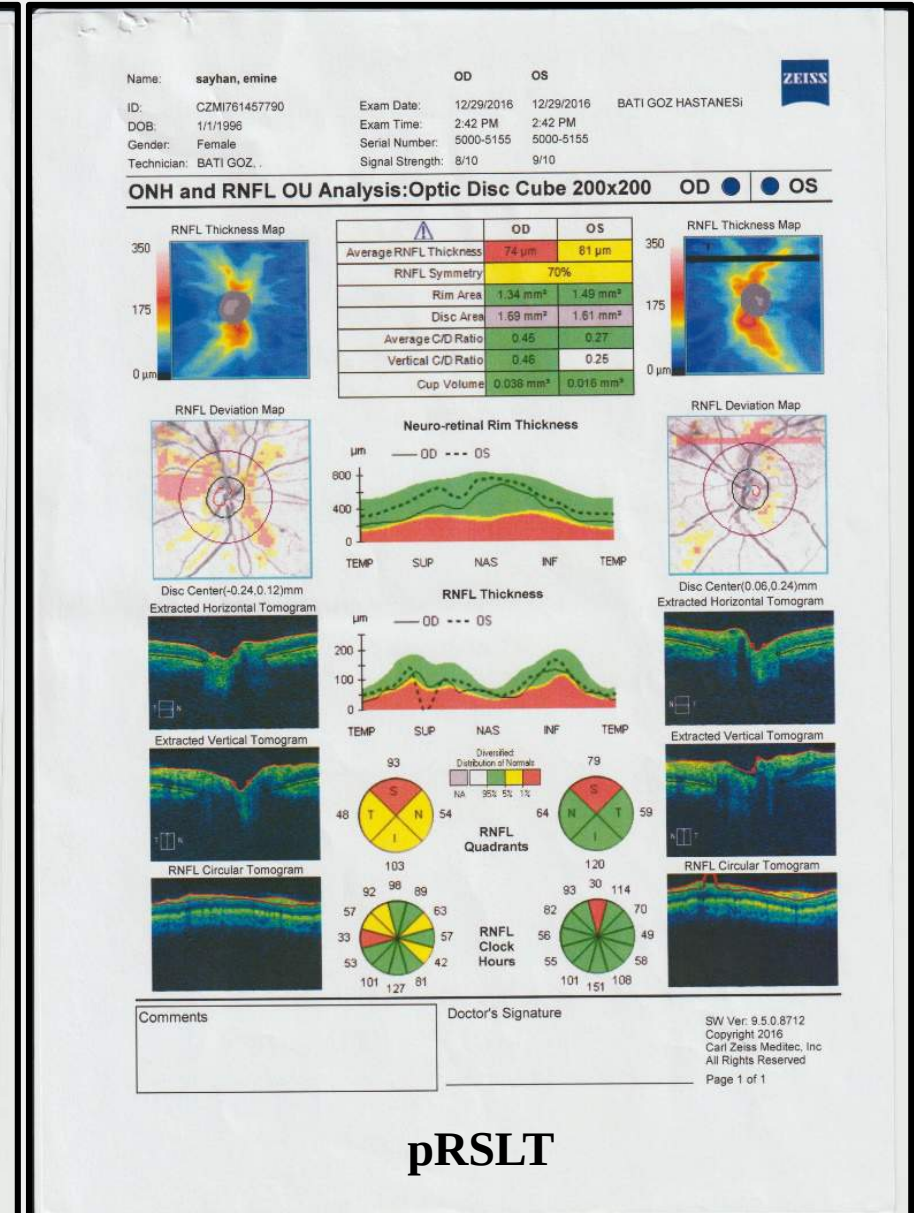
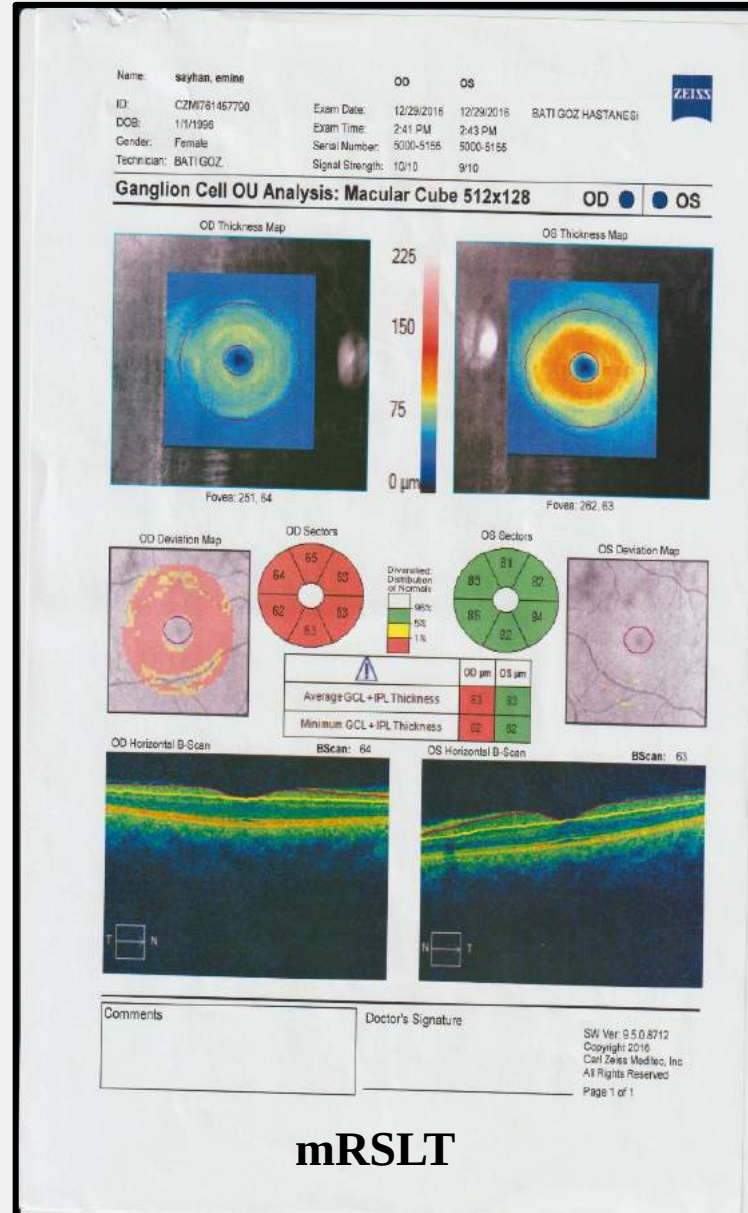
Signature :

Date :

Aralık 2016
SAĞ OPTİK NÖRİT

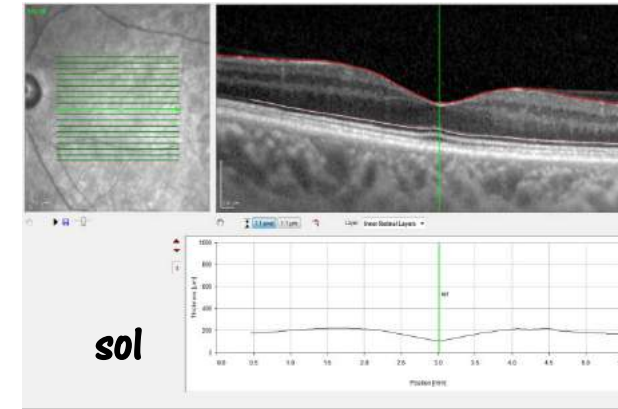
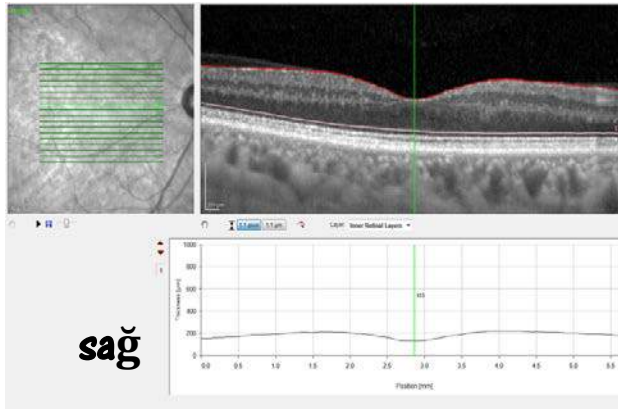
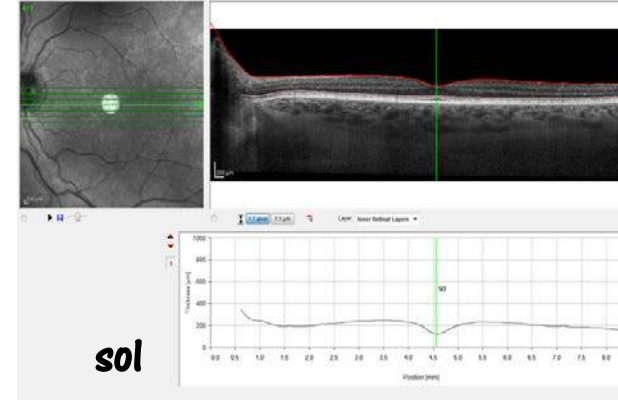
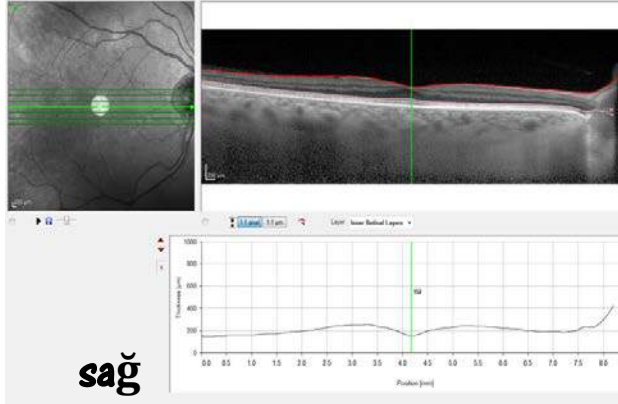
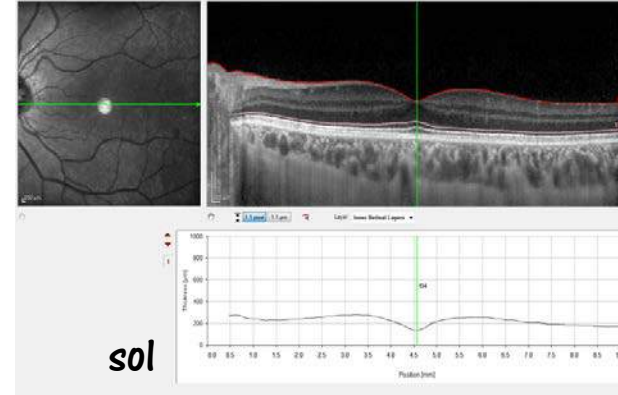
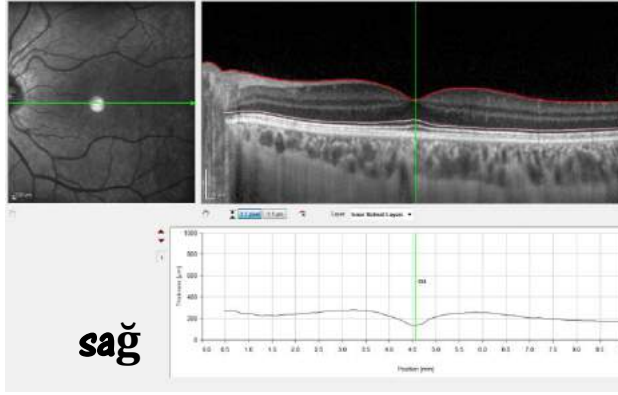
Ğ mRSLT incelmış
Ğ pRSLT incelmış.

L mRSLT- NORMAL
L pRSLT
Üst kadranda incelmış



Sağlık

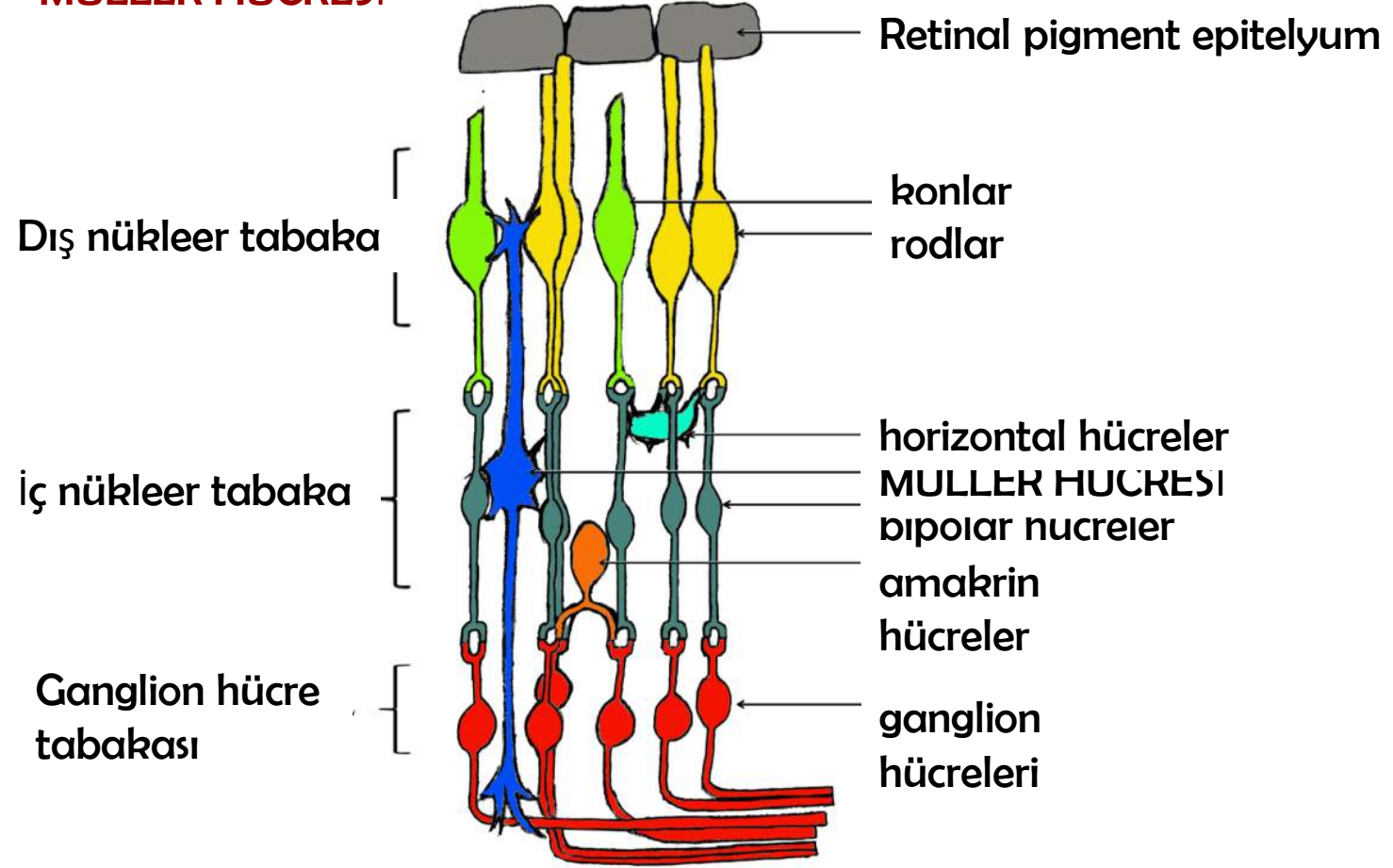
NMO



Maküler segmentasyonda retinal katmanlar-iç retinal tabaka(Ganglion HT+RSLT+İPT)

ıkarsamalar ve YORUM

MÜLLER HÜCRESi



anlamalı
iller RSLT

MULTİPL SKLEROZ'DA GÖRÜLEN OPTİK NEVRİTTE OKT DEĞERLENDİRMELERİ VE BİR YILLIK İZLEM

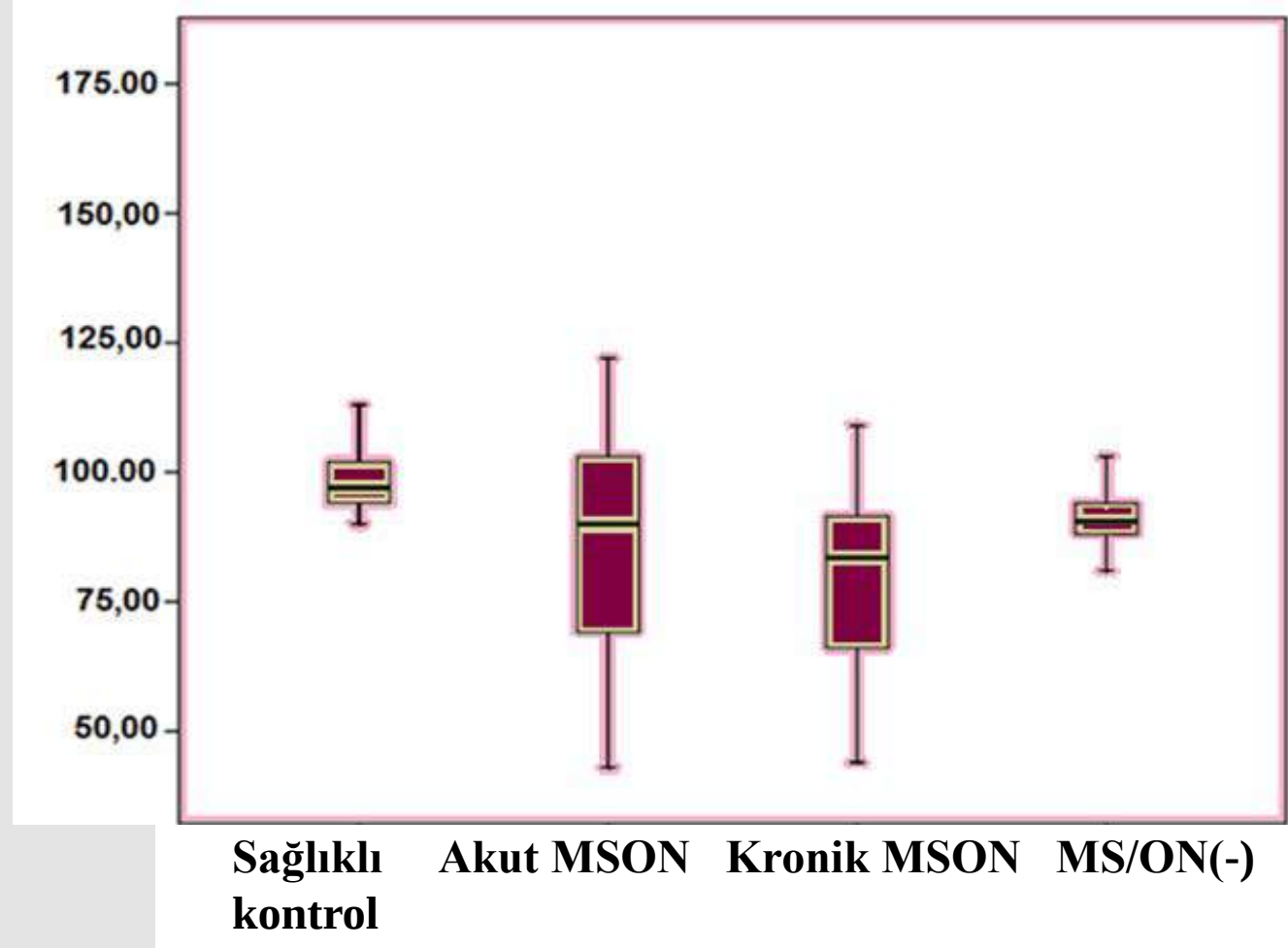
Kasar S, İdiman F, İdiman E ve ark. 2011

**Ortalama RSLT kalınlığı ile GUP latansları arasında bağıntı (+) ($r=0.41$),
Orbital MRG ile RSLT arasında bir ilişki saptanmadı ($p>0.05$).**

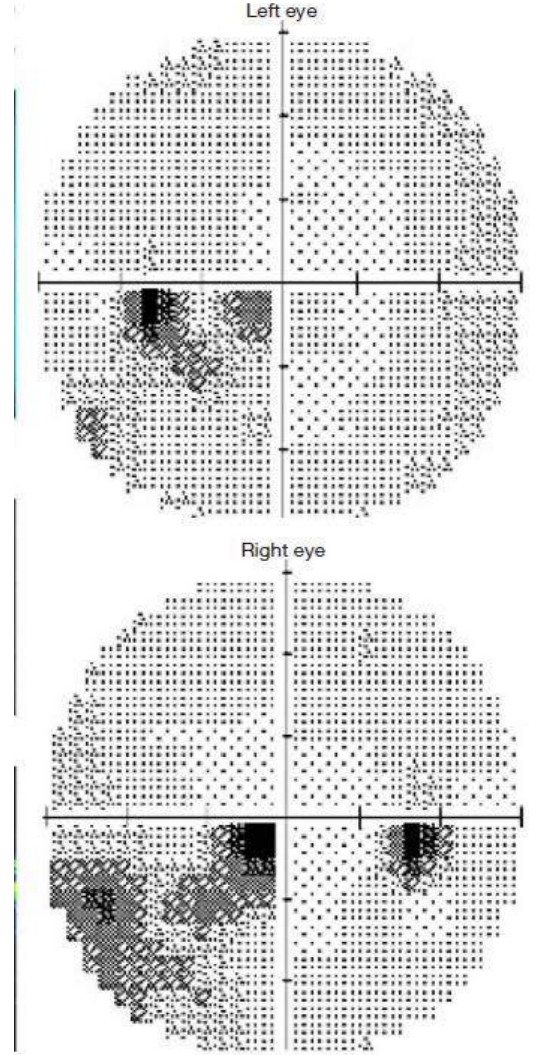
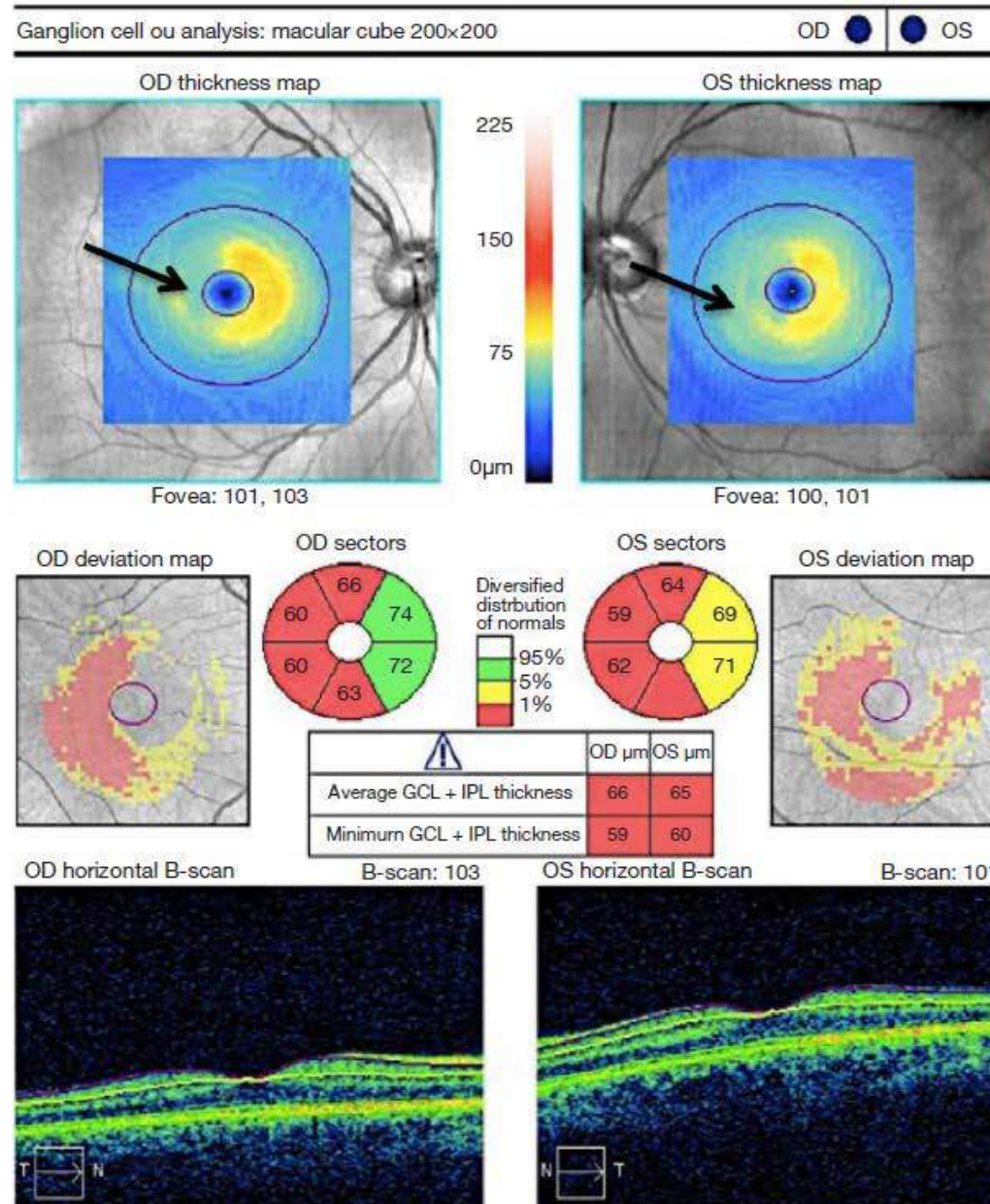
RSLT kalınlığı 1 yıl sonra daha da ↓ bulundu ($p=0.001$)

**Yaş etmeni kontrol edilerek MS hastalık süresinin etkisine bağlı olarak
RSLT kalınlığının, 5 yıldan daha ↑ olanlarda 1 yıl ve ↓ olanlara göre daha
çok incelmisti ($p=0.008$)**

MS-ON'de OKT- pRSLT kalınlığı



RRMS'li bir hastada «TRAKTUS LEZYONU» nın OKT yansıması



30 y K RRMS sol homonim inkongröz hemianopiye bağlı, okurken sözcüklerin başını görmediğini belirtiyor. OKT bilateral sağ hemiretinal kaybı işaret ediyor. Ayrıca – olasılıkla- solda optik sinir etkilenmesi de söz konusu (Fİ)...



Multifocal visual evoked potentials and contrast sensitivity correlate with ganglion cell-inner plexiform layer thickness in multiple sclerosis



Divya Narayanan^a, Han Cheng^{a,*}, Rosa A. Tang^b, Laura J. Frishman^a

^a College of Optometry, University of Houston, Houston, TX, USA

^b University of Houston, MS Eye CARE Clinic, Houston, TX, USA

See Editorial, pages 157–159

Multipl skleroz(MS)da OKT, multifokal GUP/VEP ve KONTRAST DUYARLIK verileri birbiri ile uyumludur.

Narayan D et al Clin Neurophysiol 2019

trast sensitivity (CS) were obtained for 53 eyes with last optic neuritis (ON) > 6 months and 105 non-ON eyes in 90 patients. One eye (43 ON, 73 non-ON) was used for correlations when both had the same history. Global (G, 60 sectors) and central 5.6° (C, 24 sectors) mfVEP amplitude and latency were calculated as mean logSNR and median latency.

Results: Eyes showing abnormal mfVEP (amplitude or latency) vs OCT (GCIPLT or RNFLT) was 77% vs 69% ($p = 0.33$) in ON, 45% vs 22% ($p < 0.0005$) in non-ON. In ON and non-ON, mfVEP measures and CS correlated with GCIPLT and RNFLT ($r = -0.24$ to 0.78 , $p = 0.03$ – 0.0001). In ON, mfVEP amplitude (C,G) correlated better with GCIPLT ($r = 0.78$, 0.76) than RNFLT ($r = 0.43$, 0.58 ; $p < 0.001$, 0.01).

Conclusions: MFVEP measures and CS correlated well with GCIPLT and RNFLT in ON and non-ON. MFVEP amplitudes were more highly correlated with GCIPLT than RNFLT in ON. MFVEP detected significantly more defects than OCT in non-ON.

Significance: GCIPLT, mfVEP and CS provide useful measures of optic nerve integrity in RRMS.

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Contents lists available at ScienceDirect

Multiple Sclerosis and Related Disorders

journal homepage: www.elsevier.com/locate/msardPeripapillary retinal nerve fiber layer thickness measured by optical coherence tomography in different clinical subtypes of multiple sclerosis[☆]

Irmina Jankowska-Lech^{a,*}, Jaromir Wasyluk^c, Witold Palasik^b, Barbara Terelak-Borys^a,
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OKT

Multipl skleroz(MS)un farklı progressif alt tiplerinin ayırımı ve değişimi konusunda bilgi sağlar

patients had a history of optic neuritis (ON). EDSS score was 1.0–3.5 (mean 3.05 ± 1.02) in the Prog(+)MS group and 1.0–3.5 (mean 1.40 ± 0.57) in the Prog(-)MS. Control group: 31 healthy volunteers (3 males, 28 females), aged 20–62 years (mean 37.4 ± 10.88). Peripapillary RNFL thickness was measured around the optic nerve head (ONH) using spectral-domain OCT (Topcon OCT 1000 MarkII, FastMap v. 3.40, Topcon, Japan). Scans were obtained according to OSCAR-IB consensus criteria.

The generalized estimating equation model (GEE) was used in the statistical analysis to assess differences in RNFL thickness between Prog(-)MS and Prog(+)MS patients, taking into consideration history of ON, EDSS score, immunomodulatory therapy, MS progression, MS duration, age and gender.

The protocol was approved by the Ethical Committee of the Medical Centre of Postgraduate Education, Warsaw, Poland and informed consent was obtained from all subjects.

Results: There was a significant difference between Prog(-)MS and Prog(+)MS groups for mean, nasal and superior quadrant of RNFL thickness. For individuals with a history of ON, significant differences were found between the two MS phenotypes regardless of RNFL thickness measurements.

Conclusions: A significant correlation was established between RNFL thickness and progression of neurodegeneration in MS patients with no regard to history of ON. RNFL thickness may be considered a MS biomarker and potential diagnostic tool for assessment of disease progression.

Retinal layer segmentation in multiple sclerosis: a systemic review and meta-analysis

Petzold A, Balcer LJ, Calabresi PA et al.
Lancet Neurol 2017;16(10):797-812

25497 kayıt, 110 makale ve 40 bildiri (toplam MS'li hastaların 5776 gözü-
1667 MSON'lu ve 4109 MS-WON) değerlendirilmiş.

Bu fark; sabit ve kesin olduğu için **OKT'NİN TANı, MONİTORİZASYON
VE ARAŞTIRMALARA DAHİL EDİLMESİNİ TAVSİYE EDİYORUZ.**

Retinal imaging with optical coherence tomography: a biomarker in multiple sclerosis?

This article was published in the following Dove Press journal:
Eye and Brain

Fiona Costello^{1,2}
Jodie M Burton^{1,3}

¹Department of Clinical

Abstract: Multiple sclerosis (MS) is a progressive neurological disorder characterized by both inflammatory and degenerative components that affect genetically susceptible individuals. Currently, the cause of MS remains unclear, and there is no known cure. Commonly used therapies

**OKT İLE RETİNAL GÖRÜNTÜLEME:
MULTİPL SKLEROZ(MS) DA BİR BİYOBELİRTEÇ Mİ ?**

EVET

Costello F and Burton JM

Keywords: multiple sclerosis, biomarker, optical coherence tomography, axonal degeneration, neuronal loss, central nervous system inflammation

Using OCT as a diagnostic biomarker in MS

Capturing clinical and subclinical relapses to show dissemination in space and time

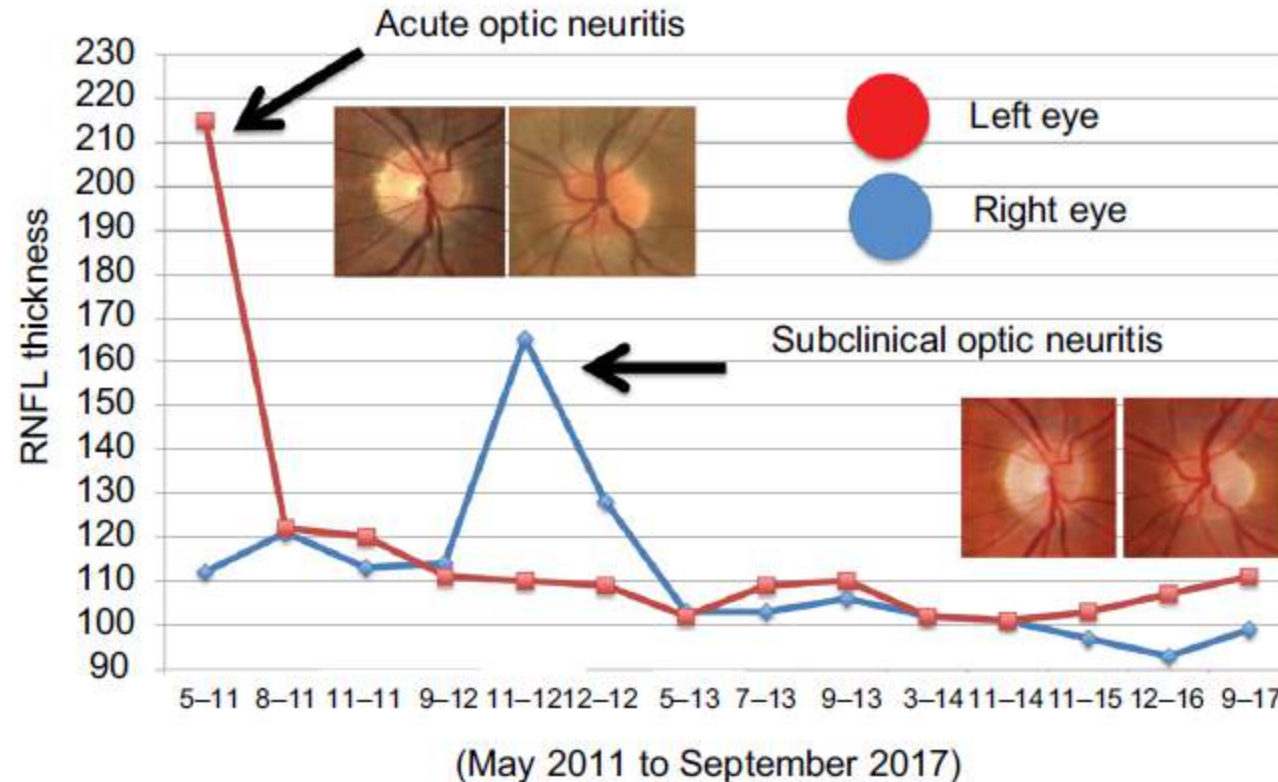


Figure 2 OCT-measured peripapillary RNFL thickness measures obtained from May 2011 to September 2017 in a patient with acute optic neuritis in the left eye (2011), and subclinical optic neuritis in the right eye (2012). Note there is mild test-retest variability in the RNFL measures of both eyes over time. The clinical and subclinical optic neuritis events were heralded by marked increases in the RNFL thickness of the affected eye(s), relative to the baseline RNFL values.

Abbreviations: OCT, optical coherence tomography; RNFL, retinal nerve fiber layer.

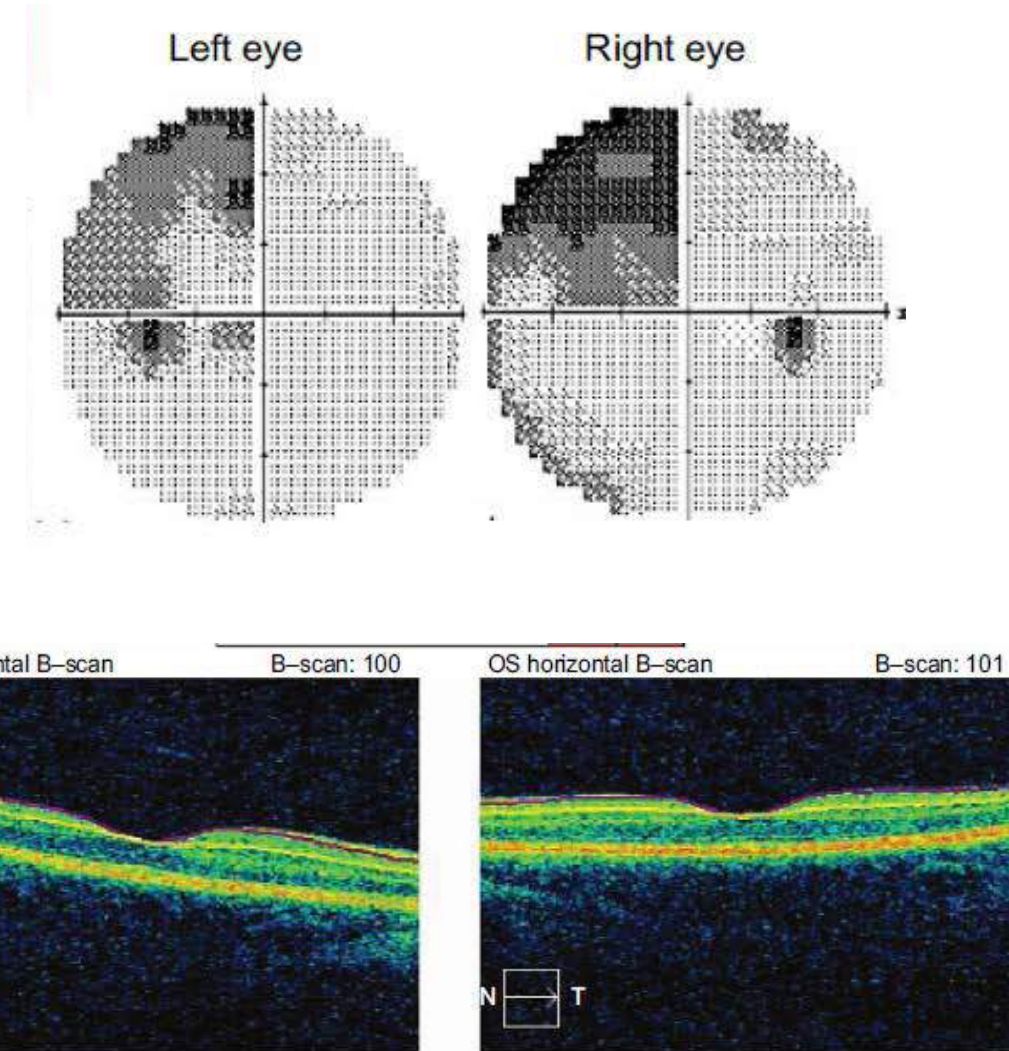
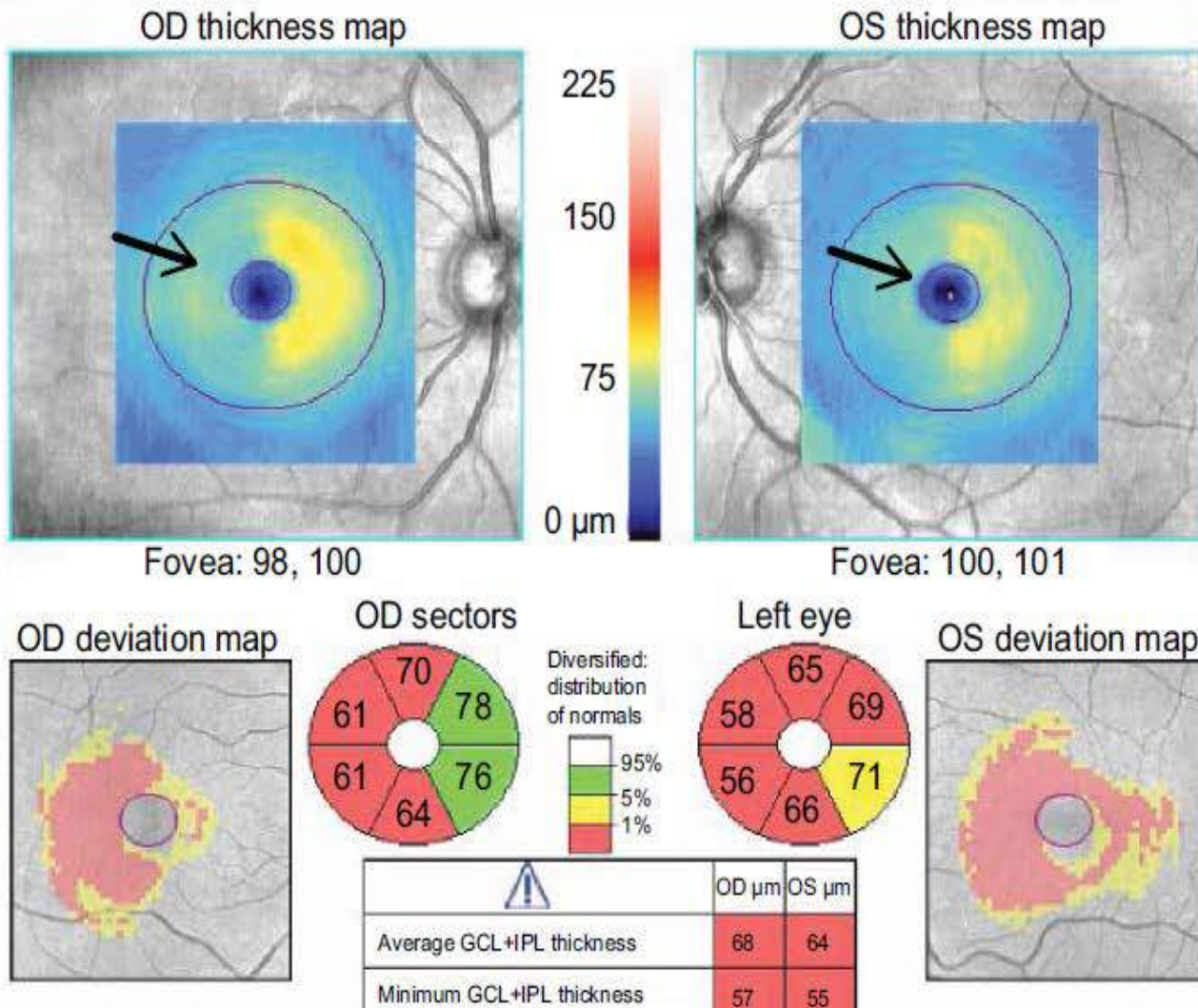


Figure 3 GCL analysis showing right hemiretinal thinning and left homonymous visual field loss caused by a lesion in the right optic tract.

Notes: This 30-year old woman with RRMS presented with difficulty seeing the beginning of words caused by a left quadrantanopic visual field defect. She had a left relative afferent visual field defect. GCL analysis shows a pattern of right hemiretinal loss (arrows) correlating with a right optic tract lesion.

Abbreviations: GCL, ganglion-cell layer; RRMS, relapsing–remitting multiple sclerosis; IPL, internal plexiform layer.

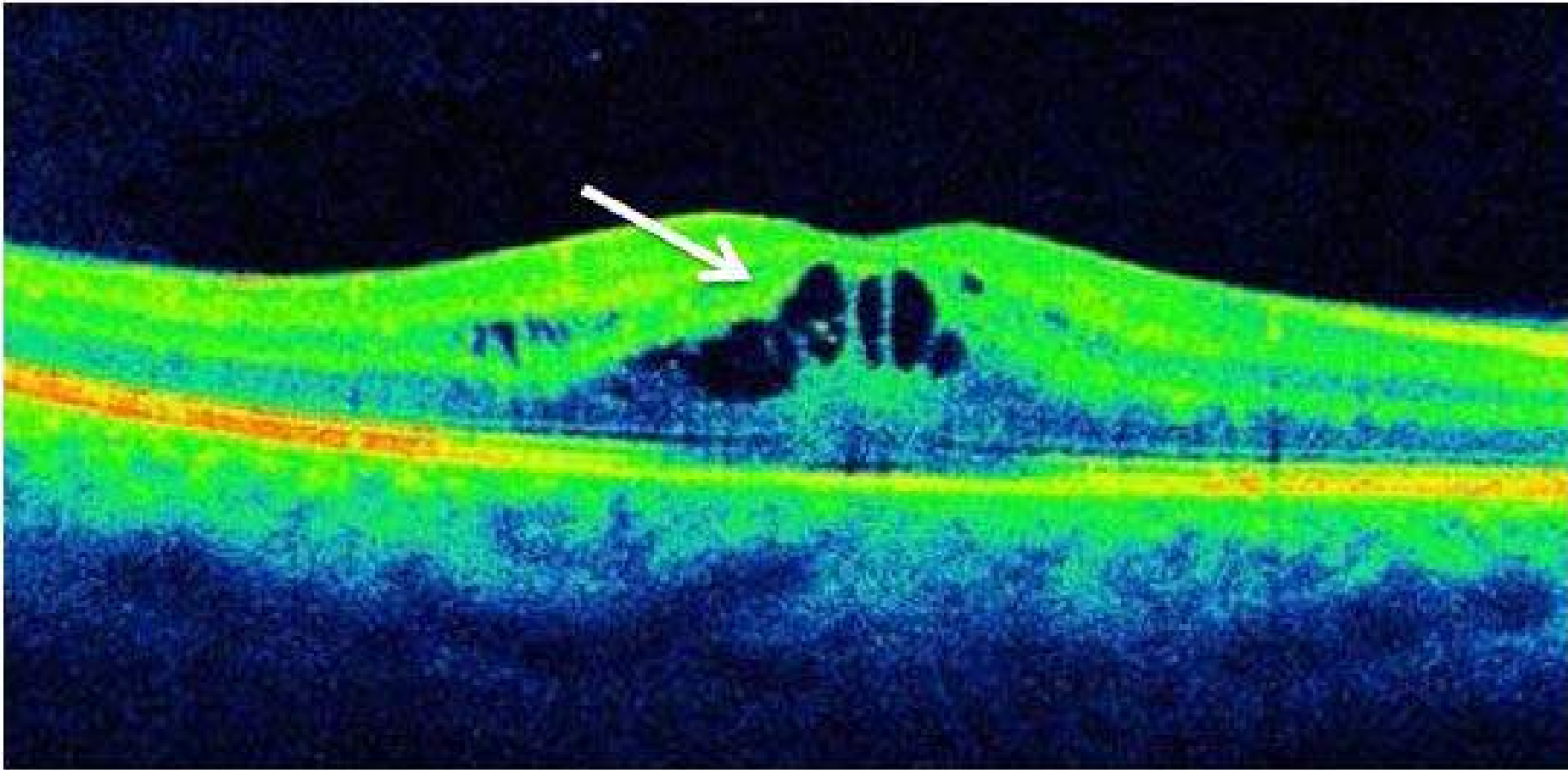


Figure 4 Optical coherence tomography showing evidence of cystoid macular edema (arrow) in a patient with fingolimod-associated macular edema.

OCT is an alternative to MRI for monitoring MS – YES

Elias S Sotirchos  and Shiv Saidha

Multiple Sclerosis Journal

2018, Vol. 24(6) 701–703

DOI: 10.1177/

1352458517753722

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OKT MULTİPL SKLEROZ(MS) MONİTORİZASYONUNDA MRG İÇİN BİR ALTERNATİF MİDİR ? EVET

Sotirchos ES and Saidha S 2018

MRI in the surveillance of MS patients, monitoring of subclinical disease activity and assessing response to disease-modifying therapies (DMTs).

Optical coherence tomography (OCT) is an imaging technique that allows rapid and non-invasive acquisition of high-resolution, cross-sectional images of the

when compared to the cost of MRI scans. Additionally, reproducibility of spectral-domain OCT-derived quantitative measures have been shown to be excellent in MS patients, and standardized quality control criteria have been validated to ensure reproducibility across centers.^{3–5}

Elias S Sotirchos

Shiv Saidha

Johns Hopkins Hospital
and Division of
Neuroimmunology and
Neurological Infections,
Department of Neurology,
Johns Hopkins University
School of Medicine,
Baltimore, MD, USA

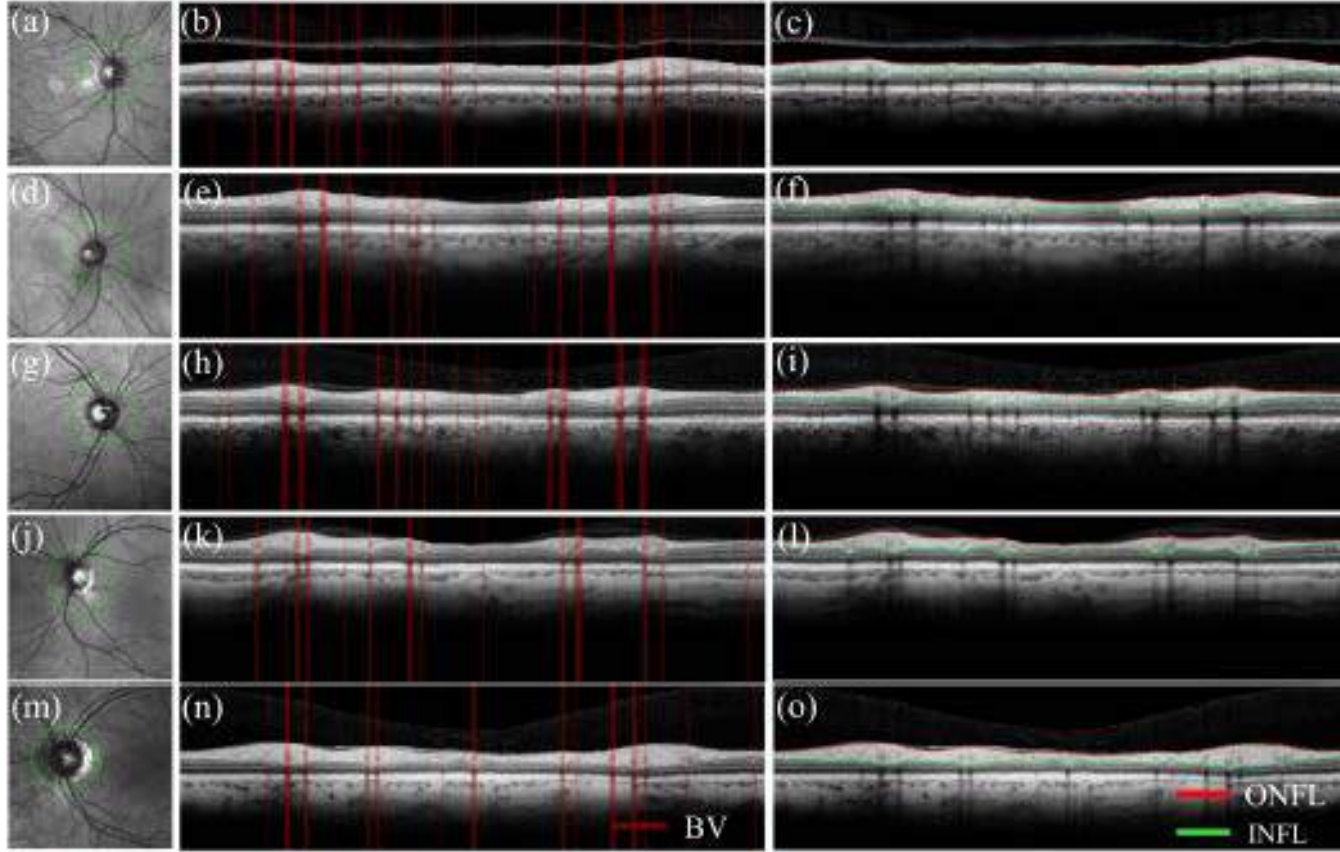
OKT'nin ON VE MS'de YARARLANIMINA İLİŞKİN SON DURUM

- o **Demiyelinizan-nörodejeneratif hastalıkta anormallik duyarlılığı yüksektir**
- o **MS, NMOSD ve MOG antikorları ile eşlik eden ON'in TANI ve AYIRICI TANI'sında kullanılabilir**
- o **OKT subklinik hastalığı belirleyebilir, MS kuşkusu olan hastalarda zaman ve mekan disseminasyonuna kanıt sağlayabilir**
- o **OKT MSON'li hastada izlem için kullanılabilir, RSLT ve iç retinal tabaka incelmesi ON'li hastalarda vizüel prognozun kötülüğünü işaret eder.**
- o **OKT MS'li hastalarda tedavi monitorizasyonunda kullanılabilir.**
Bazı ilaçların yan etkilerine kanıt sağlayabilir.
- o **OKT MS'li hastalarda NEDA için kanıt olarak kullanılabilir**

YENİ OKT “OCT” TEKNOLOJİLERİ

Son yıllarda Faz sensitif OKT (*Schwartz et al. 2014, Wang et al. 2007, Wang et al. 2006*),
Polarizasyon-sensitif OKT (*Pircher et al. 2011*),
Spektroskopik OKT (*Kim et al., 2015*)
OKT Anjiografi (OCTA) (*Ferrara et al., 2016*)

Detection of retinal blood vessel changes in multiple sclerosis with optical coherence



Sağlıklı kontrol (a,b,c)

İlımlı MS (d,e,f)

Orta ağırlıkta MS (g,h,i)

Ağır MS (j,k,l)

İdiopatik ON (m,n,o)

OKT-pRSLT iç ve dış sinir lifi tabakası ve segmentlerde kan damarları görünümü



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OKT-ANJİOGRAFİ

“OCT-ANGİOGRAPHY”

- * Retinal damarların değerlendirmesinde kullanılan non-invaziv bir yöntemdir. Bu konuda gold standart «FFA» dır.**
- * OKT-A’da Kimyasal verilmemesi, hızlı, kolay ve ucuz olması çok önemli avantajdır.**
- * Posterior retina-Maküler hastalık değerlendirmelerinde çok yararlı bulunmuştur (özellikle diyabetik ve YBMD...)**
- * OKTA/OCTA halen evrilmekte olan bir inceleme/araştırma alanıdır.**

OKT-A'NIN KULLANIM ALANLARI VE BEKLENTİLER

- **OKT-A halen evrilmekte olan bir inceleme/araştırma alanıdır.**
- **OKT-A retinal kan akım bozukluğunu erken belirler ve erken önleyici tedaviyi sağlayarak hastalık morbiditesini düşürür**
- **Günümüzde retinal –maküler-vasküler hastalıklarda daha yoğun kullanılır**
- **OPTİK SİNİR HASTALIKLARININ DEĞERLENDİRİLMESİNDE KULLANIMI OLDUKÇA YENİDİR**

RESEARCH ARTICLE

Open Access



Optical coherence tomography angiography of the macula and optic nerve head: microvascular density and test-retest repeatability in normal subjects

Ching Wei Lim^{1,2}, Jun Cheng³, Elton Lik Tong Tay¹, Hwei Yee Teo¹, Elizabeth Poh Ying Wong¹, Vernon Khet Yau Yong¹, Boon Ang Lim¹, Owen Kim Hee¹, Hon Tym Wong¹ and Leonard Wei Leon Yip^{1*} 

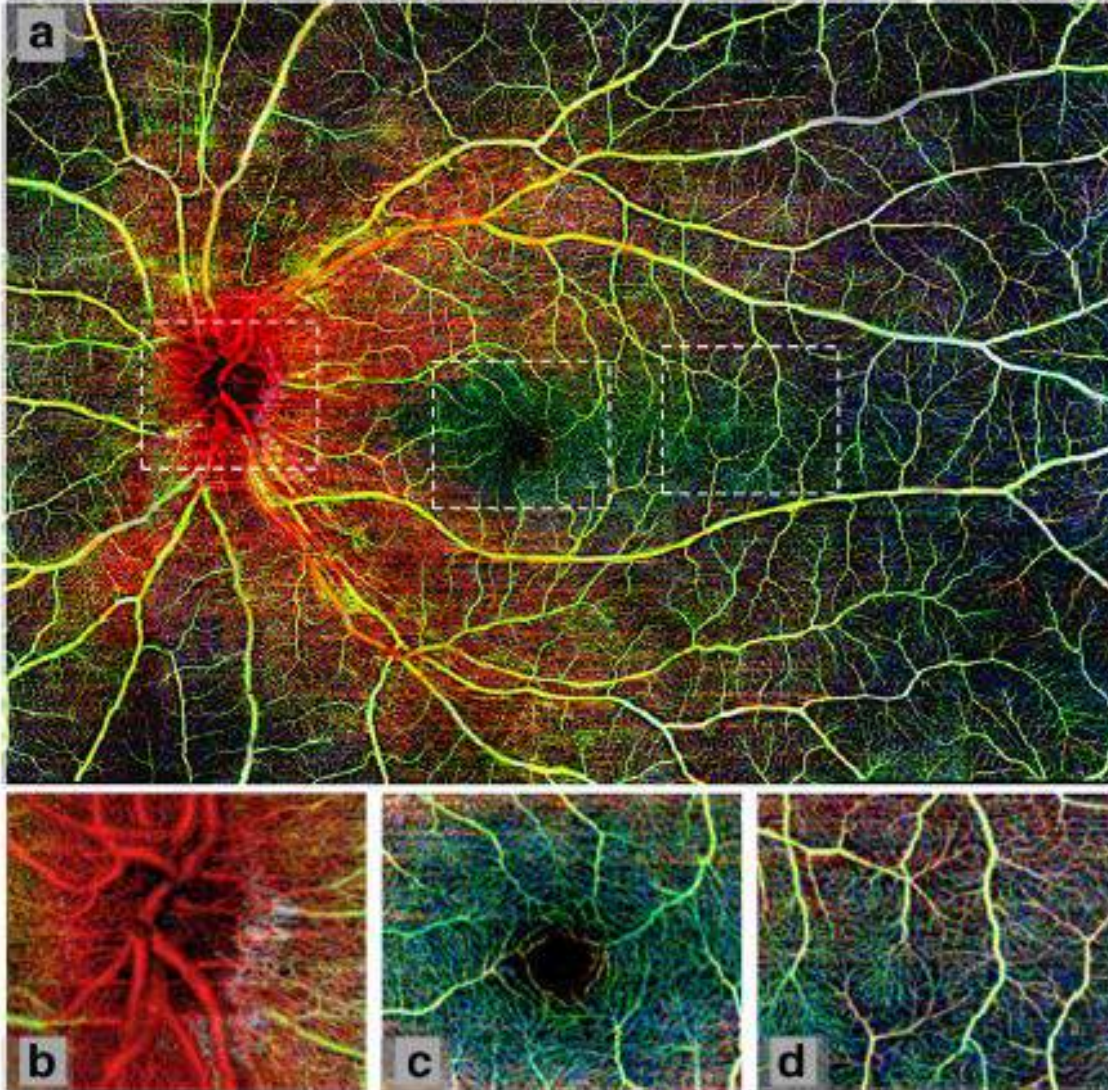
Abstract

Background: Despite the potential usefulness of optical coherence tomography angiography in retinal and optic disc conditions, the reliability of the imaging modality remains unclear. This study set out to measure the microvascular density of macula and optic disc by mean of optical coherence tomography angiography and report the repeatability of the vessel density measurements.

Methods: Cross sectional observational cohort study. Subjects with normal eyes were recruited. Two sets of optical coherence tomography angiography images of macula and optic nerve head were acquired during one visit. Novel in-house developed software was used to count the pixels in each images and to compute the microvessel density of the macula and optic disc. Data were analysed to determine the measurement repeatability.

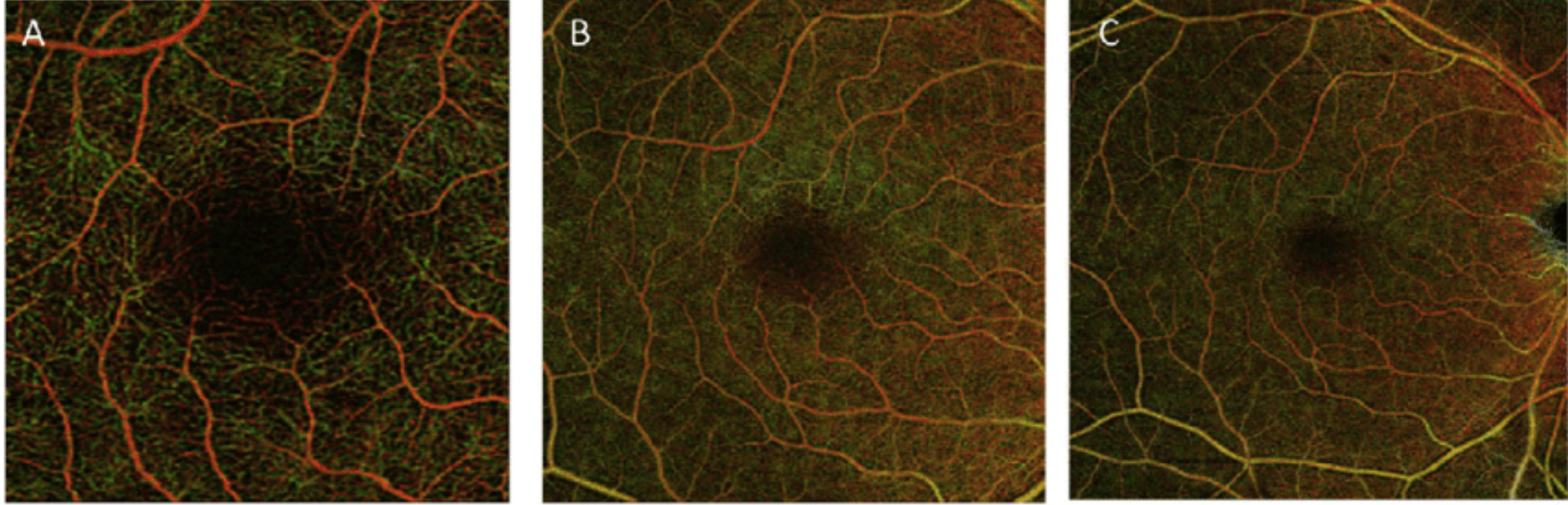
Results: A total of 176 eyes from 88 consecutive normal subjects were recruited. For macular images, the mean vessel density at superficial retina, deep retina, outer retina and choriocapillaries segment was OD 0.113 and OS 0.111, OD 0.239 and OS 0.230, OD 0.179 and OS 0.164, OD 0.237 and OS 0.215 respectively. For optic disc images, mean vessel density at vitreoretinal interface, radial peripapillary capillary, superficial nerve head and disc segment at the level of choroid were OD 0.084 and OS 0.085, OD 0.140 and OS 0.138, OD 0.216 and OS 0.209, OD 0.227 and OS 0.236 respectively. The measurement repeatability tests showed that the coefficient of variation of macular scans, for right and left eyes, ranged from 6.4 to 31.1% and 5.3 to 59.4%. Likewise, the coefficient of variation of optic disc scans, for right and left eyes, ranged from 14.3 to 77.4% and 13.5 to 75.3%.

Conclusions: Optical coherence tomography angiography is a useful modality to visualise the microvasculature plexus of macula and optic nerve head. The vessel density measurement of macular scan by mean of optical coherence tomography angiography demonstrated good repeatability. The optic disc scan, on the other hand, showed a higher coefficient of variation indicating a lower measurement repeatability than macular scan. Interpretation of optical coherence tomography angiography should take into account test-retest repeatability of the imaging system.



(a) 42 para g r nt n n birleřtirilmesi ile oluřturulmuř bir OCT-Anjio g r n m ..
(*kırmızı*-RSLT, *yeřil* Ganglion HT ve i pleksiform T, *mavi*- İ n kleer ve dıř pleksiform T damarları ile yansıyor)

(b) Optik sinir bařı (c) Fovea
(d) temporal b lge



**OKTA'DA normal bir kiřide deęiřik boyutlardaki kesitlerle
Retinal damarların görünümü (A) 3A°3mm (B) 6A°6mm (C) 8A°8 mm.
Kırmızı-yüzeyel retinal tabaka, yeřil daha derin retinal tabaka,
sarı geçiř bölgelerini temsil ediyor.**

İmajlar an AngioPlex™ device (Carl Zeiss Meditec).

Review Article

Optical Coherence Tomography Angiography of the Optic Disc; an Overview

Handan Akil¹, MD; Khalil Ghasemi Falavarjani^{1,2}, MD; Srinivas R. Sadda¹, MD; Alfredo A. Sadun¹, MD, PHD

¹Department of Ophthalmology, David Geffen School of Medicine, University of California Los Angeles, Los Angeles, CA

²Eye Research Center, Rassoul Akram Hospital, Iran University of Medical Sciences, Tehran, Iran

Abstract

Different diseases of the optic disc may be caused by or lead to abnormal vasculature at the optic nerve head. Optical coherence tomography angiography (OCTA) is a novel technology that provides high resolution mapping of the retinal and optic disc vessels. Recent studies have shown the ability of OCTA to visualize vascular abnormalities in different optic neuropathies. In addition, quantified OCTA measurements were found promising for differentiating optic neuropathies from healthy eyes.

Keywords: Optical Coherence Tomography Angiography; Optic Disc; Optic Nerve Head; Glaucoma; Optic Neuropathy



Published in final edited form as:

Br J Ophthalmol. 2014 October ; 98(10): 1368–1373. doi:10.1136/bjophthalmol-2013-304547.

Optical coherence tomography angiography of optic nerve head and parafovea in multiple sclerosis

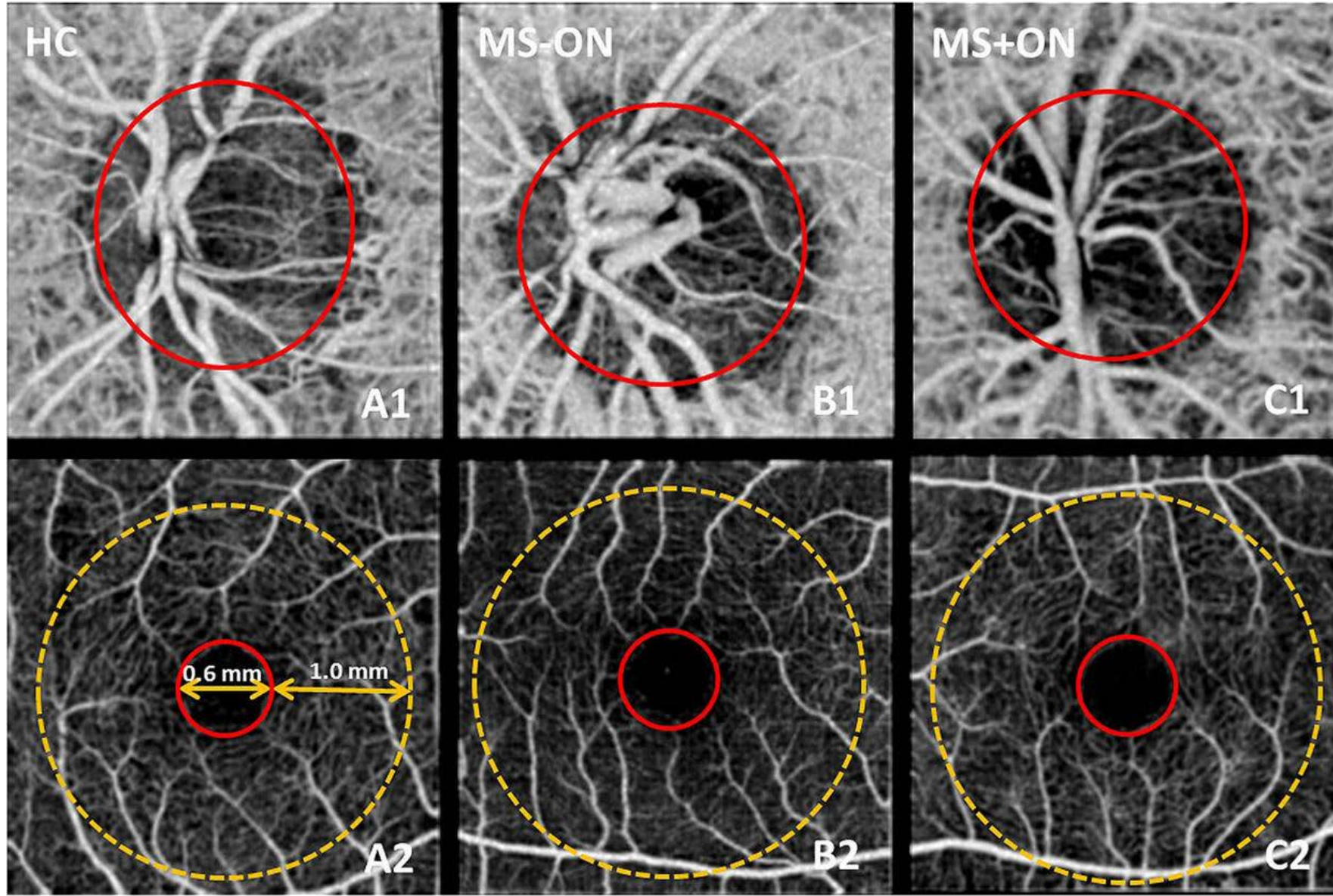
MULTİPL SKLEROZDA OPTİK SİNİR BAŞI (ONH)nın ve PARAFOVEA'nın OKT-A'sı

Wang X et al 2014

OCT-A'ya dayalı flow index(FI) ölçümleri uygulanabilir ve yararlanılabiliridir. ONH ve parafoveal perfüzyonun klinik ölçümleri için uygun bir yöntemdir. Multipl skleroz(MS)'da ONH'nın FI'i ON'in yol açtığı hasarı belirlemek ve şiddetini nicelendirmek açısından yararlı olabilir.

parafoveal FI.

Conclusions—Based on OCT angiography, the FI measurement is feasible, highly repeatable and reproducible, and it is suitable for clinical measurement of ONH and parafoveal perfusion. The ONH FI may be useful in detecting damage from ON and quantifying its severity.



Optical coherence tomography angiography of optic nerve head and parafovea in multiple sclerosis
Wang X, Jia Y, Spain R et al. *Br J Ophthalmol.* 2014 ; 98(10): 1368–1373.

**Sağlıklı kontrol, MS-ON(-)ve MS-ON(+) hastalarda optik sinir başı ve makulanın OCTA görüntüleri...
Optik sinir başı anjiogramları kırmızı çemberle çevrilmiş alanda akış indeksi ortalandı.**

Optical coherence tomography angiography enhances the detection of optic nerve damage in multiple sclerosis

Rebecca I Spain^{1,2}, Liang Liu³, Xinbo Zhang³, Yali Jia³, Ou Tan³, Dennis Bourdette^{1,2}, David Huang³

Abstract

Optic coherence tomography angiography enhances the detection of optic nerve damage in multiple sclerosis.

Spain RI et al 2017

- * OKT ve OKT-A yöntemleri ile optik sinir hasarı araştırıldı.
- * MS'li 45 hasta (68 göz) (25 MSON+, 43 MSON-), 32 sağlıklı kontrol (55 göz) değerlendirildi.
- * pRSLT, mGHK ve OSB-Aİ (optik sinir başı akım indeksi) ölçümlendi.
- * En belirgin farklılık MSON + olgularda ve OSB-Aİ ve mGHK kalınlığında görüldü.
- * MSON + olgularda OSB-Aİ'nde hem yapısal farklılık hem de perfüzyon düşüklüğü görüldü.
- * OKT-A ile optik sinir hasarının belirlenmesinde duyarlılığını arttı. (AROC istatistiksel sonuç)

Be a useful additional retinal marker in evaluation of ON in MS.

<http://dx.doi.org/10.1136/bjophthalmol-2017-310477>

Optical coherence tomography angiography indicates associations of the retinal vascular network and disease activity in multiple sclerosis

Multiple Sclerosis Journal

1–11

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OKT-A Multipl skleroz (MS)da hastalık aktivitesi ile yüzeyel ve derin retinal vasküler değişikliklerinin birlikteliğini işaret eder

Feucht N et al MS journal 2018

MS/KİS-ON olgularında iç retinal tabaka volümleri ile yüzeyel ve derin damar yoğunluğu pozitif korelasyon gösterdi. Son OKT-A'dan 24 ay öncesi koriokapiller damar yoğunluğu enflamatuvar hastalık aktivitesi ile eşlik ediyordu.

...were associated with ongoing inflammatory disease activity during 24 months prior to OCT-A examination in MS and CIS patients.

Conclusion: Optic neuritis is associated with rarefaction of the superficial and deep retinal vessels. Alterations of the choriocapillaries might be linked to disease activity in MS.

Ophthalmology, Klinikum
rechts der Isar, Technische
Universität München,
Munich, Germany

Gildas Lepennetier
Benjamin Knier



AQP4(+) NMOSD'de OCT-A ile PERİPAPİLLER VE PARAFOVEAL VASKÜLER AĞIN BELİRLENMESİ

Huang Y et al 2018

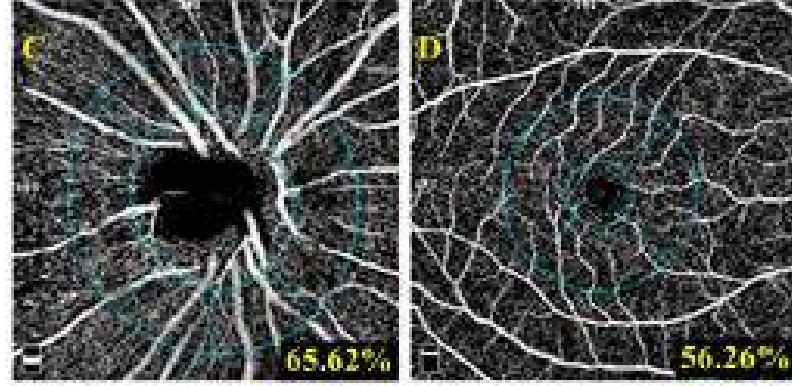
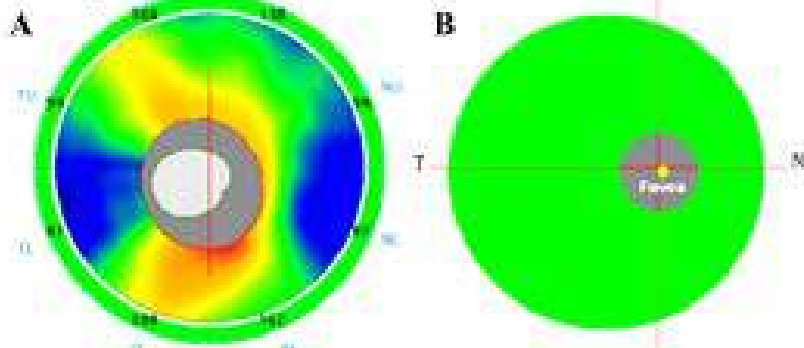
ON öyküsü (+) ya da (-) 55 NMOSD olgusu ile 33 sağlıklı kontrolde sD- OKT ve OKT-Anjio yapılmıştır.

ON öyküsü(+) ya da (-) NMOSD'li olgularda periPapiller(pPDD) ve paraFoveal(pFDD) damar yoğunluğu anlamlı olarak düşük bulundu. Damar yoğunluğunda düşme ON öyküsünden ve RSLT incelmelerinden (atrofiden) önce görülebildi.

ON öyküsü(+) gözlerde pDD (peripapiller damar dansitesi) sD OKT ölçümleri ile uyumluydu.

SONUÇ: NMOSD li hastalarda subklinik retinal vaskülopati
ON ve RSLT atrofisinden önce ortaya çıkabilir.

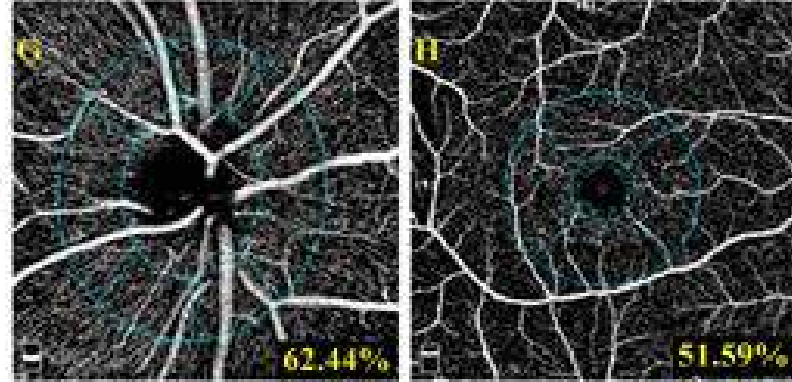
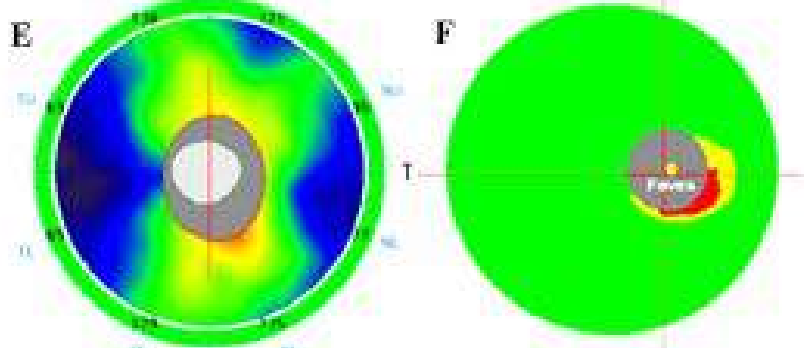
Healthy control



sD-OCT ve OKT-Anjio'nun sağlıklı kontrol, ON öyküsü(-) ve (+) NMOSD'li gözlerdeki görüntüleri.

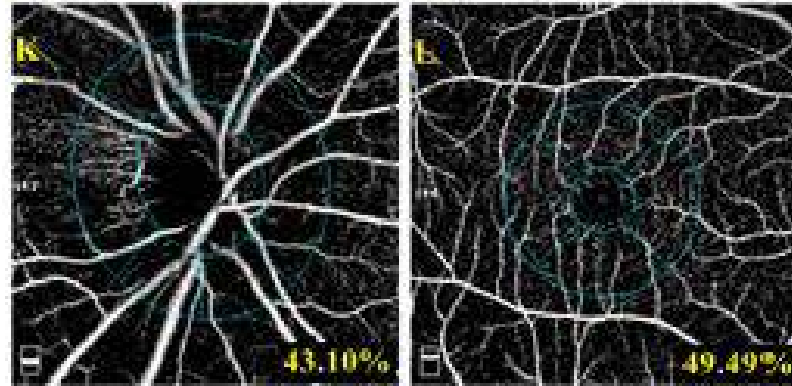
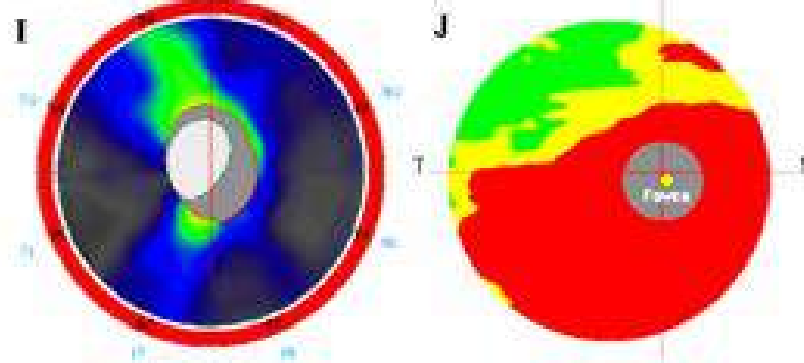
En üstte sağlıklı gözde OKT'de normal pRSLT (A) ve mRRT (B) kalınlığı, OKT_Anjioda normal pPDD (C) ve pFDD (D)

NMOSD-ON



Ortada ON öyküsü(-) NMOSD'li gözde OKT'de normal pRSLT(E), inferior nazalde ılımlı incelmış mRRT kalınlığı (F)ve OKT-Anjioda azalmış pPDD(G) ile pFDD(H) ve

NMOSD+ON



En altta ON öyküsü(+) NMOSD' li bir gözde OKT'de çok incelmış pRSLT (I) ve mRRT (J) kalınlığı yanında OKT_Anjioda diffuz olarak azalmış pPDD(K) ve pFDD(L) bölgeleri.

RESEARCH

Open Access



Optical coherence tomography angiography at the acute phase of optic disc edema

Marie-Bénédicte Rougier^{1*} , Mélanie Le Goff² and Jean-François Korobelnik^{1,2}

OKT-A morfolojik analizlerde optik sinir başı ödeminin 3 farklı nedeni olan iskemik, inflamatuvar ve KIBAS (papillaödemi) ayırımında diğer yöntemlerden daha yararlı ve başarılı bulundu.

patients) were imaged. The apparent disappearance or moderate pattern alteration of the peripapillary capillary vessels were observed in patients with NAION or papillitis, respectively. For papilledema, the capillaries at the surface of the optic disc were dilated and tortuous, but no peripapillary network pattern changes were observed. The quantitative analysis did not show any difference of peripapillary network between NAION and healthy eyes. For papillitis, the flux index was higher in inflammatory eyes compared to the healthy eyes in average ($p = 0.03$).

Conclusion: At the acute phase, the morphological analysis of OCT-A appeared to be more useful than the quantification analysis, facilitating the differentiation between the three kinds of ONH edema: ischemic, inflammatory and papilledema.

Keywords: Optical coherence tomography angiography, Optic nerve head, Edema, NAION, Microvascular network, And morphology

REVIEW

Open Access



Emerging Applications of Optical Coherence Tomography Angiography (OCTA) in neurological research

Liang Wang¹, Olwen Murphy², Natalia Gonzalez Caldito², Peter A. Calabresi² and Shiv Saidha^{2*} 

Abstract

Purpose: To review the clinical and research value of optical coherence tomography angiography (OCTA) in the field of neurology.

NÖROLOJİK ARAŞTIRMALARDA OKT-A'NIN YENİ UYGULAMALARI

Wang L et al 2018

OKT-A Nörolojik araştırmalarda yararlı olabilir. Özellikle Multipl skleroz(MS), optik nöropati ve Alzheimer hastalığı gibi hastalıklarda vaskülopatinin karakterini belirleme açısından klinik değerlendirme ve araştırma amaçlı kullanılabilir.

Table 1. Patient characteristics

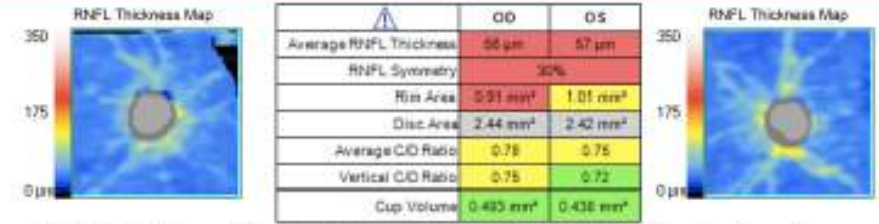
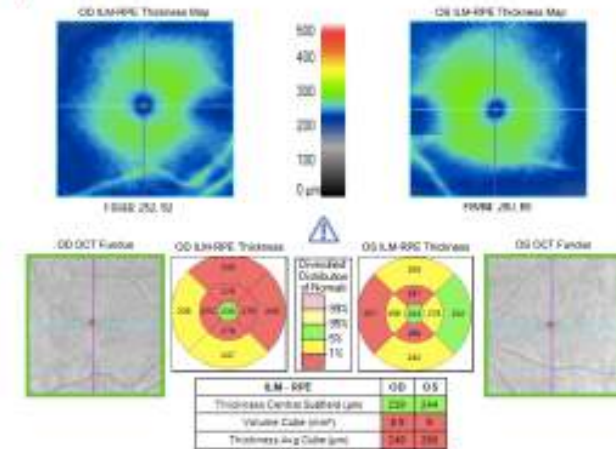
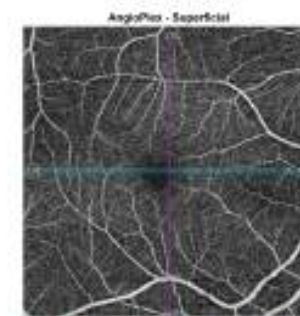
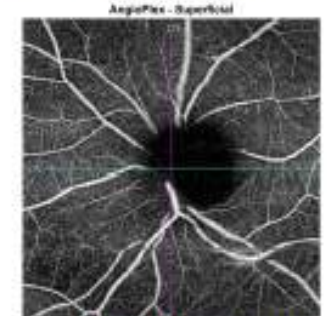
	RRMS (n=14)	NMOSD (n=9)	Controls (n=11)	p-value
Age	27.6±7.4 (14.0 – 40.0)	35.9±14.9 (18.0–58.0)	34.2±8.4 (23.0–45.0)	0.272
Gender (F)	6 (42.9%)	8 (88.9%)	5 (45.5%)	0.066
Disease duration (y)	3.3±3.3 (0.3 – 10.0)	5.7±3.1 (2.0 – 10.0)	-	
# of eyes w/ ON +	15 (53.6%)	15 (83.3%)	0	
# of eyes w/ ON -	13 (46.4%)	3 (16.7%)	22 (100%)	
Unilateral ON	13 (92.9%)	3 (33.3%)	0	
Bilateral ON	1 (7.1%)	6 (66.7%)	0	
Monophasic ON	11 (78.6%)	2 (22.7%)	0	
Recurrent ON	3 (21.4%)	7 (77.8%)	0	

Table 2. OCTA and OCT analyses of patients with NMOSD ON+, RRMS ON+ and controls

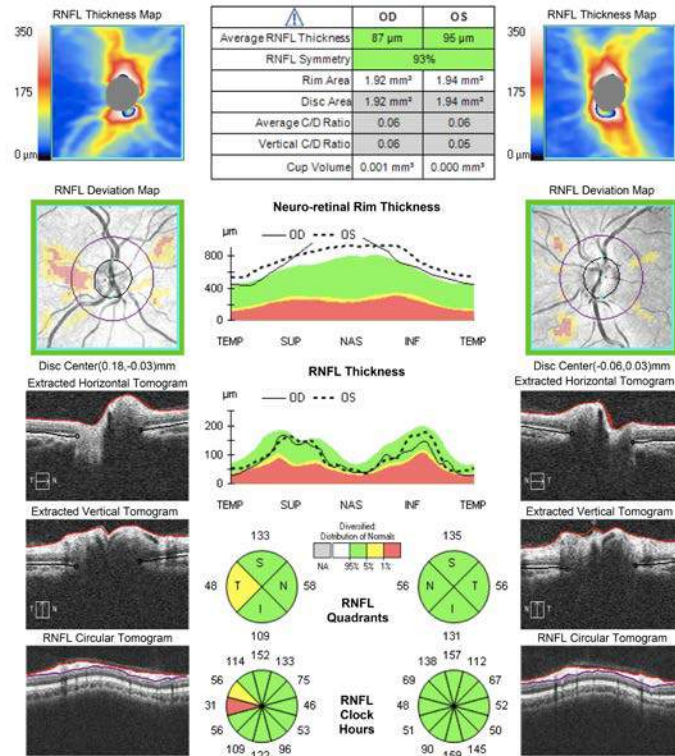
	NMOSD ON+ (n=15)	RRMS ON+ (n=15)	Controls (n=22)	p*	p**	p***
Superficial peripapillary vascular density	15.8 ±3.2	18.8 ± 0.8	18.8±0.3	<0.001	0.001	NS
Superficial macular vascular density	16.7±2.3	18.3±0.8	18.5±0.7	<0.001	0.010	NS
pRNFL thickness_avg	68.3±17.4	83.3±15.2	96.3±10.0	<0.001	NS	0.029
pRNFL thickness_sup	85.1±26.9	112.0±24.4	122.2±12.5	0.001	NS	NS
pRNFL thickness_inf	80.0±29.8	107.7±27.4	125.4±21.8	<0.001	NS	NS
pRNFL thickness_nasal	62.1±14.3	63.9±8.6	70.4±13.5	NS	NS	NS
pRNFL thickness_temp	45.7±6.5	49.8±9.0	67.7±6.5	<0.001	NS	<0.001
pRNFL symmetry	57.9±25.2	79.8±18.5	90.2±3.3	0.010	NS	NS
Disc area	2.0±0.5	1.8±0.3	1.8±0.3	NS	NS	NS
C/D ratio_avg	0.6±0.2	0.4±0.2	0.4±0.1	0.001	0.030	NS
Cup volume	0.2±0.1	0.1±0.1	0.1±0.1	NS	NS	NS

* : NMOSD ON+ vs. controls

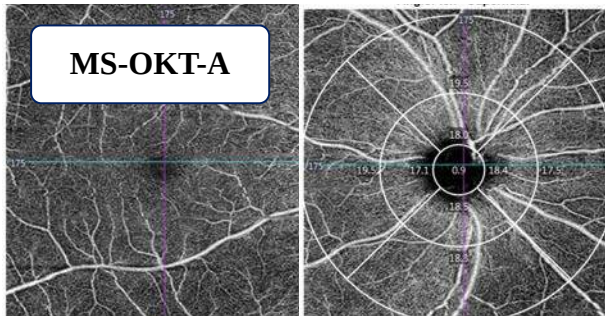
** : NMOSD ON+ vs. RRMS ON +


Fig 1. ONH and RNFL OU analysis of a NMOSD patient showing thinning of RNFL.

Fig 2. Thinning of macula thickness OU of a NMOSD patient

Fig 3. Superficial angiography showing reduced macular vessel density (right eye) in a NMOSD patient

Fig 4. Superficial angiography showing reduced peripapillary vessel density (left eye) in a NMOSD patient

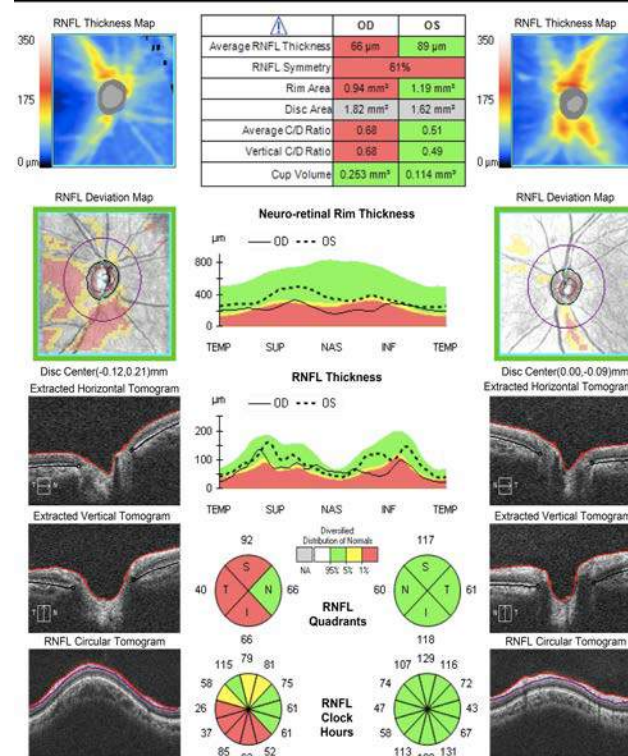
MS olgusu OKT



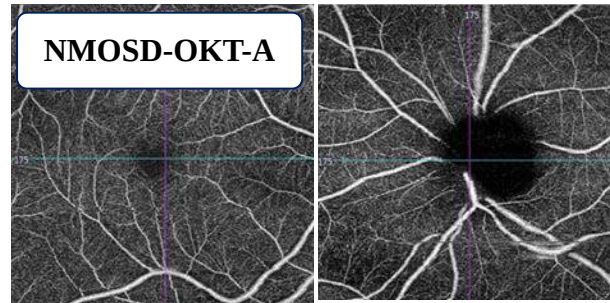
MS-OKT-A



NMOSD olgusu OKT



NMOSD-OKT-A



**AŞKIN ARİTMETİĞİNDE, $1+1=$ HER ŞEYDİR,
VE $2-1=$ HİÇBİR ŞEY DEMEKTİR**