

# التهاب العصب البصري في مرض التصلب العصبي المتعدد وأسباب أخرى

الرباط

2025 فبراير 21

10:15-11:00

أكسل بيتزولد



# الإفصاحات

المعهد الوطني لحقوق الإنسان في المملكة المتحدة

# ملخص



- MS و ON الخلفية: معايير
- التشخيص والتصنيف
- السيناريوهات السريرية
- في التهاب العصب البصري MS & PIRA
- التحقق من صحة معايير التشخيص
- خاتمة

## A Diagnosis of optic neuritis

Diagnosis based on clinical assessment and paraclinical tests (panel 1)

(a) Subacute monocular loss of vision, dyschromatopsia, pain worsening on eye movements, RAPD + 1 paraclinical test

(b) Like (a) without pain + 2 paraclinical tests

(c) Like (a) or (b) but binocular (RAPD unreliable) + MRI and another paraclinical test

Definite optic neuritis

(d) Clinically seen in acute phase, with features of (a), (b), or (c), with fundus examination consistent with optic neuritis classical disease course and no available paraclinical tests  
(e) Retrospective typical history + paraclinical test(s)

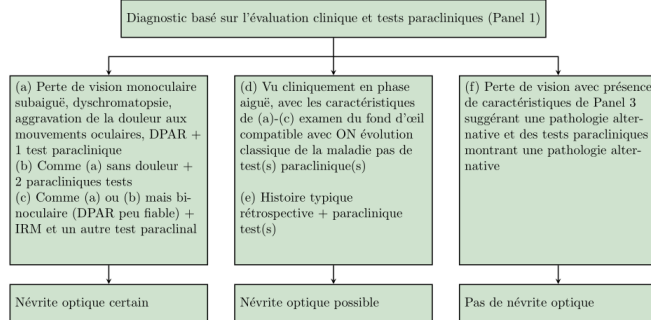
Possible optic neuritis

(f) Loss of vision with features from panel 3 being present that suggest alternative pathology and paraclinical tests showing alternative pathology

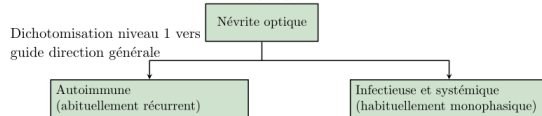
Not optic neuritis



**A Diagnostic de la névrite optique**



**B Classification de la névrite optique**



## B Classification of optic neuritis

Level 1 dichotomisation to guide general management

Optic neuritis

Autoimmune  
(usually relapsing)

Infectious or systemic  
(usually monophasic)

Level 2  
consensus  
opinion

AQP4-ON  
CRMP5-ON  
MOG-ON  
MS-ON  
SION  
RION  
CRION

Infectious optic neuritis  
Post-infectious optic neuritis  
Post-vaccination optic neuritis  
(panel 4)

Systemic disorders (panel 4)

Level 3 expert opinion

List of disorders that might in a future revision of the classification be considered to reach level 2  
(appendix pp 23-25)



## Panel 1: Diagnostic criteria for optic neuritis

### Clinical criteria

- A: Monocular, subacute loss of vision associated with orbital pain worsening on eye movements, reduced contrast and colour vision, and relative afferent pupillary deficit
- B: Painless with all other features of (A).
- C: Binocular loss of vision with all features of (A) or (B).

### Paraclinical criteria

- OCT: Corresponding optic disc swelling acutely or an inter-eye difference in the mGCIPL of >4% or >4 μm or in the pRNFL of >5% or >5 μm within 3 months after onset.
- MRI: Contrast enhancement of the symptomatic optic nerve and sheaths acutely or an intrinsic signal (looking brighter) increase within 3 months.
- Biomarker: AQP4, MOG, or CRMP5 antibody seropositive, or intrathecal CSF IgG (oligoclonal bands).

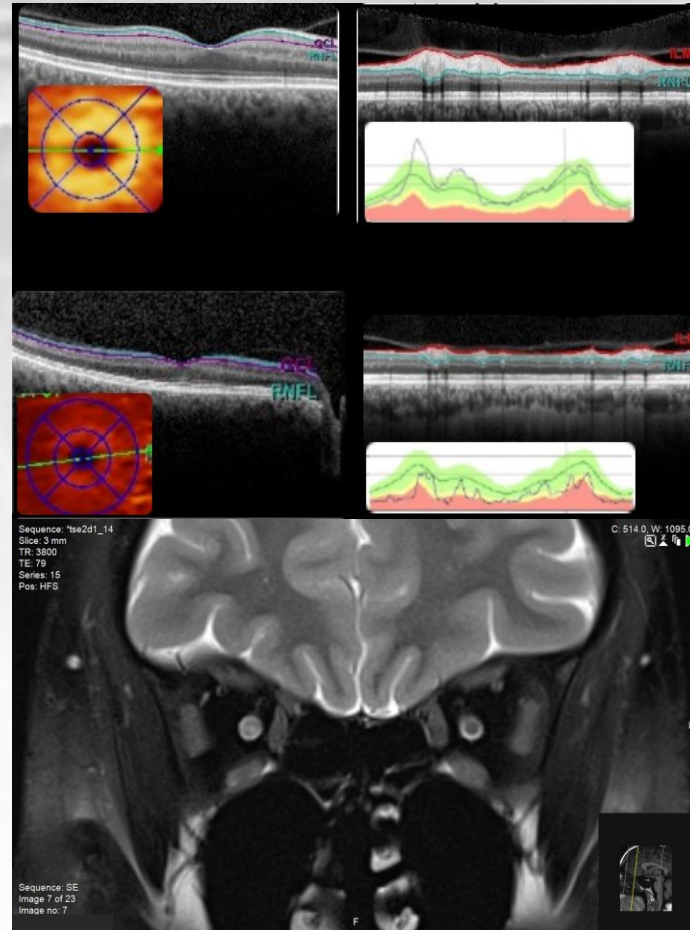
### Application of the clinical and paraclinical criteria

#### Definite optic neuritis

- (A) and one paraclinical test
- (B) and two paraclinical tests of different modality
- (C) and two different paraclinical tests of which one is MRI

#### Possible optic neuritis

- (A), (B), or (C) if seen acutely but in absence of paraclinical tests, with fundus examination typical for optic neuritis and consistent with the natural history during follow-up
- Positive paraclinical test or tests, with a medical history suggestive of optic neuritis



# الحالة الأولى



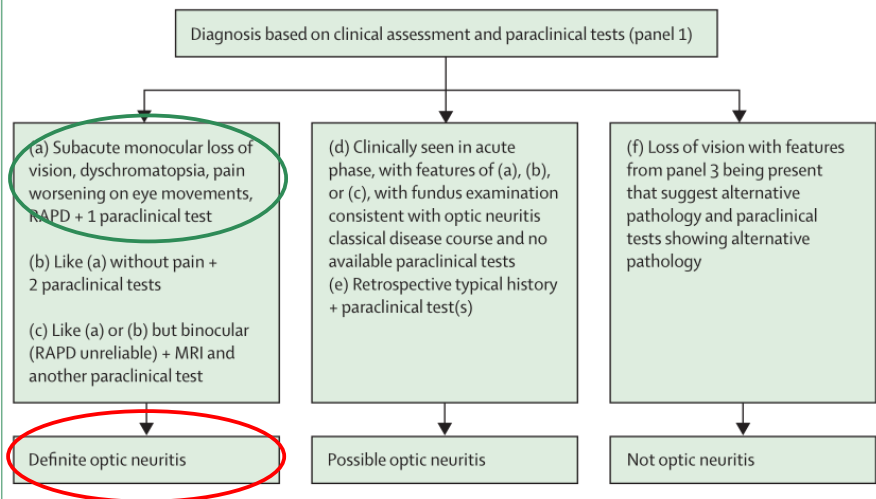
- عامًا 34 مريضة قوقازية تبلغ من العمر
- أيام من الألم، يزداد سوءًا مع حركات العين 7
- VA RE 6/9 ، LE 6/5 خلل التصبغ و
- الأيمن RAPD
- التقارير: التعب، مشاكل الإدراك، سلس البول، الاكتئاب
- سنوات مضت 3 خدر في الجانب الأيمن يستمر لمدة شهر واحد و PmHx:
- Gd+ آفات غير مصحوبة بأعراض 3 و DIT و DIS: التصوير بالرنين المغناطيسي



# تمرين عملي : الحالة الأولى



## A Diagnosis of optic neuritis



### Panel 1: Diagnostic criteria for optic neuritis

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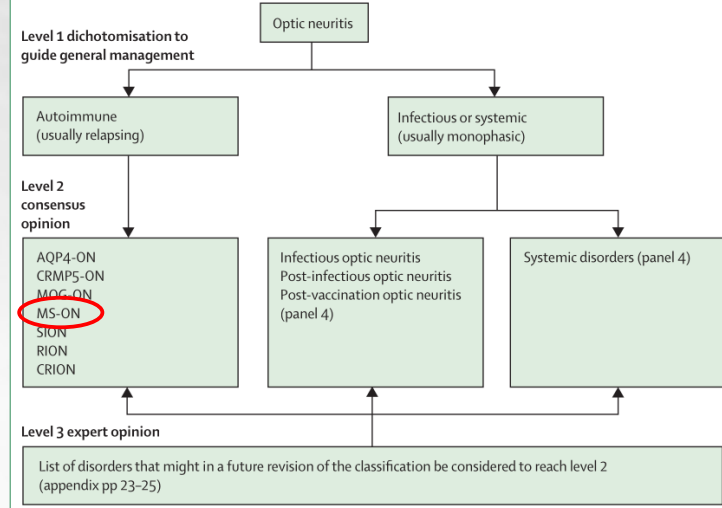
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## B Classification of optic neuritis



# الحالة الثانية

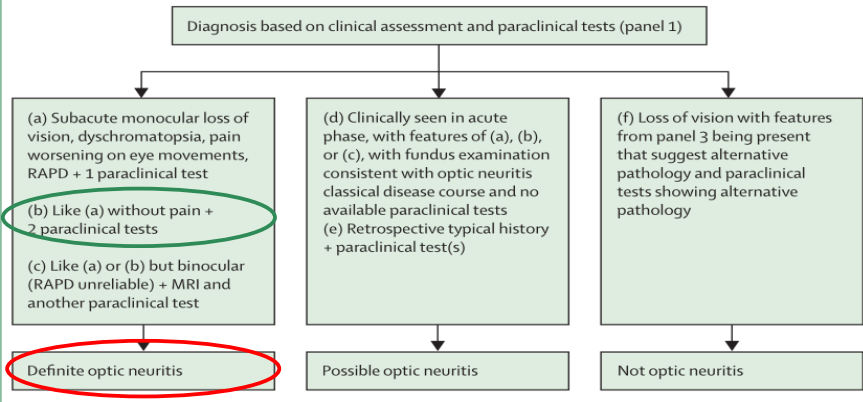


- عامًا 28 ذكر من أصل أفريقي كاريبي، يبلغ من العمر
- (6/38) (LE) فقدان الرؤية بدون ألم
- خلل في الرؤية اللونية
- الأيسر RAPD
- عامًا بعد العلاج 21 الانتكاسات المستجيبة للكورتيكوستيرويدات على مدار حوالي
- Gd+ يظهر التصوير بالرنين المغناطيسي الحاد تورم العصب البصري الأيسر،
- مصل إيجابي AQP4

# تمرين عملي : الحالة الثانية



## A Diagnosis of optic neuritis



### Panel 1: Diagnostic criteria for optic neuritis

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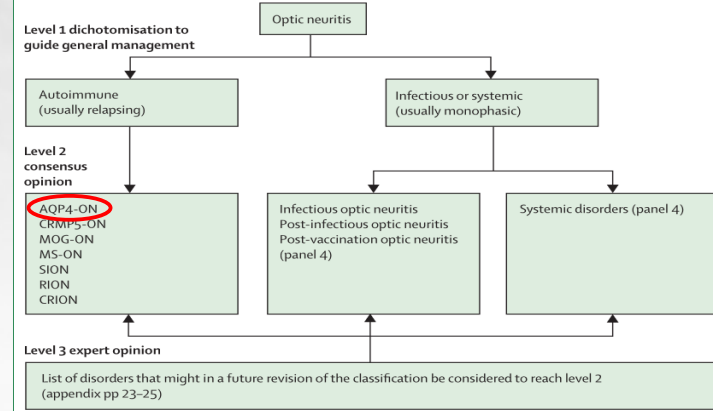
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## B Classification of optic neuritis



# الحالة الثالثة



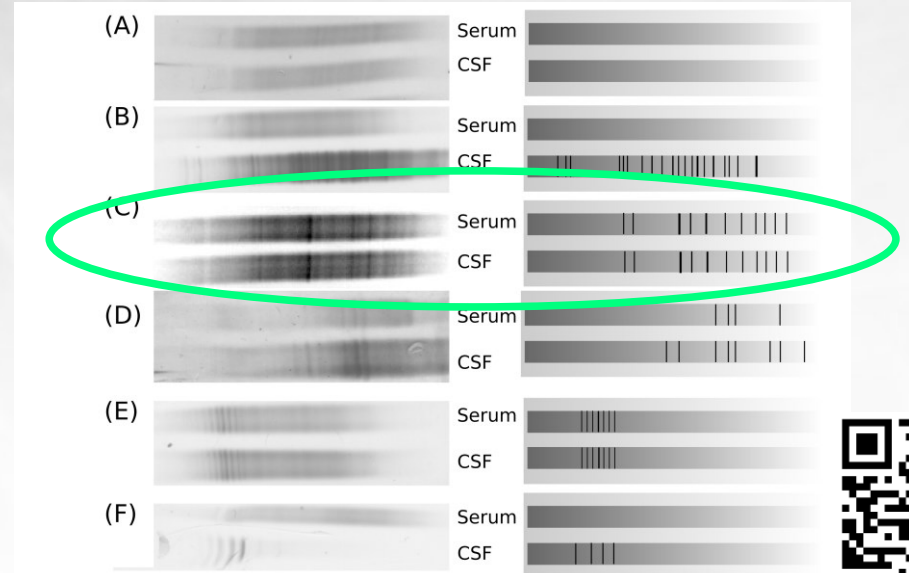
- في ولاية أريزونا COVID عامًا تتلقى لقاح 64 امرأة تبلغ من العمر
- يومًا من الألم في العين، يزداد سوءًا مع حركات العين 14 بعد
- بعد يومين من فقدان الرؤية الثنائية المتتالية
- يومًا من بداية المرض 23 يتم إعطاؤه بعد (مجم 500 أيام، 5) IVMP
- استعادة وظيفية ممتازة للرؤية بعد مرور عام واحد من العملية
  - RE 6/9، إيشيهارا 15/17
  - LE 6/7.5، إيشيهارا 17/17



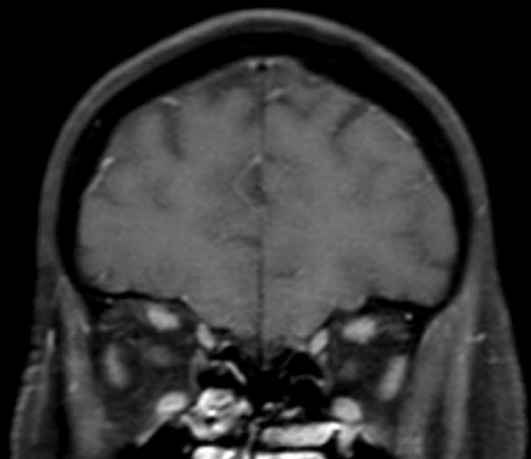
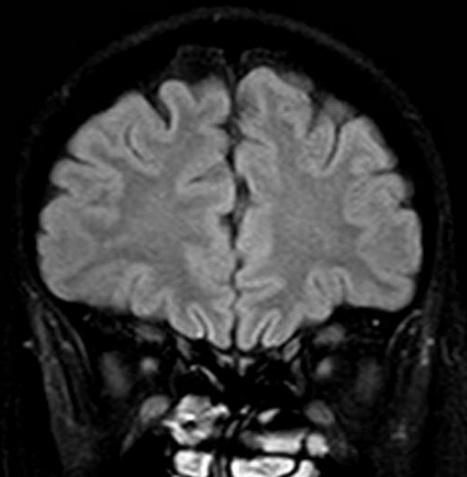
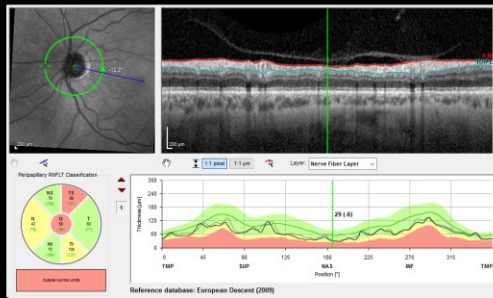
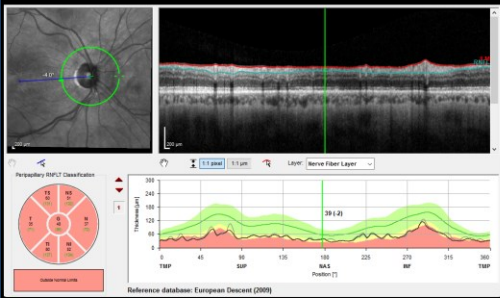
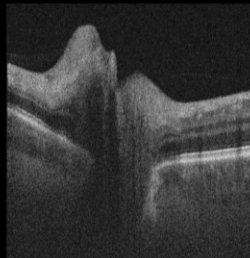
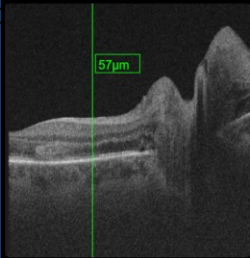
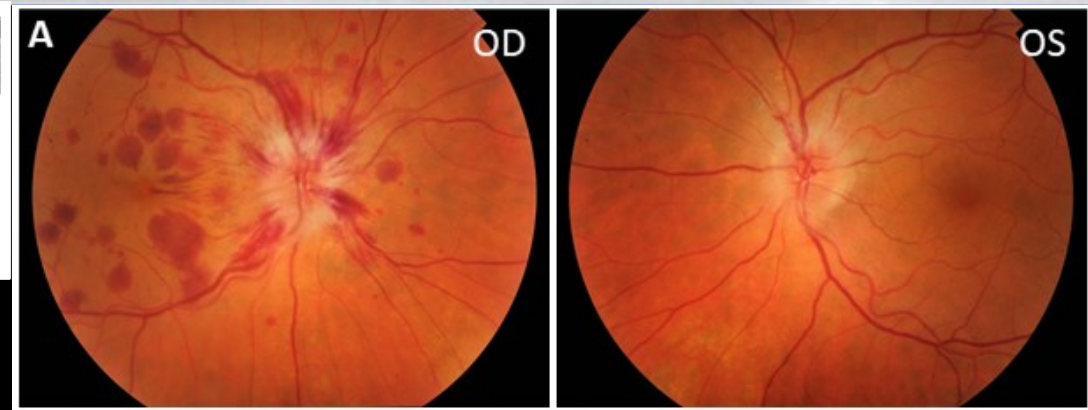
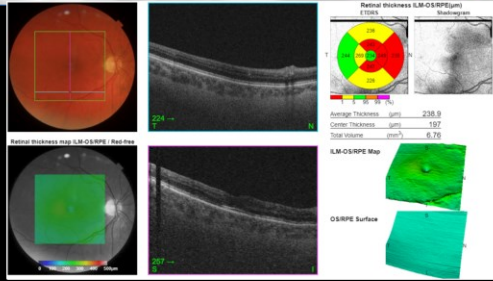
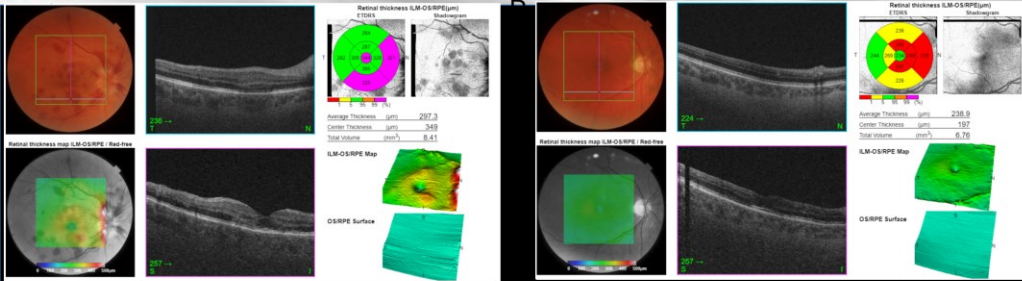
# الحالة الثالثة



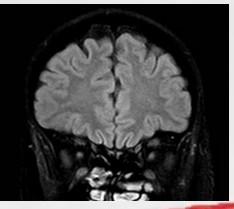
- أكتوبر: راجع الشرائح التالية للأجهزة المختلفة.
- للأعصاب البصرية، دون (FLAIR، T2) التصوير بالرنين المغناطيسي: زيادة الإشارة.  
تعزيز التباين.
- العلامة الحيوية:
  - سلبي AQP4 و MOG
  - أشربة متطابقة: IgG



# الحالة الثالثة



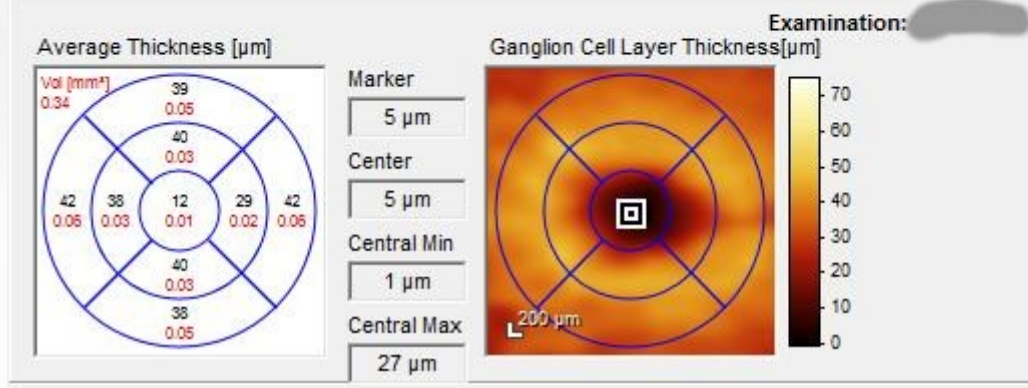
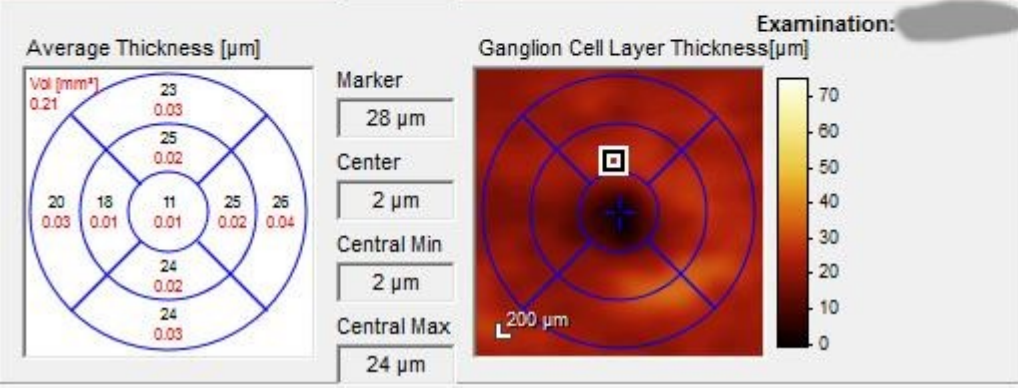
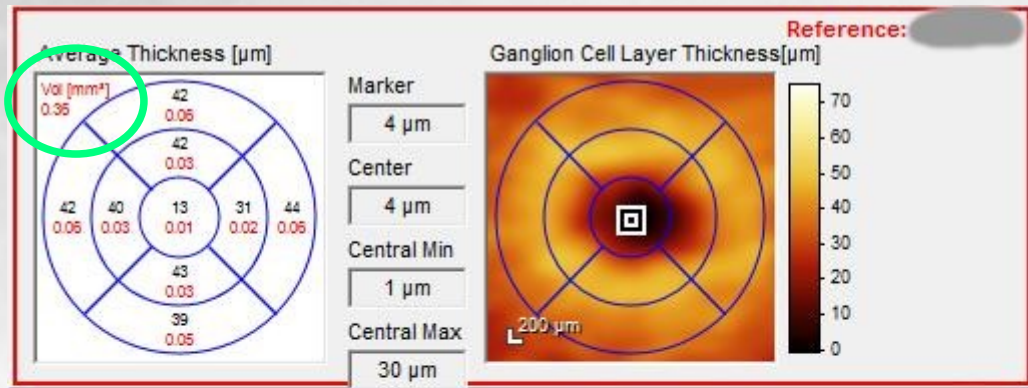
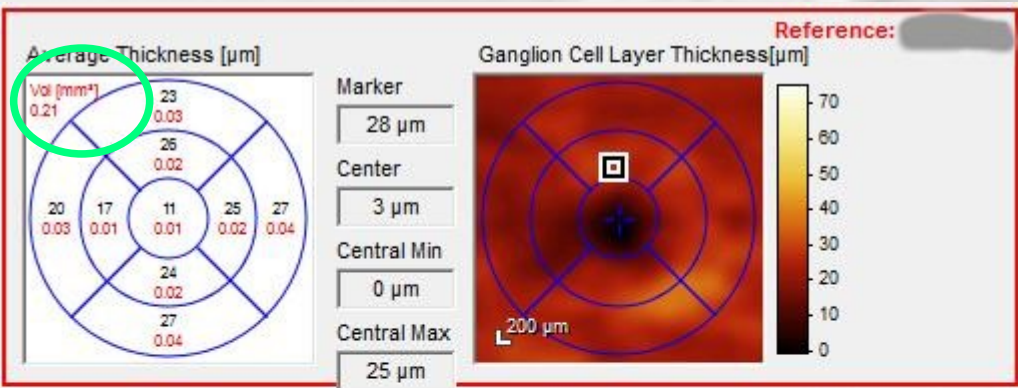
# عدم تناسق الشبكية



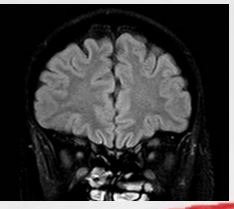
RE mGCL 0.21

LE mGCL 0.36

IEPD: 62%



# عدم تناسق الشبكية

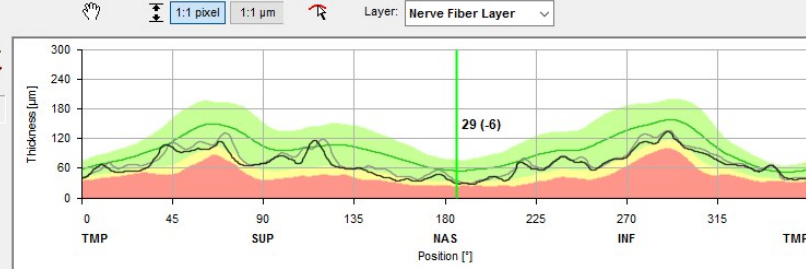
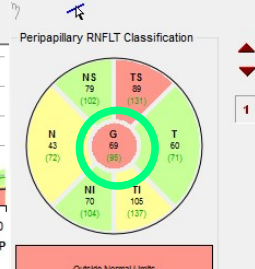
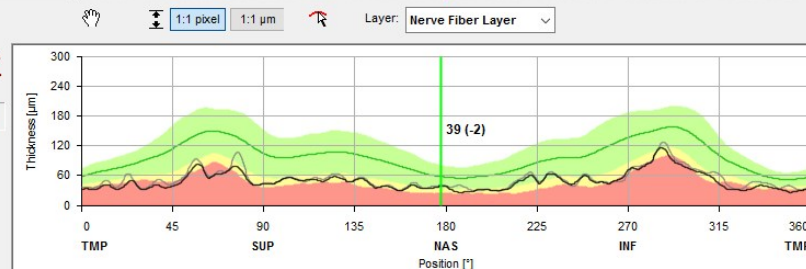
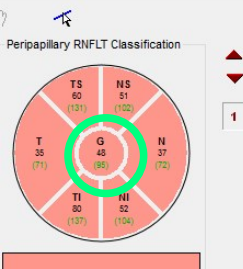
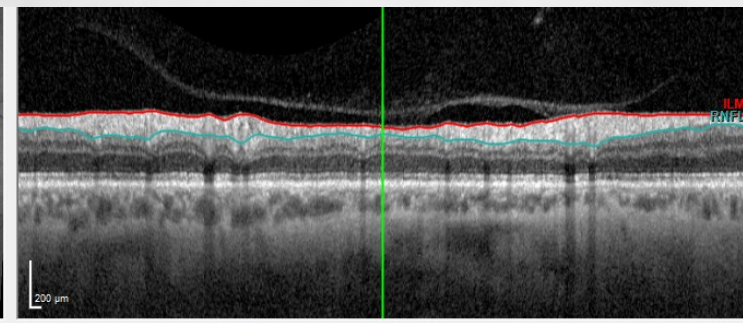
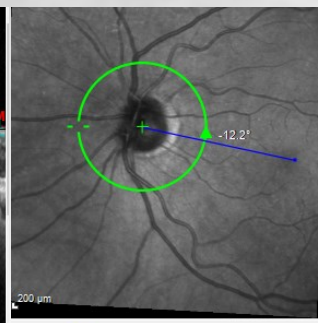
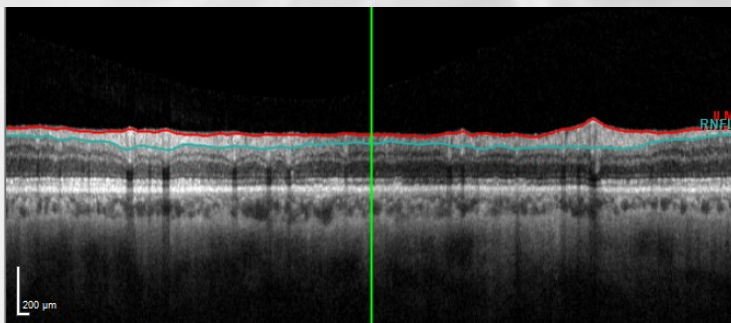
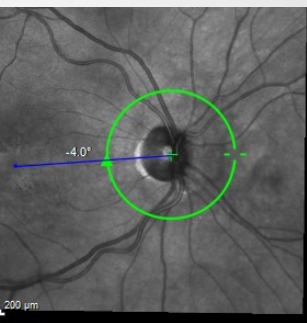


NEURO  
MARRAKECH

RE pRNFL 48  $\mu\text{m}$

LE pRNFL 69  $\mu\text{m}$

IEPD: 31%





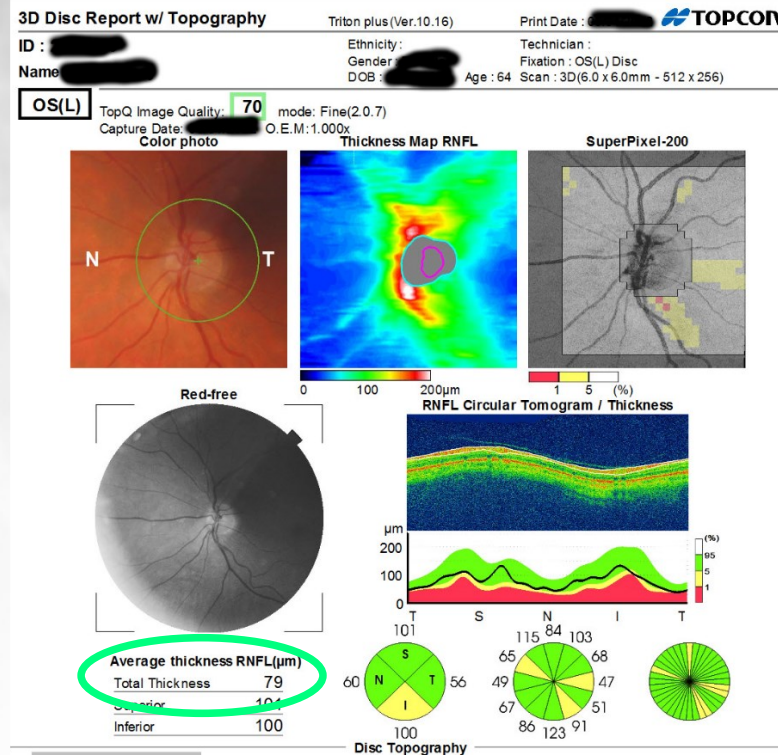
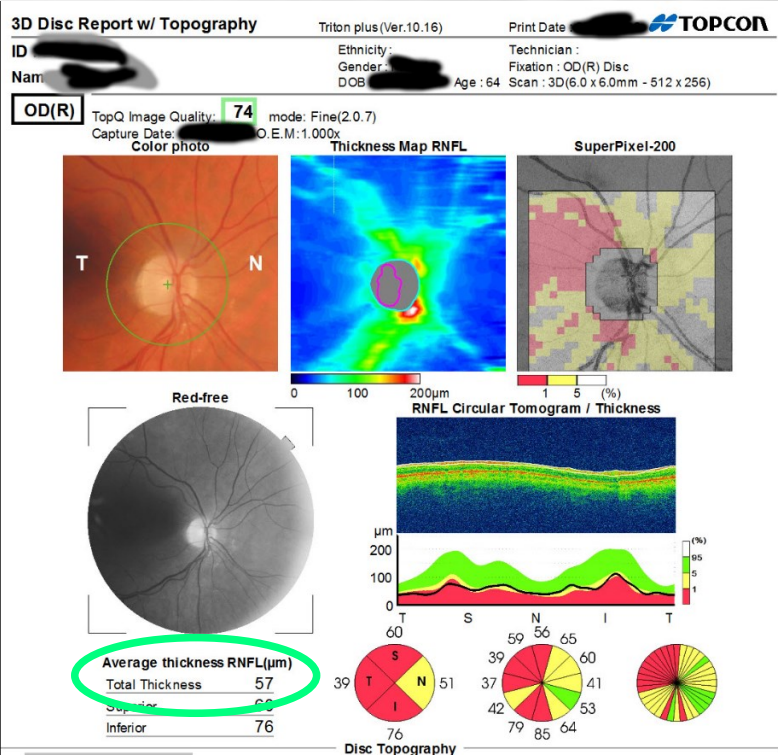
# عدم تناسق الشبكية



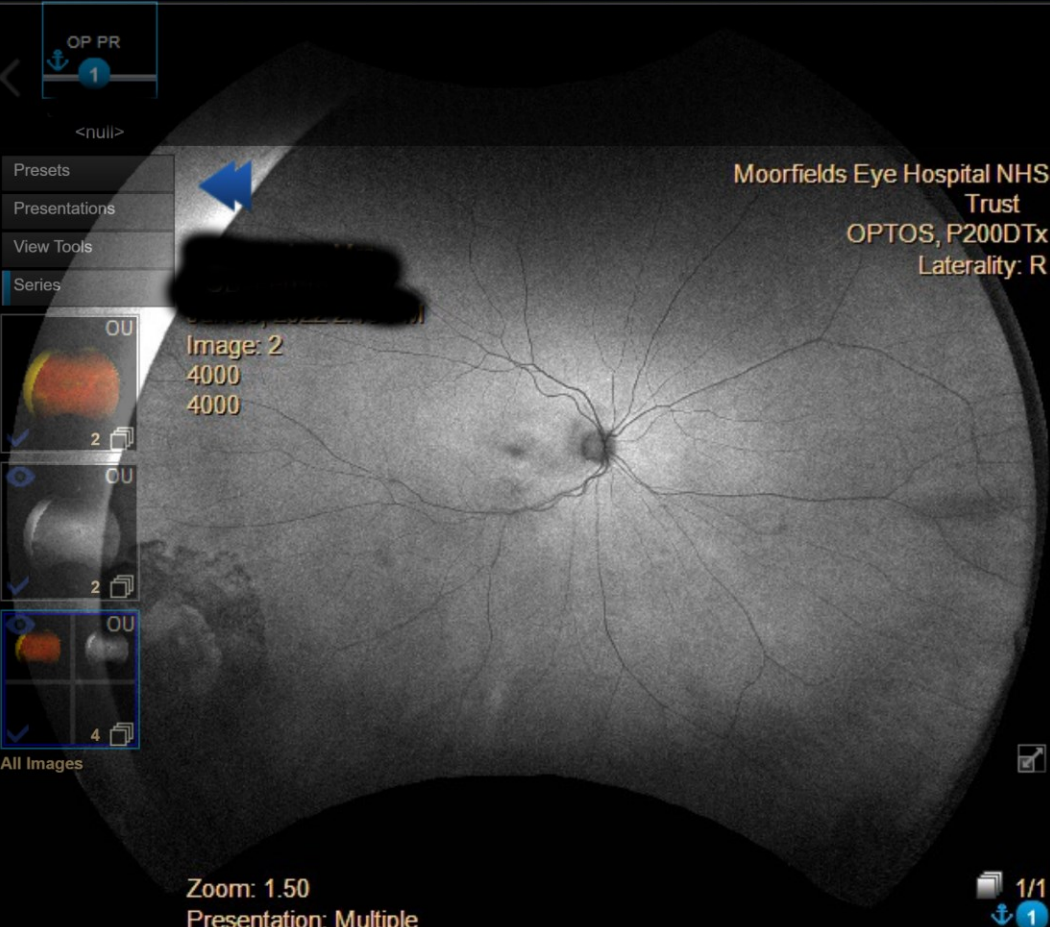
Topcon RE pRNFL 57  $\mu\text{m}$

LE pRNFL 79  $\mu\text{m}$

IEPD: 28%



# الفلورية الذاتية

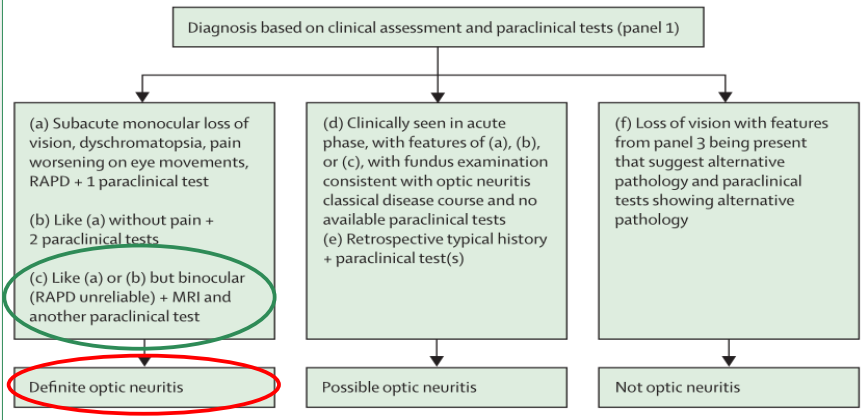


# تمرين عملي : الحالة الثالثة



**IEPD: mGCL 62% (> 4%) ، pRNFL 28-32% (> 5%)**

## A Diagnosis of optic neuritis



### Panel 1: Diagnostic criteria for optic neuritis

#### Clinical criteria

- A: Monocular, subacute loss of vision associated with orbital pain worsening on eye movements, reduced contrast and colour vision, and relative afferent pupillary deficit
- B: Painless with all other features of (A)
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- Corresponding optic disc swelling acutely or an inter-eye difference in the mGCIPL of >4% or >4 μm or in the pRNFL of >5% or >5 μm within 3 months after onset
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#### Application of the clinical and paraclinical criteria

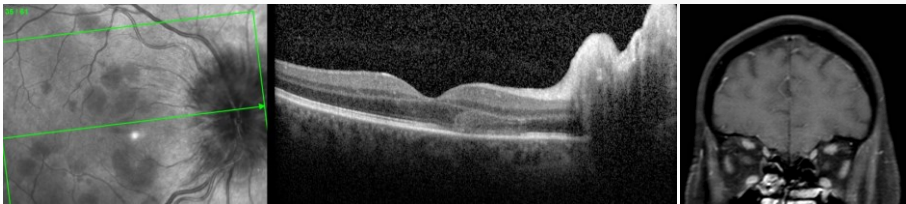
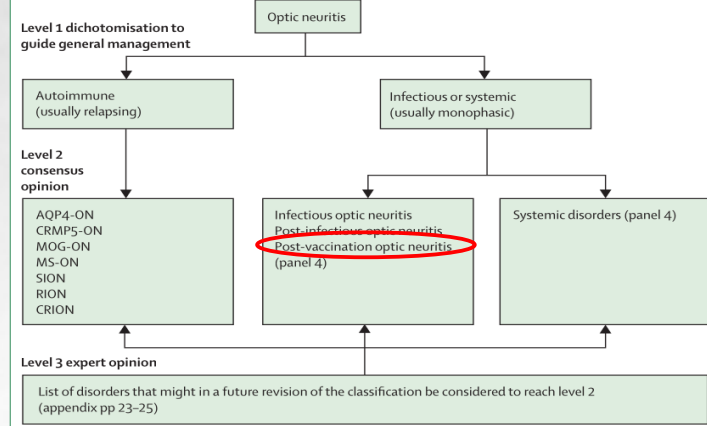
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- (A), (B), or (C) if seen acutely but in absence of paraclinical tests, with fundus examination typical for optic neuritis and consistent with the natural history during follow-up
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## B Classification of optic neuritis



ما قبل الصفائح على في حالة حادة

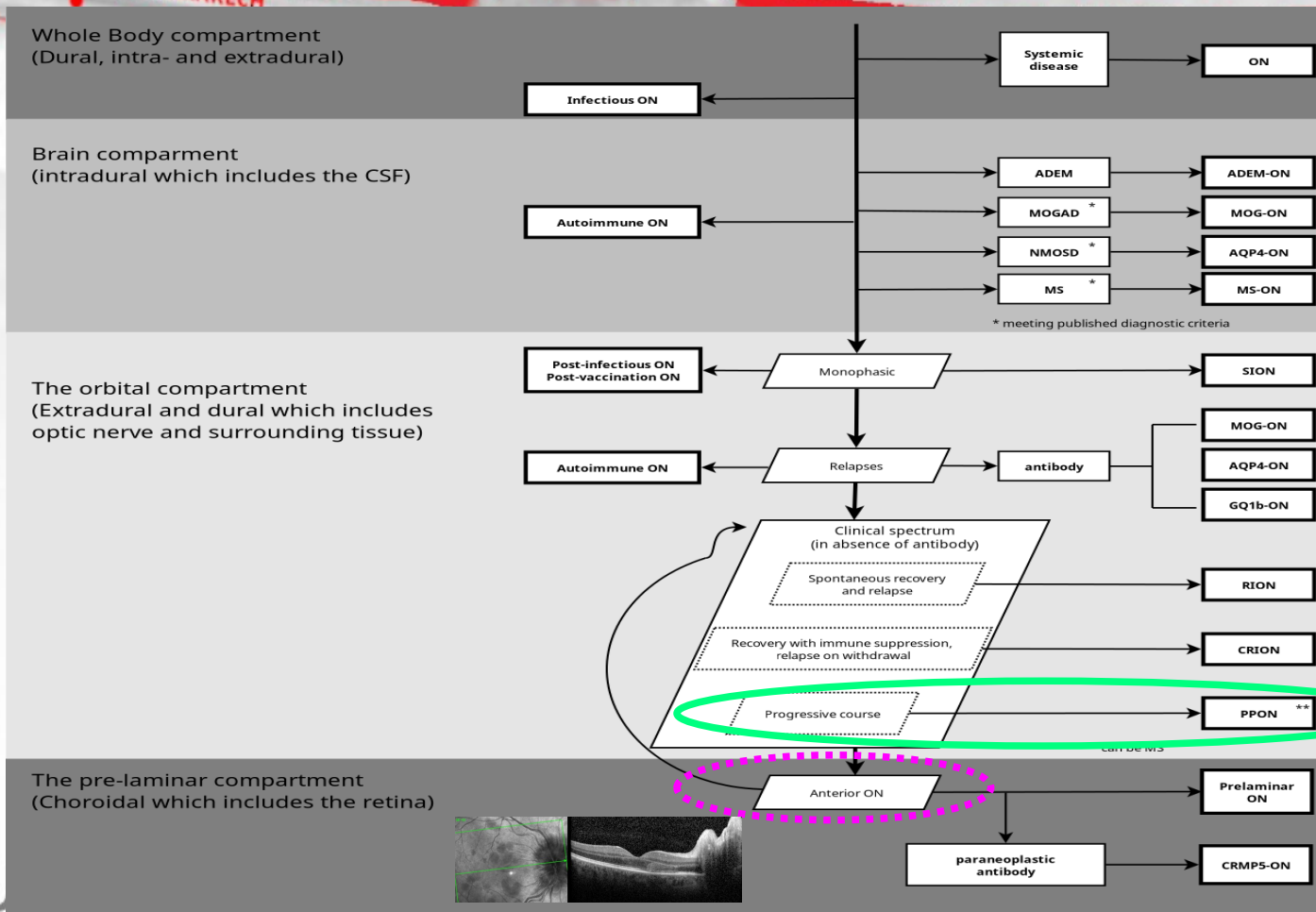
قد لا يظهر التصوير بالرنين المغناطيسي تعزيز التباين

## سيناريوهات سريرية ذات تعقيد متزايد 3



- هل هذا مرض التصلب المتعدد؟: الحالة 1  
السيناريو أ RAPD+ شبه حاد، خلل في الرؤية، LOV ألم، أحادي العين، السيناريو أ
- هل هذا هو NMOSD؟: الحالة 2  
السيناريو ب RAPD+ شبه حاد، خلل في الرؤية اللونية، LOV لا يوجد ألم، أحادي العين، السيناريو ب
- هل كان هذا بسبب لقاح كوفيد؟: الحالة 3  
السيناريو ج غير موثوق به RAPD شبه حاد، خلل في الرؤية، LOV ثنائي العين، السيناريو ج

# تشرح



دكتور برين

دكتور عين

# ON تقديمية أولية



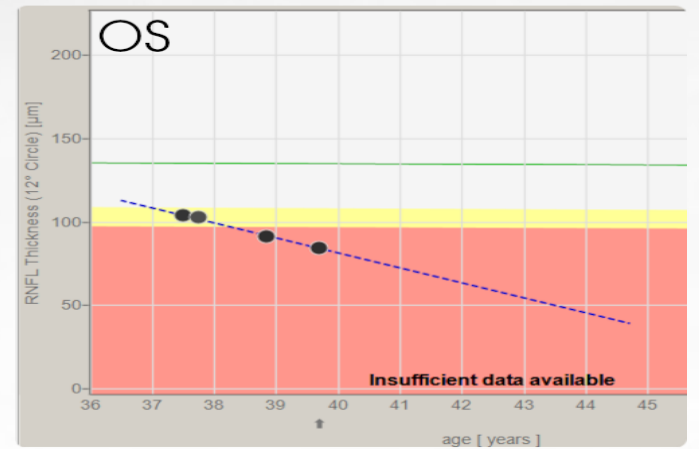
## PPON

Primary progressive optic neuritis. Diagnosis requires progressive atrophy or progressive visual loss, or both for >12 months. Diagnosis of PPON is based on time and applies to all subforms of ON that present with a progressive rather than a relapsing disease course.



# الحالة الرابعة : PPON

- عامًا تعاني من التصلب المتعدد، 27سيدة تبلغ من العمر وتتناول دواء ديميثيل فومارات
- VA:
  - 2022 RE 6/9 LE 6/24
  - 2023 RE 6/18 LE 6/24
  - 2024 RE 6/48 LE 6/60
- انخفاض pVEP ، pERG N95:P50 ، ffERG طبيعي. التصوير بالرنين المغناطيسي: مستقر
- يؤكد التصوير المقطعي البصري التقدم بشكل مستقل عن نشاط الانتكاس.



# الحالة الخامسة



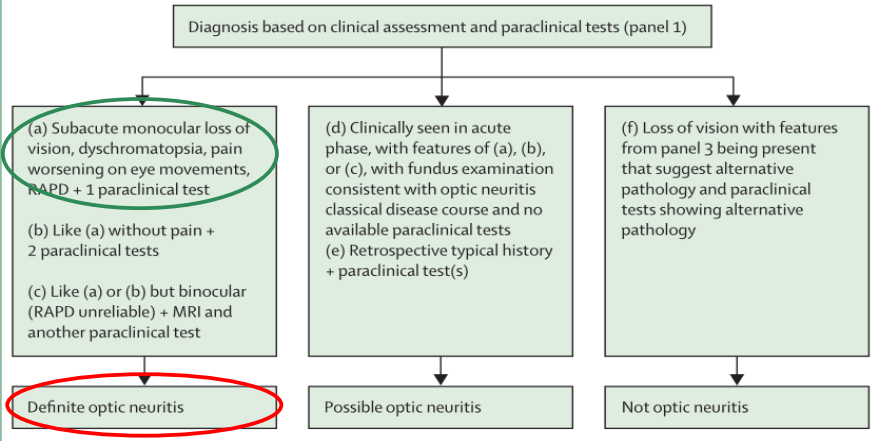
- عامًا تعاني من تفاقم الألم عند تحريك العين 54 امرأة تبلغ من العمر
- أيام 4 بعد
  - (HM) فقدان الرؤية
  - خلل في الرؤية بالعين المجردة
- الأيمن RAPD
- مصل إيجابي MOG



# تمرين عملي : الحالة الخامسة



## A Diagnosis of optic neuritis



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#### Clinical criteria

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#### Application of the clinical and paraclinical criteria

##### Definite optic neuritis

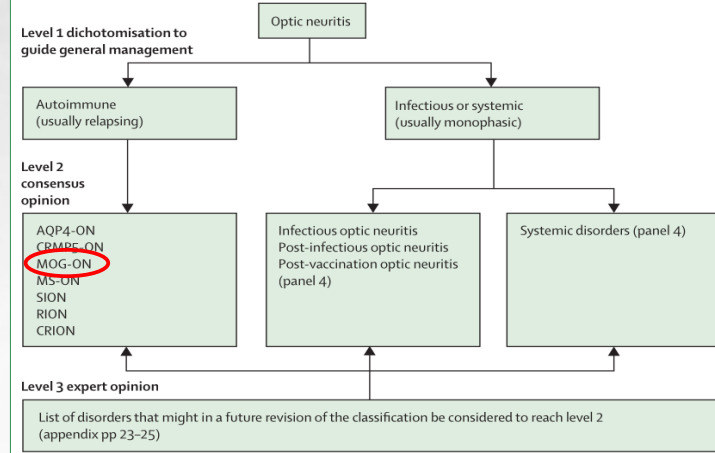
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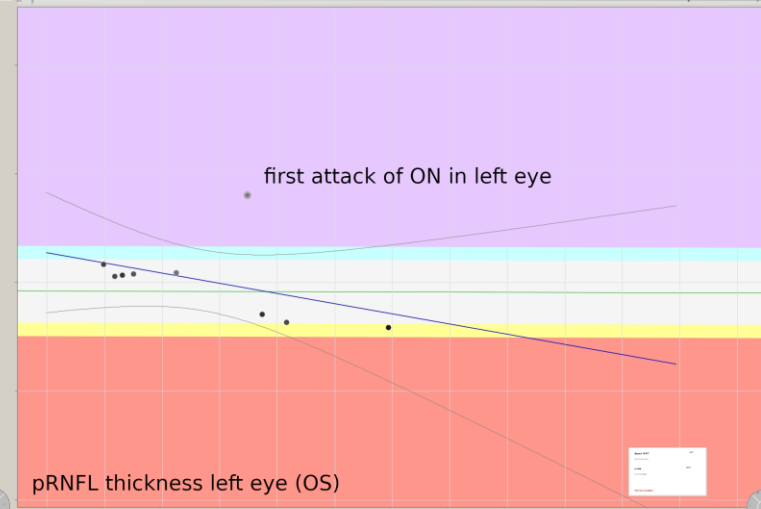
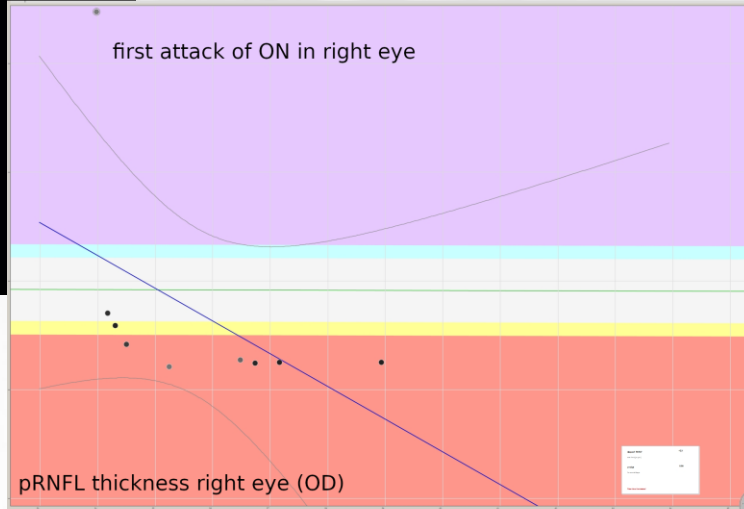


# العلاج :5 الحالة

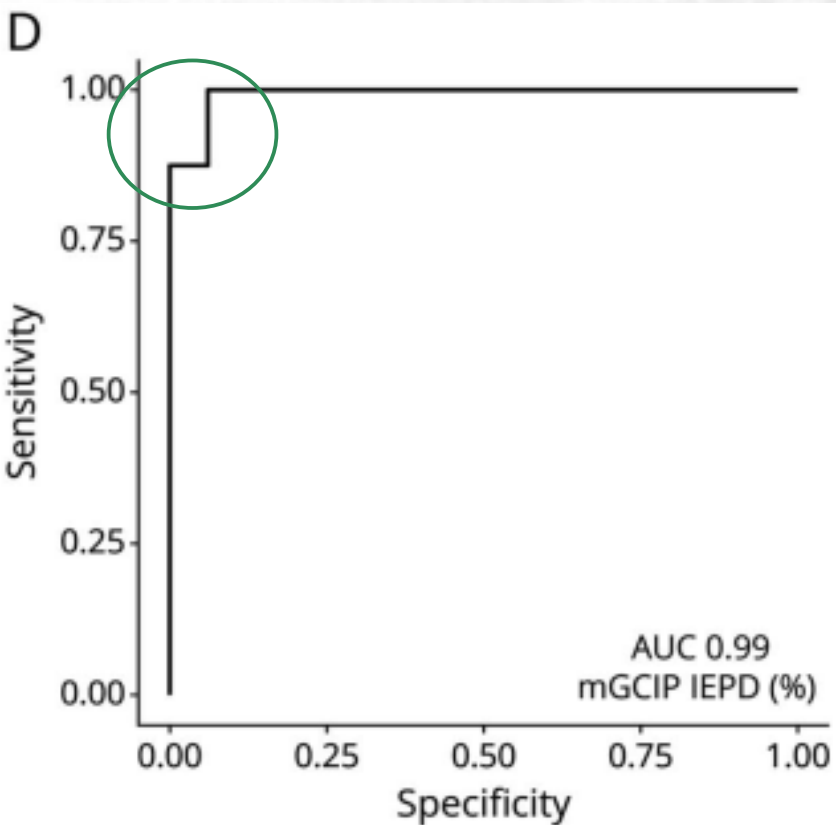


الكورتيكوستيرويدات لعلاج التهاب المفاصل الروماتويدي في غضون أسبوعين من بداية المرض. توقف الألم في غضون ساعات بعد الجرعة الأولى

خلال LE تم استخدام الكورتيكوستيرويدات في LE إلى الظهر في MOG-ON سنوات من الانتكاس، عادت أعراض 3 بعد RE مقارنة بـ LE أقل حدة في pRNFL أسبوع واحد من البداية. توقف الألم خلال ساعات. ضمور

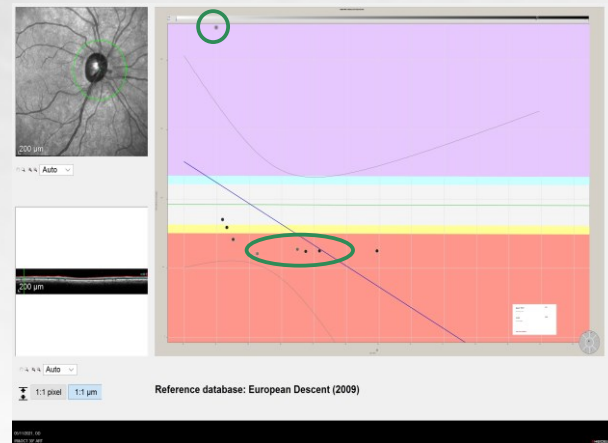


# MOG-ON في OCT التحقق من صحة



حاد:  
تورم شديد في القرص

مزمن:  
ضمور شديد



	HCS	MOG-ON
Subjects [N]	33	33
Subjects with unilateral ON [N (%)]		20 (61)
Subjects with bilateral ON [N (%)]		13 (39)
Eyes [N]	66	66
Age [y, mean (SD)]	34 (11)	39 (15)
Sex [m, N (%)]	16 (48.5)	16 (48.5)
Time since ON [y, mean (SD)]		3 (4)
pRNFL [ $\mu\text{m}$ , mean (SD)]	95.98 (7.91)	71.03 (24.35)
mGCIP [ $\mu\text{m}$ , mean (SD)]	86.48 (9.64)	67.32 (19.46)
IEAD pRNFL [ $\mu\text{m}$ , mean (SD)]	2.70 (2.49)	23.75 (17.50)
IEPD pRNFL [%, mean (SD)]	2.77 (2.61)	25.90 (16.85)
IEAD mGCIP [ $\mu\text{m}$ , mean (SD)]	2.61 (2.70)	20.60 (13.10)
IEPD mGCIP [%, mean (SD)]	2.92 (2.88)	24.94 (14.52)

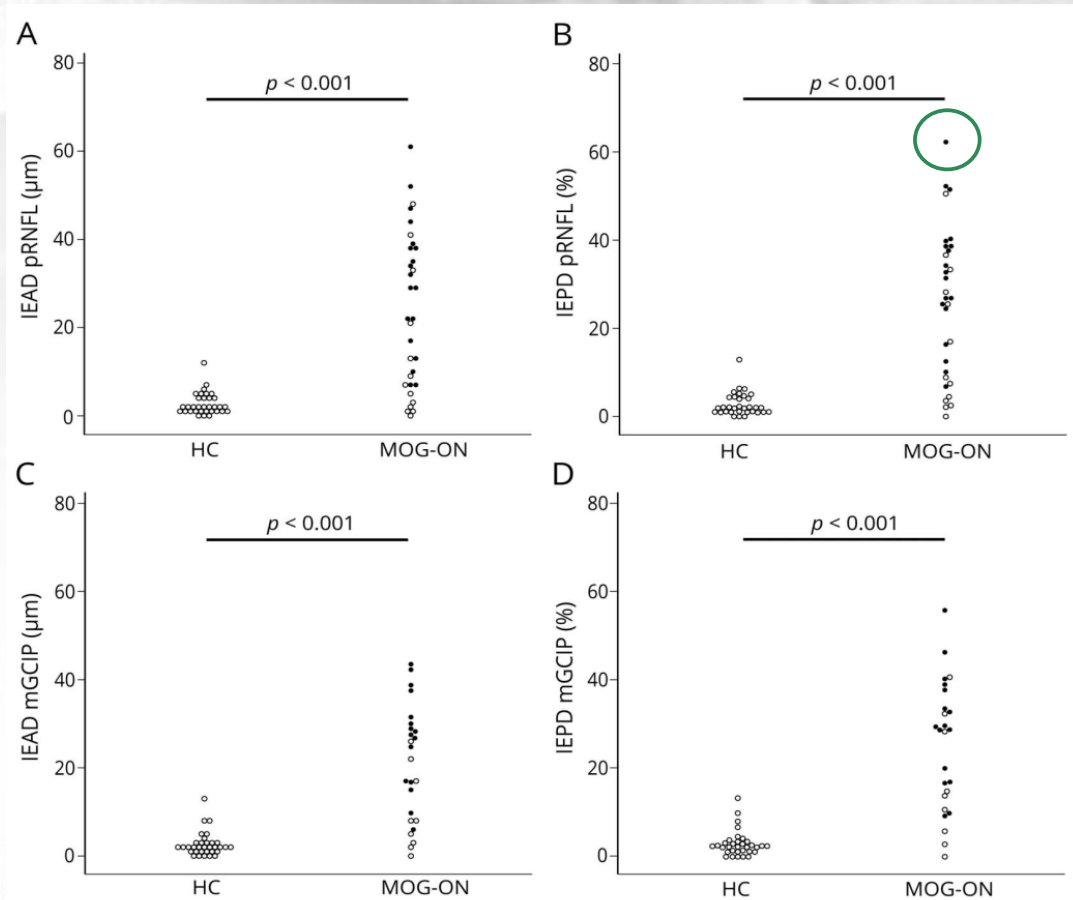
**Table 2** Intereye Percentage and Absolute Differences

	<i>t</i>	<i>p</i> Value
<b>MOG-ON (all subjects) vs HCs</b>		
pRNFL IEAD [ $\mu\text{m}$ ]	-6.739	<0.001
pRNFL IEPD [%]	-7.678	<0.001
mGCIP IEAD [ $\mu\text{m}$ ]	-6.760	<0.001
mGCIP IEPD [%]	-7.473	<0.001
<b>MOG-ON (unilateral) vs HC</b>		
pRNFL IEAD [ $\mu\text{m}$ ]	-7.796	<0.001
pRNFL IEPD [%]	-8.642	<0.001
mGCIP IEAD [ $\mu\text{m}$ ]	-8.429	<0.001
mGCIP IEPD [%]	-8.213	<0.001
<b>MOG-ON (bilateral) vs HC</b>		
pRNFL IEAD [ $\mu\text{m}$ ]	-2.499	0.028
pRNFL IEPD [%]	-3.118	0.009
mGCIP IEAD [ $\mu\text{m}$ ]	-2.389	0.043
mGCIP IEPD [%]	-2.886	0.020

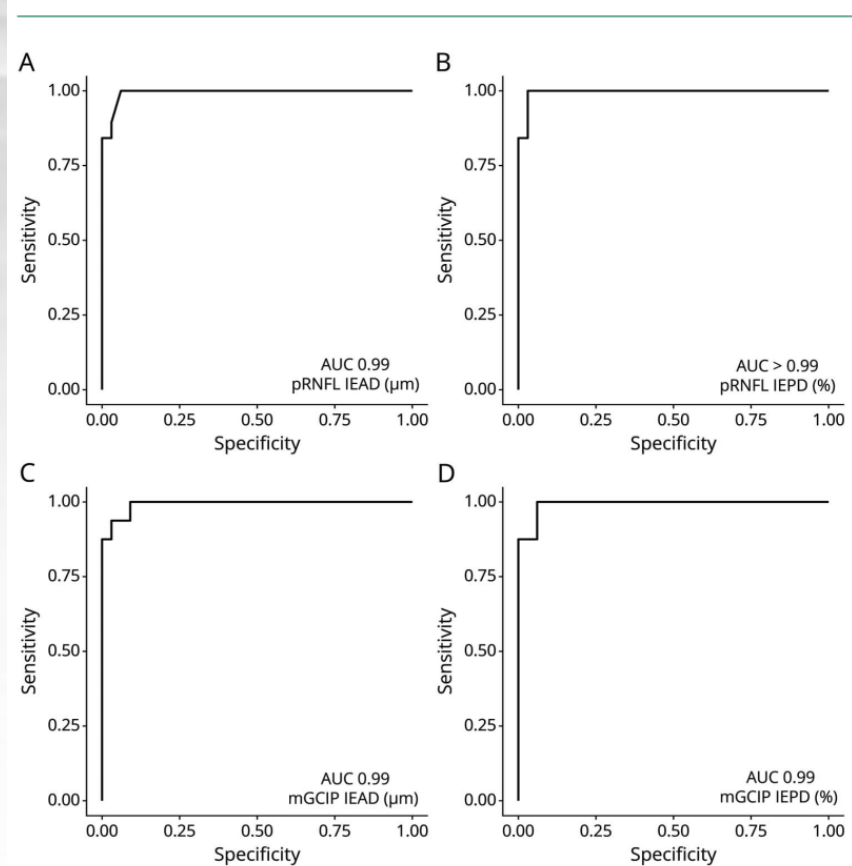




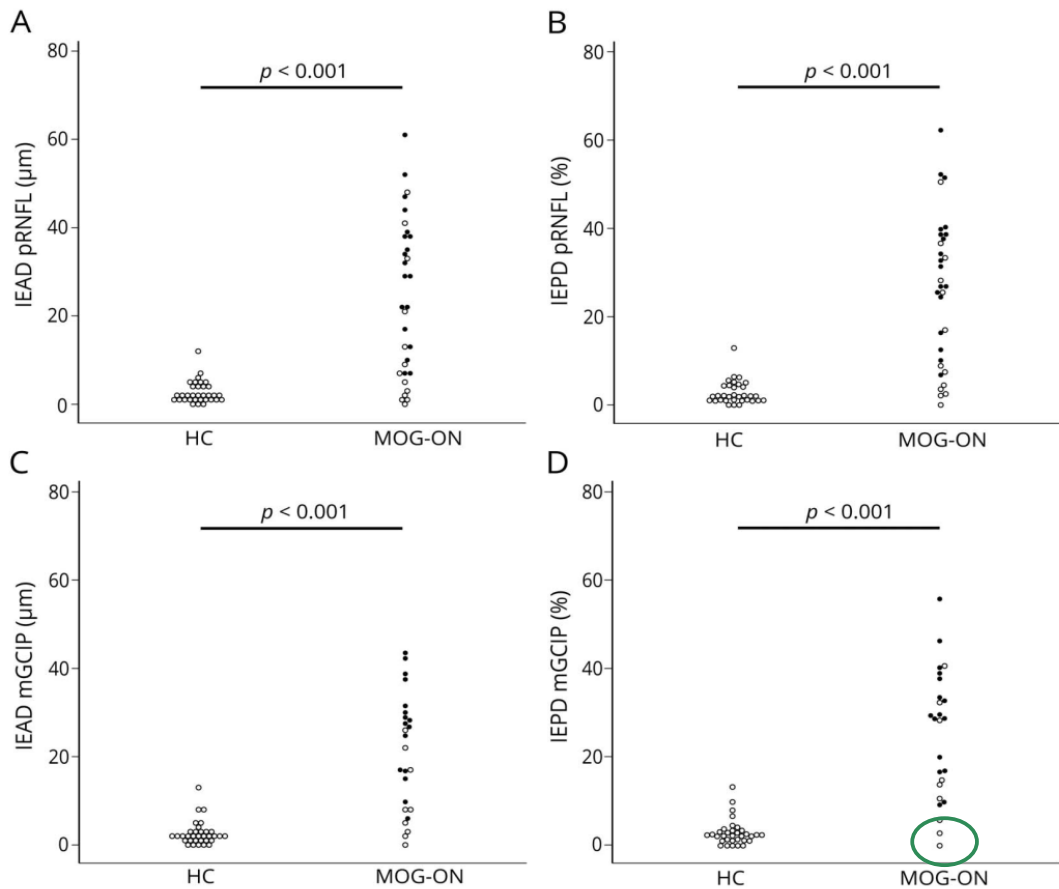
# أحادي الجانب الجانِب MOG-ON في OCT



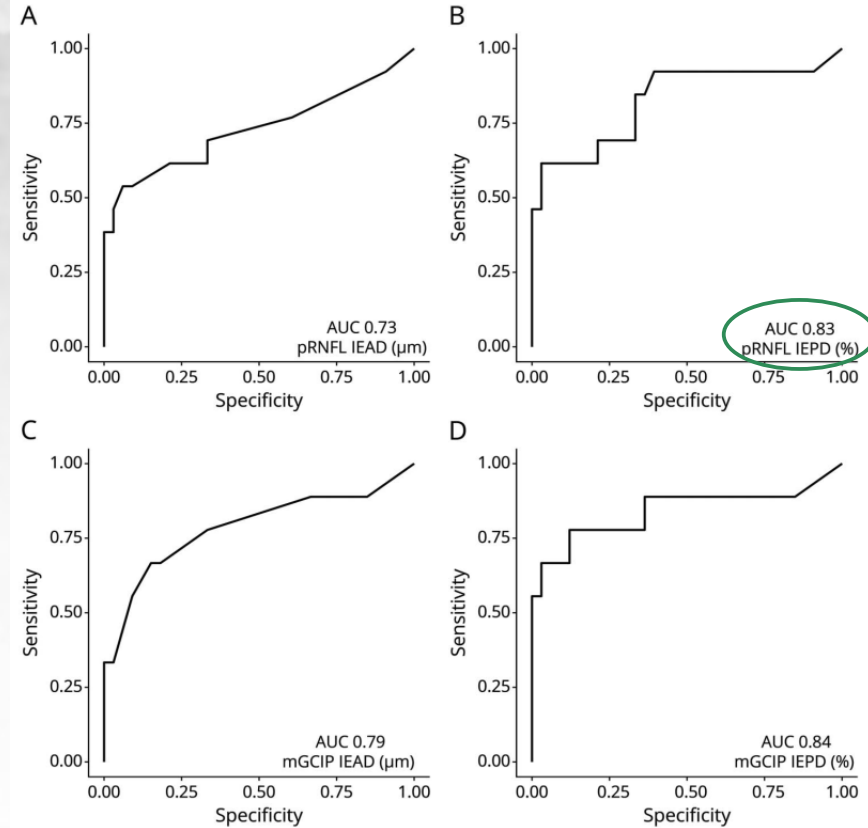
**Figure 3** Diagnostic Sensitivity and Specificity of IED in Unilateral MOG-ON



# التشائي MOG-ON في OCT



**Figure 4** Diagnostic Sensitivity and Specificity of IED in Bilateral MOG-ON

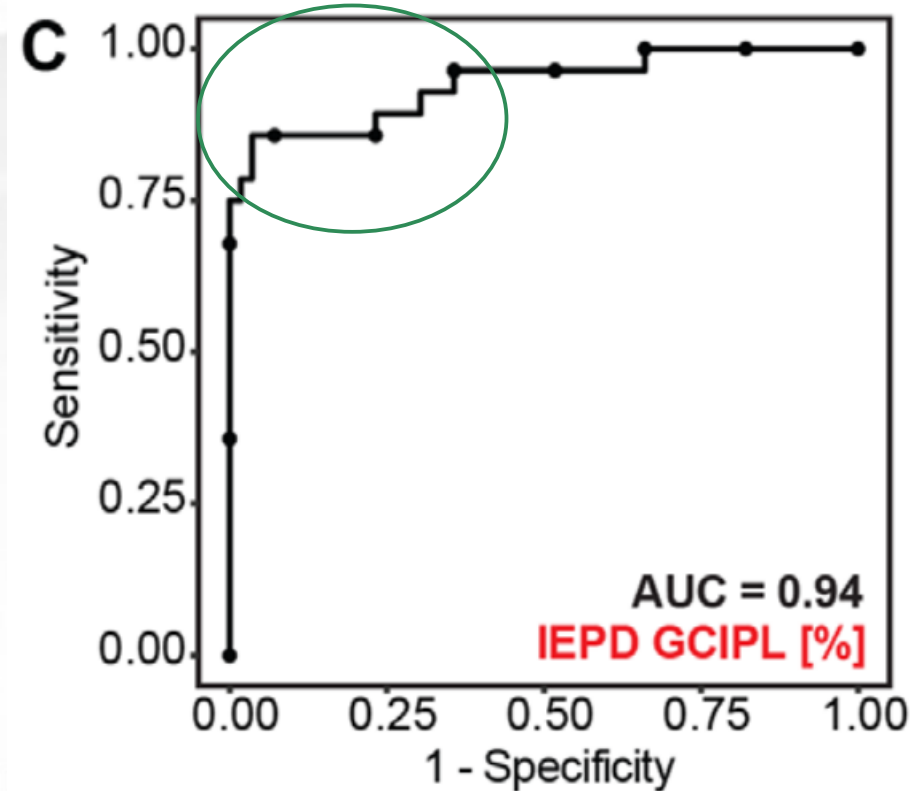


**Table 3** Diagnostic Sensitivity and Specificity of IED in MOG-ON

	AUC	95% CI	Specificity (%)	Sensitivity (%)	Positive predictive value	Negative predictive value
<b>MOG-ON vs HCs</b>						
pRNFL IEAD	0.89	0.80-0.98	79	84	0.80	0.83
pRNFL IEPD	0.93	0.86-1.0	82	84	0.82	0.84
mGCIP IEAD	0.92	0.83-1.0	82	88	0.83	0.87
mGCIP IEPD	0.94	0.86-1.0	82	92	0.84	0.91
<b>MOG-ON (unilateral) vs HC</b>						
pRNFL IEAD	0.99	0.98-1.0	79	≥99	0.74	0.99
pRNFL IEPD	>0.99	0.98-1.0	82	≥99	0.77	0.99
mGCIP IEAD	0.99	0.98-1.0	82	≥99	0.77	0.99
mGCIP IEPD	0.99	0.98-1.0	82	≥99	0.77	0.99
<b>MOG-ON (bilateral) vs HC</b>						
pRNFL IEAD	0.73	0.53-0.93	79	62	0.53	0.84
pRNFL IEPD	0.83	0.67-0.98	82	62	0.57	0.84
mGCIP IEAD	0.79	0.58-1.0	82	67	0.59	0.86
mGCIP IEPD	0.84	0.63-1.0	82	78	0.63	0.90



# AQP4-ON في OCT التحقق من صحة



**Table 1** Demographic overview

	HC	NMOSD-NON	NMOSD-ON
Subjects (n)	62	45	28
Eyes (n)	124	90	56
Patients with a disease duration <10 years (n)	.	43	21
Patients with ON as first manifestation (n)	.	.	17
Age (year, mean±SD)	37.7±10.2	39.0±10.4	38.8±12.1
Sex (male, n (%))	20 (32)	2 (4)	3 (11)
Time since ON (year, median (min–max))	.	.	2.8 (0.7–19.5)
Time since onset (year, mean±SD)	.	3.8±4.0	6.5±5.6

curve (pROC) method.

**Results** The discriminative power was high for NMOSD-ON versus HC for IEAD (pRNFL: AUC 0.95, specificity 82%, sensitivity 86%; GCIPL: AUC 0.93, specificity 98%, sensitivity 75%) and IEPD (pRNFL: AUC 0.96, specificity 87%, sensitivity 89%; GCIPL: AUC 0.94, specificity 96%, sensitivity 82%). The discriminative power was high/moderate for NMOSD-ON versus NMOSD-NON for IEAD (pRNFL: AUC 0.92, specificity 77%, sensitivity 86%; GCIPL: AUC 0.87, specificity 85%, sensitivity 75%) and for IEPD (pRNFL:

⇒ OCT parameters of novel diagnostic ON criteria are applicable in AQP4+NMOSD.

AUC 0.94, specificity 82%, sensitivity 89%; GCIPL: AUC 0.88, specificity 82%, sensitivity 82%.

**Conclusions** Results support the validation of the IED metrics as OCT parameters of the novel diagnostic ON criteria in AQP4+NMOSD.





# ON التحقق من صحة معايير



Journal of Neurology  
<https://doi.org/10.1007/s00415-024-12335-y>

ORIGINAL COMMUNICATION



Applying the 2022 optic neuritis criteria to noninflammatory optic neuropathies with optic nerve T2-hyperintensity: an observational study

مريضا 150  
حاد إلى مزمن

Fernando Labella Álvarez<sup>1,6</sup> · Valérie Biousse<sup>1,5,6</sup> · Rasha Mosleh<sup>1,2,6</sup> · Amit M. Saindane<sup>3,4</sup> · Nancy J. Newman<sup>1,4,5,6</sup> 



97.4% الخصوصية

لرأس العصب MRI Gd+ تم إجراء فحص  
البصري لأربعة مرضى يعانون من اعتلال  
العصب البصري الإقفاري.

# ON التحقق من صحة معايير



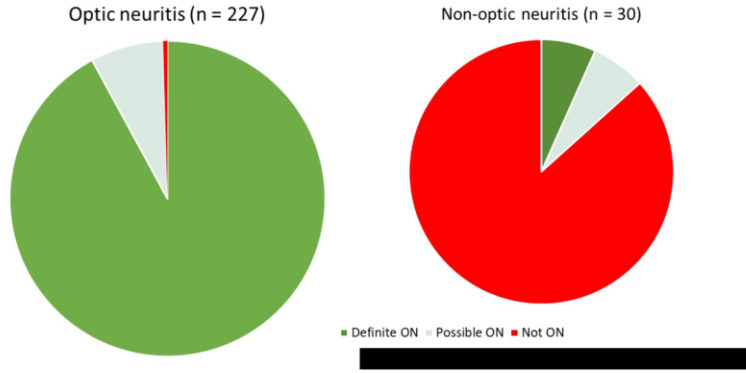
Journal of Neurology  
https://doi.org/10.1007/s00415-024-12540-9

## SHORT COMMENTARY

### Diagnostic criteria for optic neuritis in the acute and subacute phase: clinical uses and limitations

Z. Duvigneaud<sup>1</sup> · P. Lardeux<sup>1</sup> · S. Verrecchia<sup>1</sup> · L. Benyahya<sup>2</sup> · R. Marignier<sup>2,3</sup> · C. Froment Tilikete<sup>1,3</sup> 

مريضا 257  
شبه حاد



، بحسب المؤلفون الحساسية بنسبة 88% بناءً على انتشار  
99.5% و86.7% والنوعية بنسبة  
الزهري العصبي، سلبية كاذبة 1  
تسلبية 2، LHON 2: إيجابية كاذبة 4  
(99.3% نسبة الخصوصية: 2/257)

Fig. 1 Representation of the contingency table. Left: among 227 final diagnoses of optic neuritis, one false-negative was found with the new diagnostic criteria. Right: among 30 final diagnoses of non-optic neuritis, four false-positives were found with the new diagnostic criteria

# خاتمة



- ON لتشخيص وتصنيف ICON 2022 التطبيق العملي لمعايير
- PIRA كنموذج محتمل لـ PPON
- هو الأمثل (%) عدم تناسق الشبكية: الفرق في النسبة المئوية بين العينين
- دقة تشخيصية ممتازة في دراسات التحقق بأثر رجعي ICON 2022 تظهر معايير

شكرا