
Flinders
UNIVERSITY

COMMONWEALTH OF AUSTRALIA

Copyright Regulations 1969

WARNING

- We acknowledge and pay our respects to the Kaurna people, the traditional custodians whose ancestral lands we gather on. We acknowledge the deep feelings of attachment and relationship of the Kaurna people to country and we respect and value their past, present and ongoing connection to the land and cultural beliefs.

STROKE AND THE EYE

STROKES

- Leading cause of disability in Australia
- 27,428 people experienced a stroke for the first time in 2020
  - One stroke every 19 mins
  - Estimated to increases to 50,000 by 2050
- Rates of strokes have increased
  - 2012: 14% of people between 18-54
  - 2020: 24% of people between 18-54
- Rural and regional areas
  - 17% more likely to experience a stroke
- Aboriginal & Torres Strait Islanders are ~3x more likely

Impact of strokes

- 2020: 8,703 people died from a stroke
- 37% of people require support with everyday living following stroke
- Survivors lose 3.8 FT weeks of work/year

Risk Factors for strokes

- Hypertension
  - >140/80
- **Diabetes**
  - HbA1c >7.5%
- Hyperlipidaemia
  - Total >5.5mmol/L
- Obesity
  - BMI >25
- Physical inactivity
  - NO reported physical activity
- **Smoking**
  - Daily smoker
- Atrial fibrillation

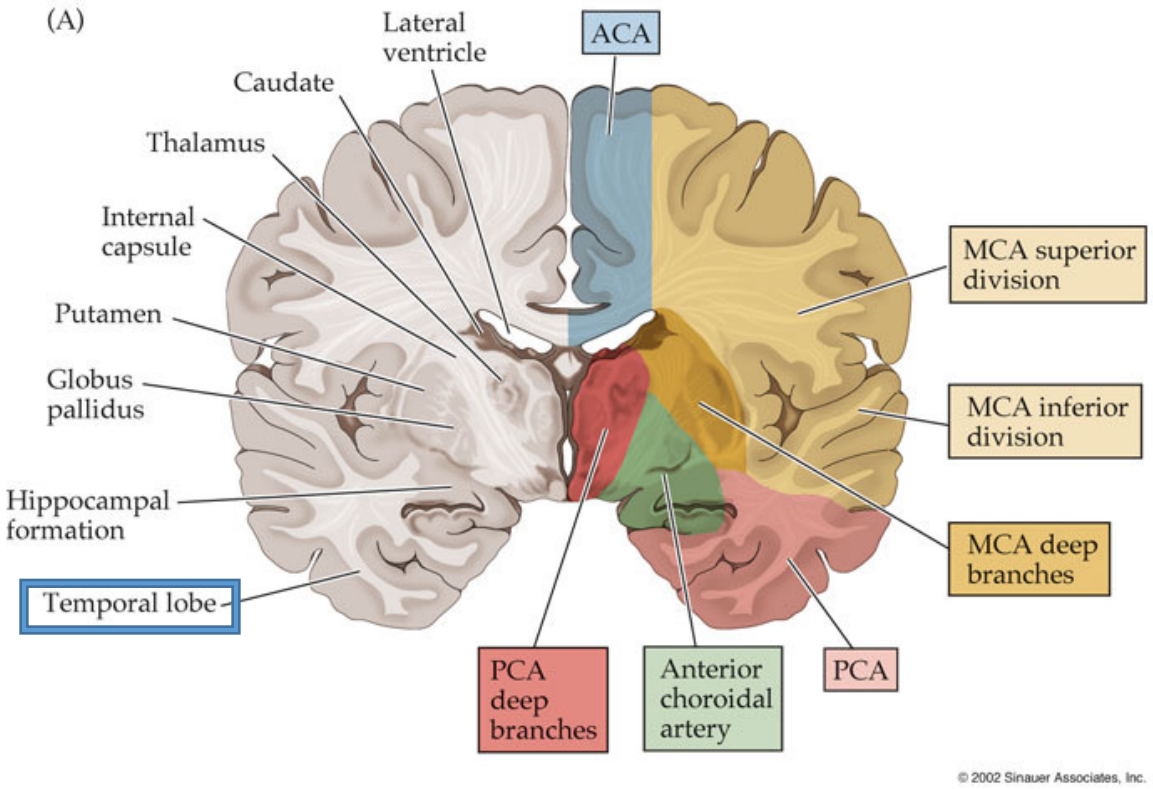
Stroke REVISION

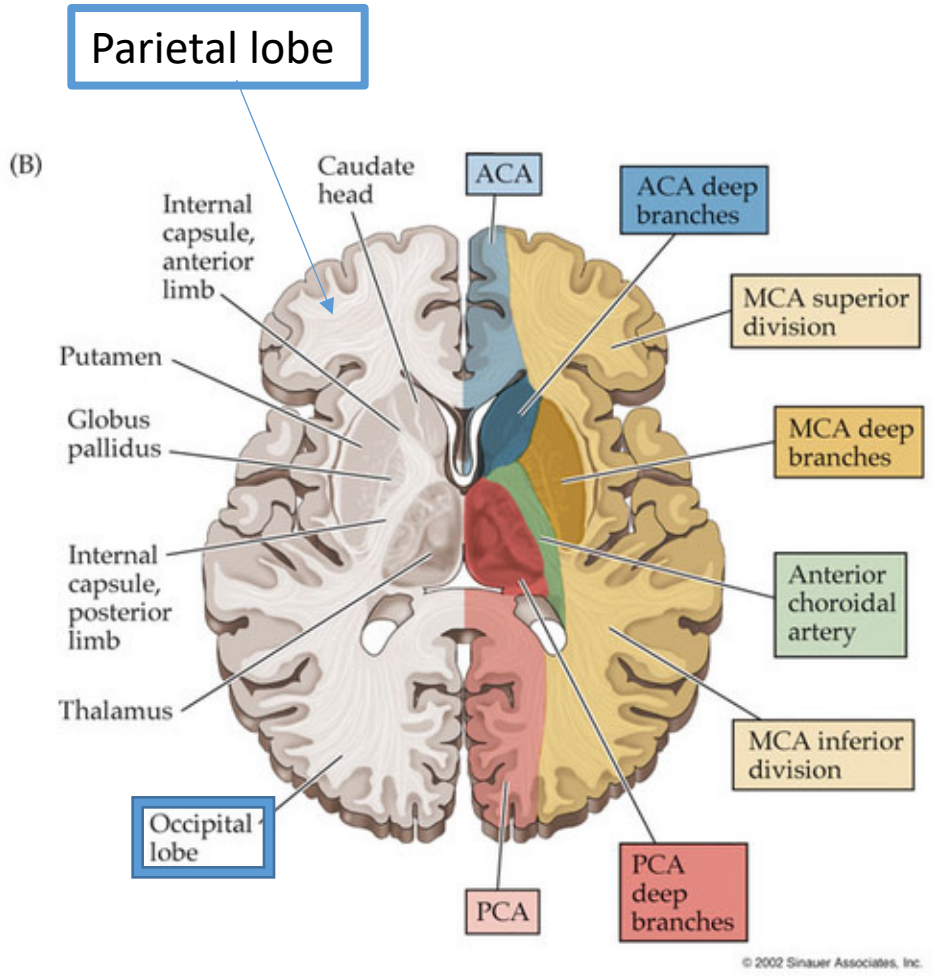
- A disruption of blood supply to the brain
- Three major types:
    - **Ischaemic**
        - Thrombotic
        - Embolic
        - Systemic hypoperfusion
    - **Haemorrhagic**
        - Intracerebral
        - Subarachnoid
    - **Transient Ischaemic attack (TIA)**

Ischaemic stroke

- **Thrombotic**
  - Due to formation of thrombus in artery
  - Thombus may block or reduce blood flow OR break off to block a distal vessel
  - Usually small vessel disease

- **Embolic**
  - Due to debris from another source accumulating and causing blockage
  - Classified by the source of emboli
    - Definite cardiac source
    - Possible cardiac source
    - Arterial source
    - Unknown source
  - Usually large vessel disease


(A)
Lateral ventricle
ACA
Caudate
Thalamus
Internal capsule
Putamen
Globus pallidus
Hippocampal formation
Temporal lobe
MCA superior division
MCA inferior division
MCA deep branches
PCA deep branches
Anterior choroidal artery
PCA
© 2002 Sinauer Associates, Inc.


Parietal lobe
(B)
Caudate head
ACA
ACA deep branches
Internal capsule, anterior limb
MCA superior division
Putamen
Globus pallidus
MCA deep branches
Internal capsule, posterior limb
Anterior choroidal artery
Thalamus
MCA inferior division
Occipital lobe
PCA
PCA deep branches
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Location of ischaemia and symptoms

CEREBRAL VESSEL	AREA OF BRAIN SUPPLIED	SYMPTOMS
Anterior Cerebral Artery (ACA)	Superior and medial area of parietal lobe & midline of frontal lobe MC	Contralateral leg > arm numbness or weakness
L Middle Cerebral Artery (L MCA)	Frontal, **temporal** and **parietal** lobe AND caudate, internal capsule, thalamus an **occipital** lobe	L strabismus, R face and arm>leg weakness, sensory loss, R hemianopia, **aphasia**
R Middle Cerebral Artery (R MCA)		R strabismus, L face and arm>leg weakness, sensory loss, R hemianopia, **neglect**
Posterior cerebral artery (PCA)	Medial **temporal** and **occipital** lobe, thalamus	Contralateral hemianopia, memory and sensory loss
Basilar artery	Cerebellum, brainstem, thalamus, **occipital** and medial temporal lobe	Coma/inattention, cortical blindness
Brainstem (superior/inferior cerebellar arteries)	Brainstem (cranial nerves)	Ataxia, vertigo, diplopia, contralateral weakness/sensory loss with ipsilateral CN deficits

Haemorrhagic Stroke

- **Intracranial haemorrhage**
  - Bleeding derived from smaller vessels
  - Slower bleeding forms haematoma -> spreads along white matter of brain
  - Symptoms may take minutes to hours to manifest
    - Headache
    - Nausea
    - Vomiting
  - Early symptoms of ICH help determine site of brain that contains haemorrhage
    - Putamen and internal capsule regions = limb motor and/or sensory signs
    - Cerebellum = ataxia
    - L temporal lobe = aphasia

Haemorrhagic Stroke

- **Subarachnoid haemorrhage**
  - Rupture of arterial aneurysm
  - Blood spreads **rapidly** in CSF -> may result in death or deep coma
  - Other causes: vascular malformation, illicit drug use, trauma
  - **Rapid** onset of symptoms
    - **Headache**
    - Loss of consciousness
    - Seizures
    - Nausea
    - Vomiting
    - Stiff neck

Transient Ischaemic Attack (TIA)

- Temporary neurological symptoms (<24hrs)
- Traditionally thought to not cause permanent tissue injury (infarction)
- New definition:
  - Transient episode of neurological function caused by focal brain, spinal cord or retinal ischaemia *without* acute infarct
  - Use or neuroimaging to identify

Management of Strokes

- Minimise brain injury, treat medical complications, uncover pathophysiologic basis of symptoms

- Acute phase:
  - Vital signs- stable airways, breathing and circulation
  - History & physical examination- **time of symptom onset**, rule out other conditions that mimic stroke
  - Neurological examination- facial paresis, arm/leg weakness, abnormal speech, VF
    - ROSIER scale $\geq$ +1
    - NIHSS score
  - Imaging and blood tests- CT and/or MRI, blood glucose, oxygen saturation

Acute therapy of Strokes

- Goal is to re-perfuse brain (ischaemic) or prevent haemorrhage expansion and monitoring CSF pressure (haemorrhagic)
- Rapid therapy is crucial
  - 18-24% of patients with SAH die *before* presenting to ED
- Treatment suitability is determined by onset of neurological symptoms or *time last know to be well*

Ischaemic stroke

- IV thrombolysis
  - Drug used to dissolve clot
  - Initiated within 4.5hrs or symptom onset or *time last know to be well*
  - Increases chance of 'good' stroke outcome defined by modified Rankin Score at 3 and 6 months
    - If given at 3 hours: 33% of patients in alteplase group achieve good outcome vs. 23% in control group
    - If given at 3-4.5hrs: 35% of patients in alteplase group achieve good outcome vs. 30% in control group
    - If given after 4.5hrs: 33% of patients in alteplase group achieve good outcome vs. 31% in control group

Ischaemic stroke

- Mechanical thrombectomy
  - Suitable for patients with onset of symptoms >4hrs but less than 24hrs OR stroke due to large artery occlusion
  - Catheterisation through femoral artery
    - Guide to internal carotid artery then to occlusion
    - Stent retriever used to reach clot and remove

Haemorrhagic stroke

- Goal is to stop bleeding by hemostatic pathways or vascular tamponade
- Anti-thrombotic medications and uncontrolled BP can inhibit hemostasis
- Haemorrhagic expansion needs to be managed
  - Increases likelihood of increased ICP
  - Surgical methods used
    - Craniotomy

Strokes and the eye

- Visual impairment following stroke significantly impacts quality of life
  - Leads to loss of independence and depression
- Visual impairment from strokes include:
  - Monocular vision loss
  - Visual field deficits
  - Cortical blindness
  - Ptosis
  - Diplopia/ocular dysmotility
  - Gaze deficits
  - Saccades
  - Smooth pursuit impairment
  - Nystagmus

	Site of stroke	Percentage
Eye movement deficit		
Cranial nerve palsy	Posterior fossa: cerebellum, brain stem, thalamus, occipital lobe	9
Saccadic		
Palsy	Cortical: parietal lobe, occipital lobe, lacunar, internal capsule, intraventricular	9
Dysmetria	Cortical: frontal lobe, parietal lobe, occipital lobe, thalamus, lacunar, basal ganglia, periventricular	50.5
	Brain stem, cerebellar	6
Smooth pursuit palsy	Cortical: parietal lobe	3
	Cerebellar	1.5
Gaze palsy	Cortical: frontal lobe, occipital lobe, parietal lobe, lacunar, basal ganglia, periventricular	4
	Brain stem	17
Visual field impairment		
Homonymous hemianopia	Occipital lobe, parietal lobe	56
Quadrantanopic defects	Occipital lobe, parietal lobe	20
Altitudinal, homonymous scotomas	Occipital lobe	6
Perceptual deficit	Cortical: parietal lobe, occipital lobe, temporal lobe, internal capsule, periventricular	100

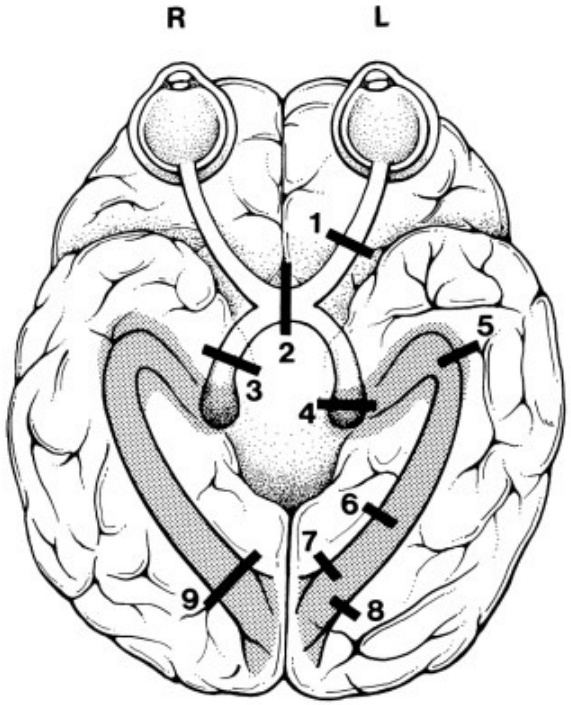
Rowe et al, Visual impairment following stroke: do stroke patients require vision assessment?, *Age and Ageing*, Volume 38, Issue 2, March 2009, Pages 188–193, https://doi.org/10.1093/ageing/afn230

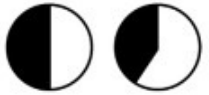
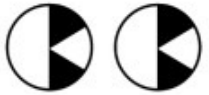
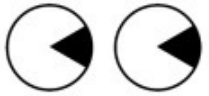
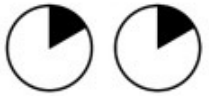
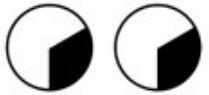
Impact of Quality of Life

- Reading
  - R sided hemianopia – difficult to to read from L to R
  - L sided hemianopia- difficulty picking up start of line
  - Saccades- troubles tracking, especially in conjunction with VF defect
- Driving
  - VF defect- unable to pass legal standards
  - Fatigue and concentration reduced
  - Binocular vision- difficulty judging depth
- Risk of falls
  - Reduced VA and poor contrast

Visual fields

- 8-25% of patients develop VF loss following a stroke
  - 54% complete homonymous hemianopia
  - 19.5% incomplete homonymous hemianopia
  - 15.2% quadrantanopia
  - 9.2% constriction of VF
  - 5.1% scotoma
  - 1.7% cortical blindness
- Most patients do no realise they have a visual field impairment
  - Only 42% of patients with field loss reported objective impairment of vision



Location	Field Defect		
	Left Eye	Right Eye	Comment
1. Left Optic Nerve			No light perception in the left eye
2. Chiasm			Bitemporal hemianopsia
3. Right Optic Tract			Incongruous left homonymous hemianopsia
4. Left Lateral Geniculate Nucleus			Right homonymous quadruple sectoranopia -or- Right homonymous sectoranopia
			
5. Left Temporal Lobe			Right homonymous upper quadrantanopsia ("pie in the sky")
6. Left Parietal Lobe			Right incomplete homonymous hemianopia, denser inferiorly
7. Left Occipital Lobe (upper bank)			Right homonymous lower quadrantanopsia (macular sparing)
8. Left Occipital Lobe (lower bank)			Right homonymous upper quadrantanopsia (macular sparing)
9. Right Occipital Lobe			Left homonymous hemianopia (macular sparing)

Assessing visual fields

- Computerised perimetry
  - Reproducible
  - Objective
  - Standardised
- Goldman Kinetic
  - Shorter
  - Can focus on suspected areas of deficits
- Tangent (Bjerrum) screen
  - Short

Assessing visual fields

- Computerised perimetry
  - 30-2 field preferable
    - Full field can take 15 mins/eye
  - Zeiss HFV
    - 30-2 SITA fast
    - Kinetic field
  - Medmont M700
    - Neurological test- fast threshold

Strokes and driving

- Impairments following stroke may temporarily impair patient's ability to drive
  - Minimum non-driving period applies:
    - 4 weeks for private drivers
    - 3 months for commercial drivers

Process for returning to driving after a stroke

1. Cleared medically for driving

2. Referred for optometric/ophthalmic assessment
    1. Visual acuity
    2. Visual fields
    3. Oculomotor deficits

3. Referred for on road driving test

Visual fields and driving

- Person is unfit to hold unconditional license:
  - If the binocular visual field does not have a horizontal extent of at least **110 degrees within 10 degrees above and below the horizontal midline**; or
  - if there is any significant visual field loss (scotoma) within a central radius of 20 degrees of the foveal fixation or other scotoma likely to impede driving performance; or
  - if there is any significant visual field loss (scotoma) with more than four contiguous spots within a 20-degree radius from fixation.

Visual fields and driving

- Conditional licenses may be given by an optometrist or ophthalmologist if:
  - ”…the horizontal extension of a person’s visual fields are less than 110 degrees but greater or equal to 90 degrees…The extent is measured on the Esterman from the last seen point to the next seen point. There is no flexibility in this regard for commercial vehicle drivers”

Visual fields and driving

- Central field loss:
  - “A significant or unacceptable central field loss is defined as any of the following:
    - a cluster of four or more adjoining points that is either completely or partly within the central 20-degree area
    - loss consisting of both a single cluster of three adjoining missed points up to and including 20 degrees from fixation, and any additional separate missed point(s) within the central 20-degree area
    - any central loss that is an extension of a hemianopia or quadrantanopia of size greater than three missed points.”

Esterman Binocular

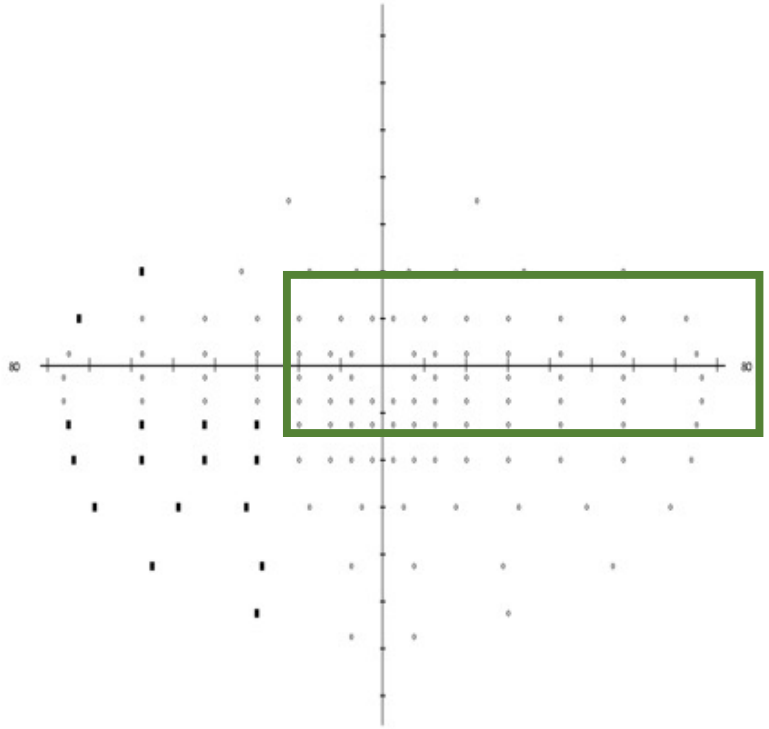
Fixation Monitor: OFF
Fixation Target: Central
Fixation Losses: 0/0
False POS Errors: 1/11
False NEG Errors: 0/11
Test Duration: 04:46

Stimulus: III, White
Background: 31.5 ASB
Strategy: Two Zone
Test Mode: Single Intensity

Pupil Diameter:
Visual Acuity:
RX: DS DC X

Date: 28-09-2022
Time: 10:03 AM
Age: 59

Stimulus Intensity: 10 dB



Seen 104/120
Not Seen 16/120
Blind Spot
Esterman Efficiency Score: 86

Esterman Binocular

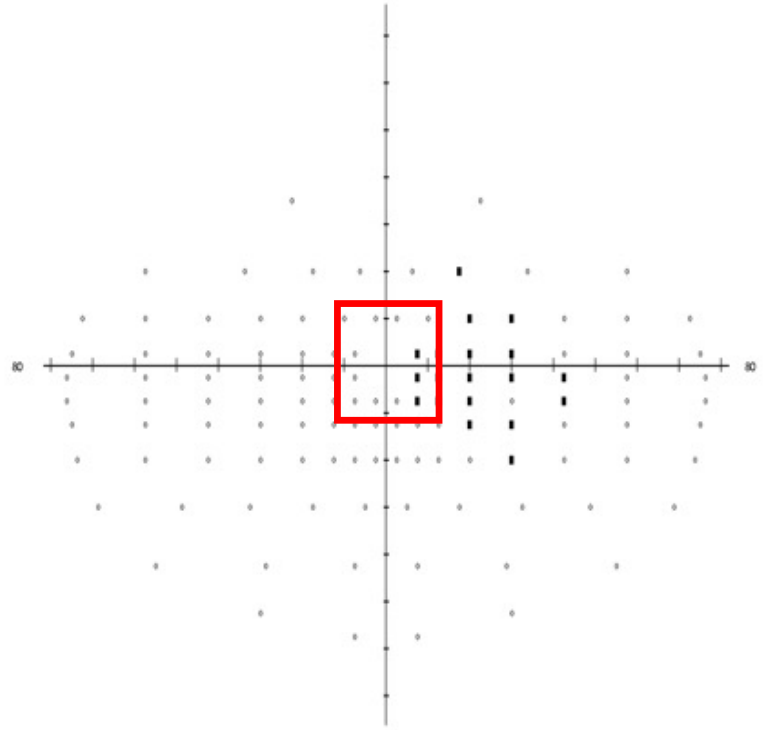
Fixation Monitor: OFF
Fixation Target: Central
Fixation Losses: 0/0
False POS Errors: 0/11
False NEG Errors: 1/10
Test Duration: 04:53

Stimulus: III, White
Background: 31.5 ASB
Strategy: Two Zone
Test Mode: Single Intensity

Pupil Diameter:
Visual Acuity:
RX: DS DC X

Date: 11-11-2021
Time: 1:28 PM
Age: 57

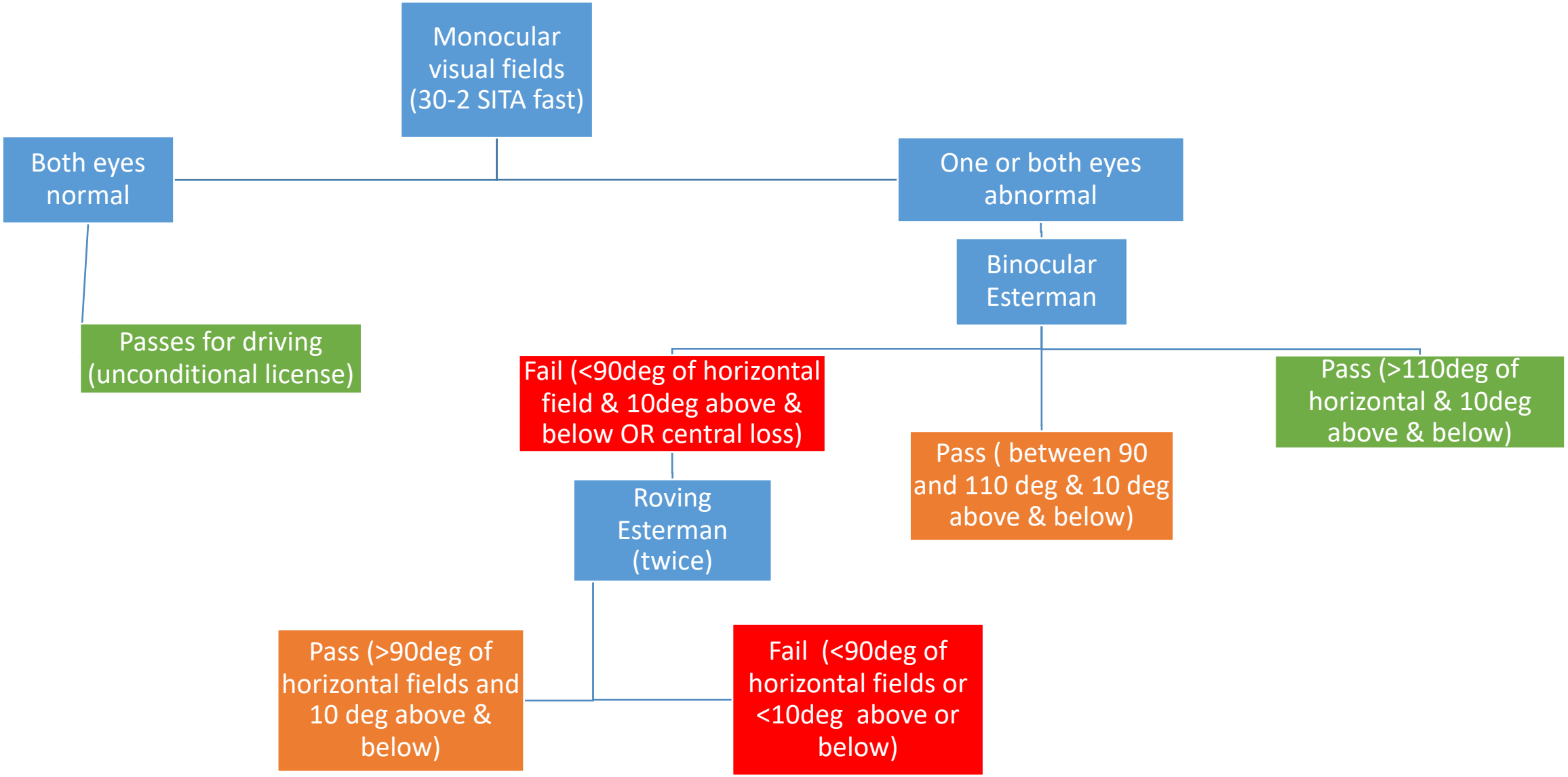
Stimulus Intensity: 10 dB



Seen 101/120
Not Seen 19/120
Blind Spot
Esterman Efficiency Score: 84

Visual field standards for driving

- Binocular Esterman
  - Roving or non–roving
  - Roving needs to be performed twice- results averaged
- Medmont Binocular Visual field
  - Must print in level map mode


Monocular visual fields (30-2 SITA fast)
Both eyes normal
One or both eyes abnormal
Passes for driving (unconditional license)
Binocular Esterman
Fail (<90deg of horizontal field & 10deg above & below OR central loss)
Pass (between 90 and 110 deg & 10 deg above & below)
Pass (>110deg of horizontal & 10deg above & below)
Roving Esterman (twice)
Pass (>90deg of horizontal fields and 10 deg above & below)
Fail (<90deg of horizontal fields or <10deg above or below)

Visual field recovery following stroke

- Up to 50% of patients with field loss can have spontaneous improvement within first 3-6 months
- Recovery may be dependent on retrograde damage
  - Damage to occipital lobe -> optic tract degeneration -> optic tract axonal injury -> retrograde degeneration of retinal ganglion cells

Oculomotor sequalae following stroke

- Most common:
  - Deficits of saccades
  - Convergence insufficiency
  - Strabismus (distance)
  - Accommodative infacility
  - Cranial nerve palsy

Oculomotor palsies

- Diplopia and palsies common following strokes
- 54% of patients have ocular motor abnormalities following stroke
  - CN III or CN IV common after strokes
- Present with diplopia or blurred vision
- Occurs most commonly in brainstem and cerebellum strokes

Oculomotor palsies

- CN III
  - CT: vertical deviation and exoT
  - Convergence insufficiency common
- CNIV
  - CT: vertical deviation
  - May have convergence insufficiency
- CNVI
  - CT: esoT
  - Convergence insufficiency, nystagmus and saccadic abnormalities common

Management of binocular vision

- PRESCRIBE OPTIMAL PRESCRIPTION
- Poor evidence for interventions
- Prisms
  - Alleviate diplopia
- Vision exercises
  - Convergence insufficiency improved with training
- Occlusion
- Surgical

Case 1

- M, 57 year old
- L posterior cerebral artery infarct Sept 2020
  - Atherosclerosis
- Smoker
- Meds:
  - Blood thinner
  - HTN
  - Lipids

What symptoms/ocular findings would you expect?

What symptoms/ocular findings would you expect?

- PCA supplies part of occipital lobe and thalamus

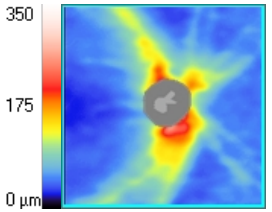
- Signs/symptoms
  - Contralateral homonymous hemianopia +/- macular sparing
  - CN palsy
  - Saccadic deficits
  - Sensory symptoms
  - Loss of touch
  - Ataxia

Case 1- examination

- Best corrected VA
  - RE: +1.75/-0.50x105 6/6+
  - LE: +1.00/-0.25x83 6/4.8
  - Add +2.00
- Pupils: PERRL, no RAPD
- EOMS: jerky but full movements

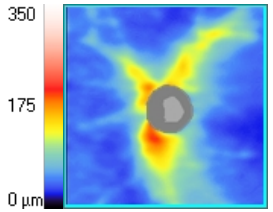
ONH and RNFL OU Analysis:Optic Disc Cube 200x200 OD ● | ● OS

RNFL Thickness Map

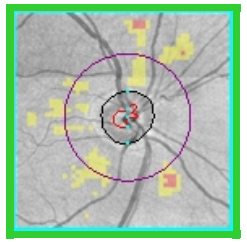


	OD	OS
Average RNFL Thickness	73 µm	71 µm
RNFL Symmetry	90%	
Rim Area	1.34 mm²	1.20 mm²
Disc Area	1.61 mm²	1.59 mm²
Average C/D Ratio	0.40	0.49
Vertical C/D Ratio	0.33	0.53
Cup Volume	0.016 mm³	0.061 mm³

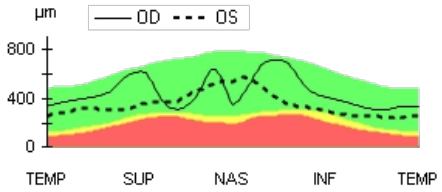
RNFL Thickness Map



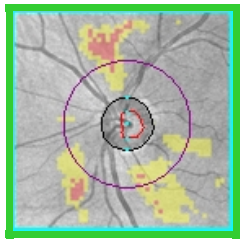
RNFL Deviation Map



Neuro-retinal Rim Thickness

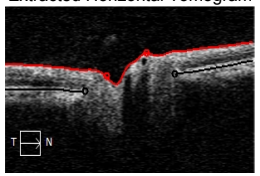


RNFL Deviation Map

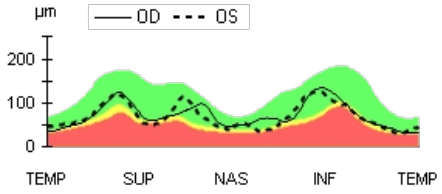


Disc Center(0.09,0.12)mm

Extracted Horizontal Tomogram

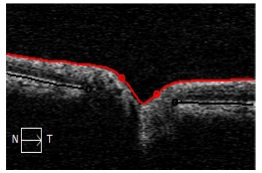


RNFL Thickness

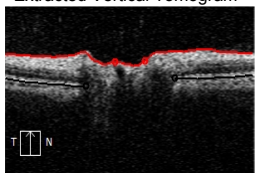


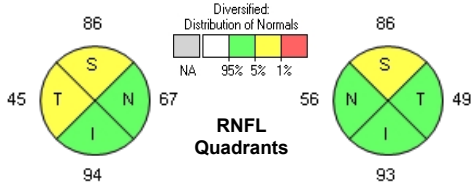
Disc Center(0.09,-0.06)mm

Extracted Horizontal Tomogram

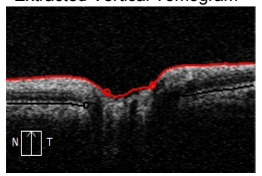


Extracted Vertical Tomogram

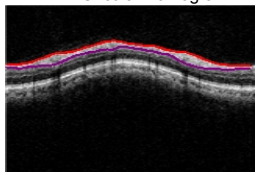




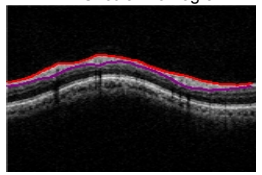
Extracted Vertical Tomogram



RNFL Circular Tomogram



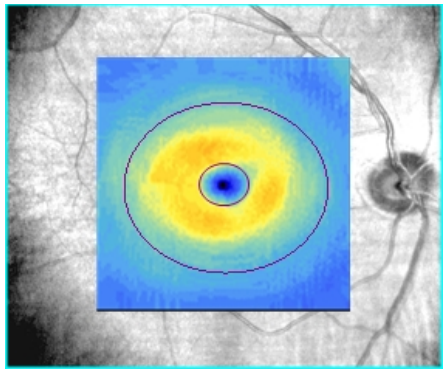
RNFL Circular Tomogram



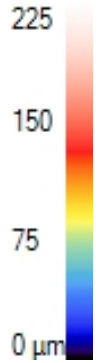
Technician: Operator, Cirrus Signal Strength: 7/10 9/10

Ganglion Cell OU Analysis: Macular Cube 512x128 OD ● | ● OS

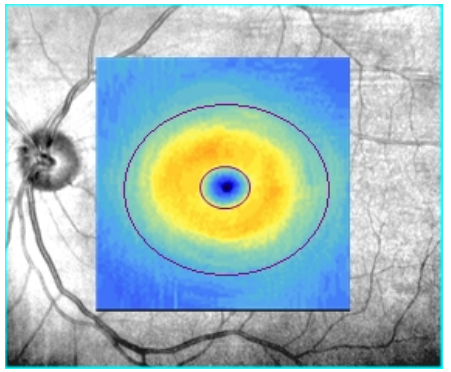
OD Thickness Map



Fovea: 259, 65

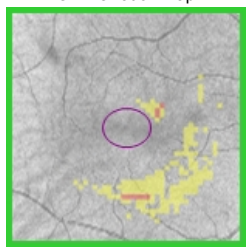


OS Thickness Map

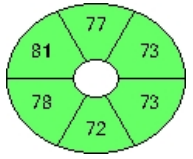


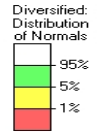
Fovea: 261, 66

OD Deviation Map

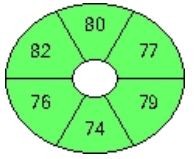


OD Sectors

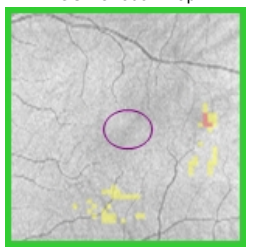




OS Sectors

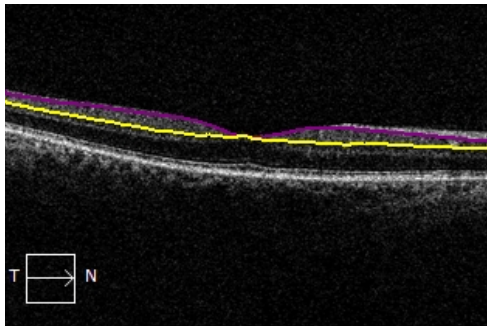


OS Deviation Map

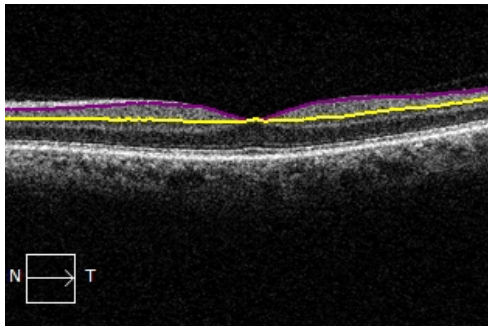


	OD µm	OS µm
Average GCL + IPL Thickness	76	78
Minimum GCL + IPL Thickness	73	76

OD Horizontal B-Scan **BScan:** 65



OS Horizontal B-Scan **BScan:** 66



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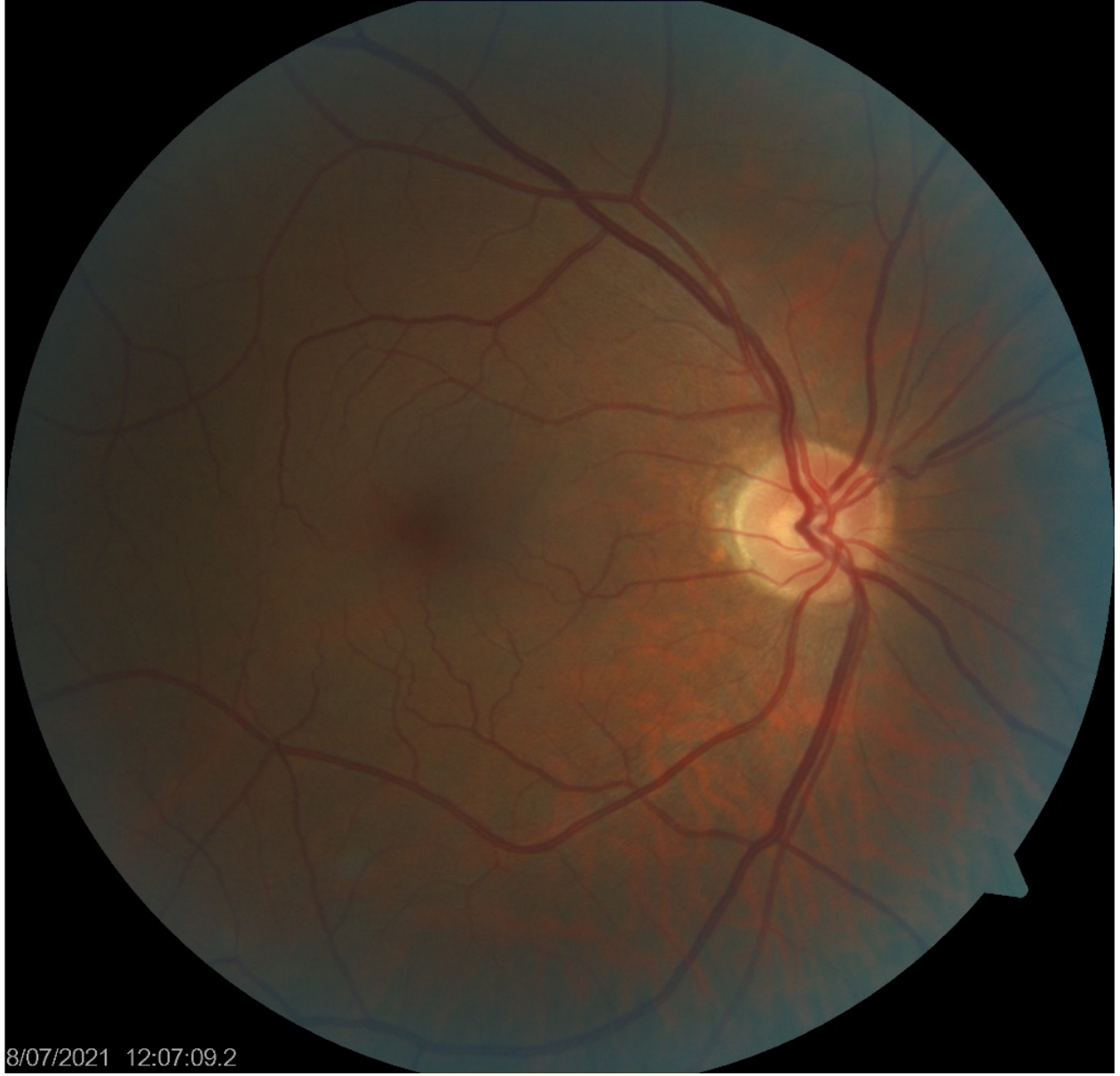
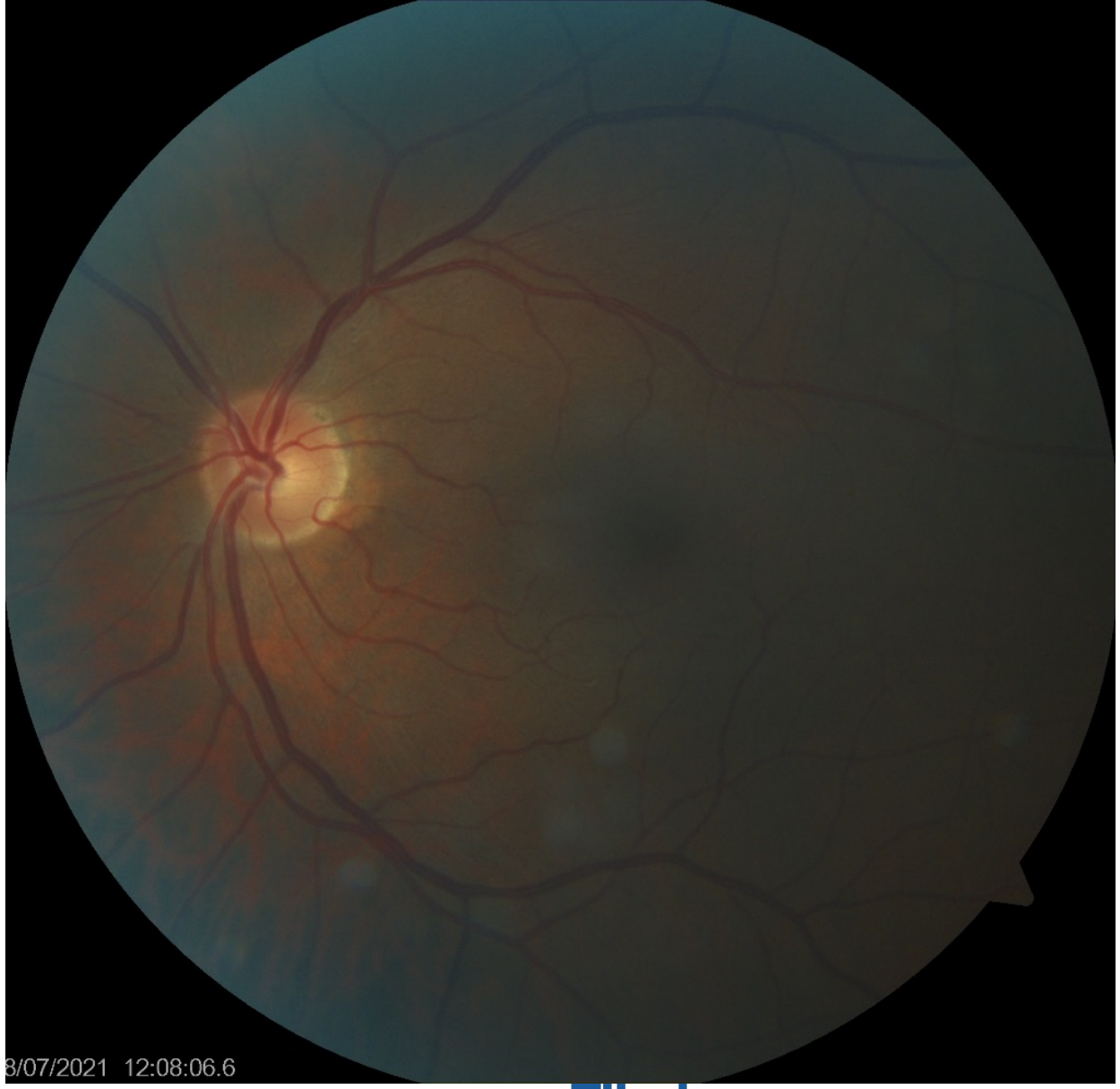
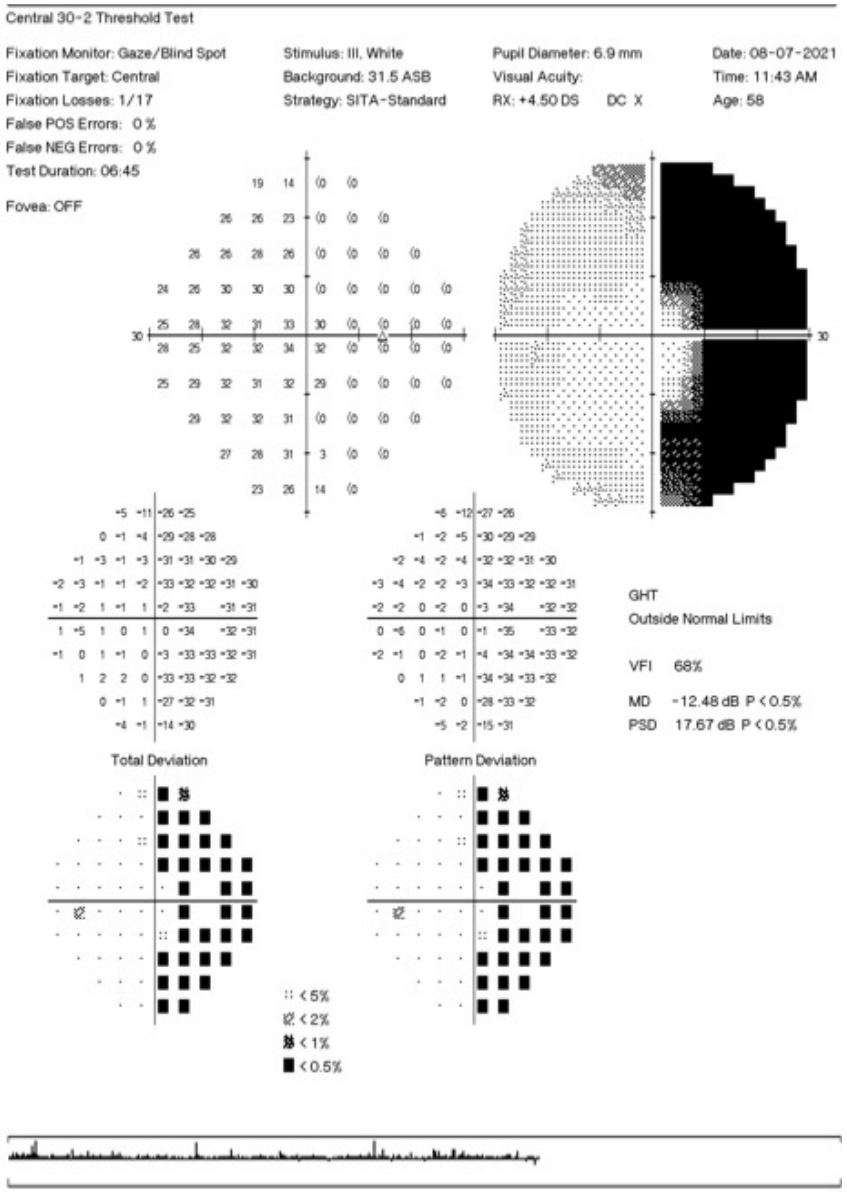
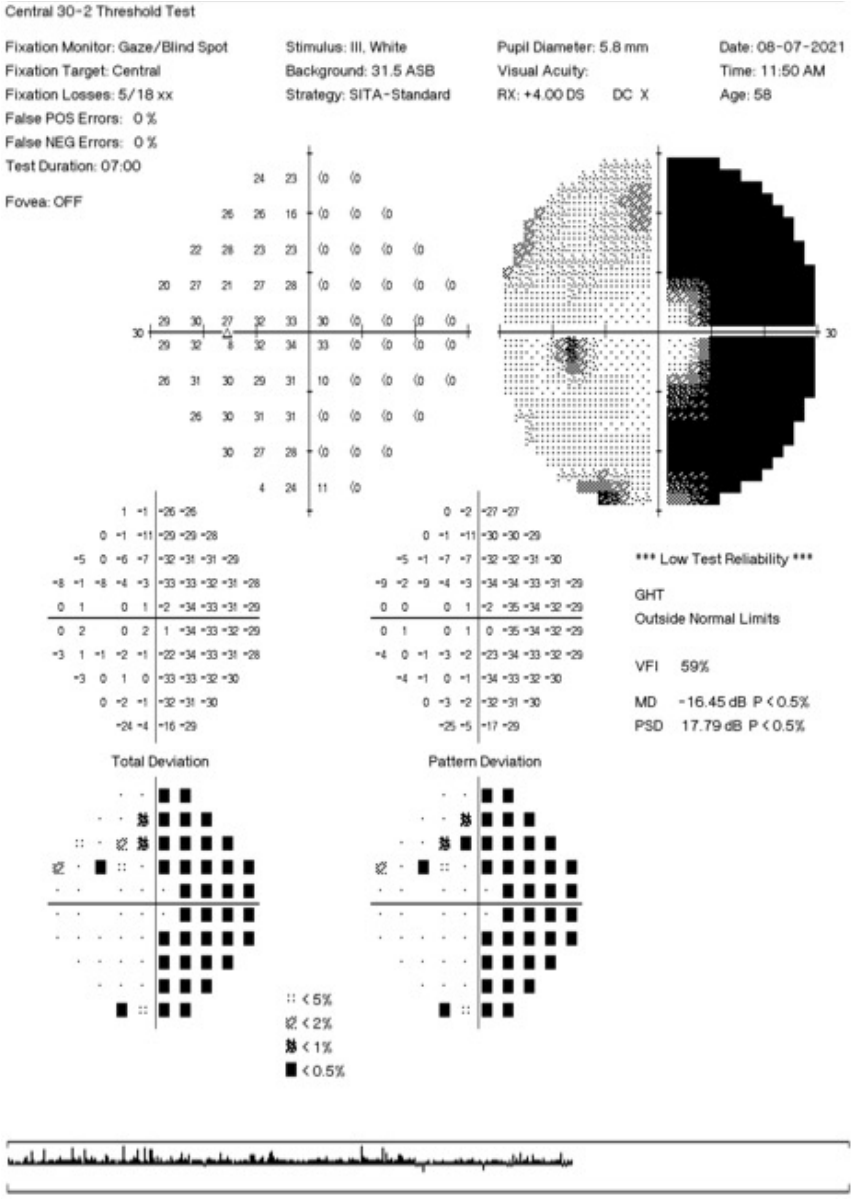

8/07/2021 12:07:09.2


8/07/2021 12:08:06.6


Central 30-2 Threshold Test
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 1/17
False POS Errors: 0 %
False NEG Errors: 0 %
Test Duration: 06:45
Fovea: OFF
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard
Pupil Diameter: 6.9 mm
Visual Acuity:
RX: +4.50 DS DC X
Date: 08-07-2021
Time: 11:43 AM
Age: 58
GHT
Outside Normal Limits
VFI 68%
MD -12.48 dB P < 0.5%
PSD 17.67 dB P < 0.5%
Total Deviation
Pattern Deviation
:: < 5%
< 2%
< 1%
< 0.5%


Central 30-2 Threshold Test
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 5/18 xx
False POS Errors: 0 %
False NEG Errors: 0 %
Test Duration: 07:00
Fovea: OFF
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Standard
Pupil Diameter: 5.8 mm
Visual Acuity:
RX: +4.00 DS DC X
Date: 08-07-2021
Time: 11:50 AM
Age: 58
*** Low Test Reliability ***
GHT
Outside Normal Limits
VFI 59%
MD -16.45 dB P < 0.5%
PSD 17.79 dB P < 0.5%
Total Deviation
Pattern Deviation
:: < 5%
< 2%
< 1%
< 0.5%

Esterman Binocular

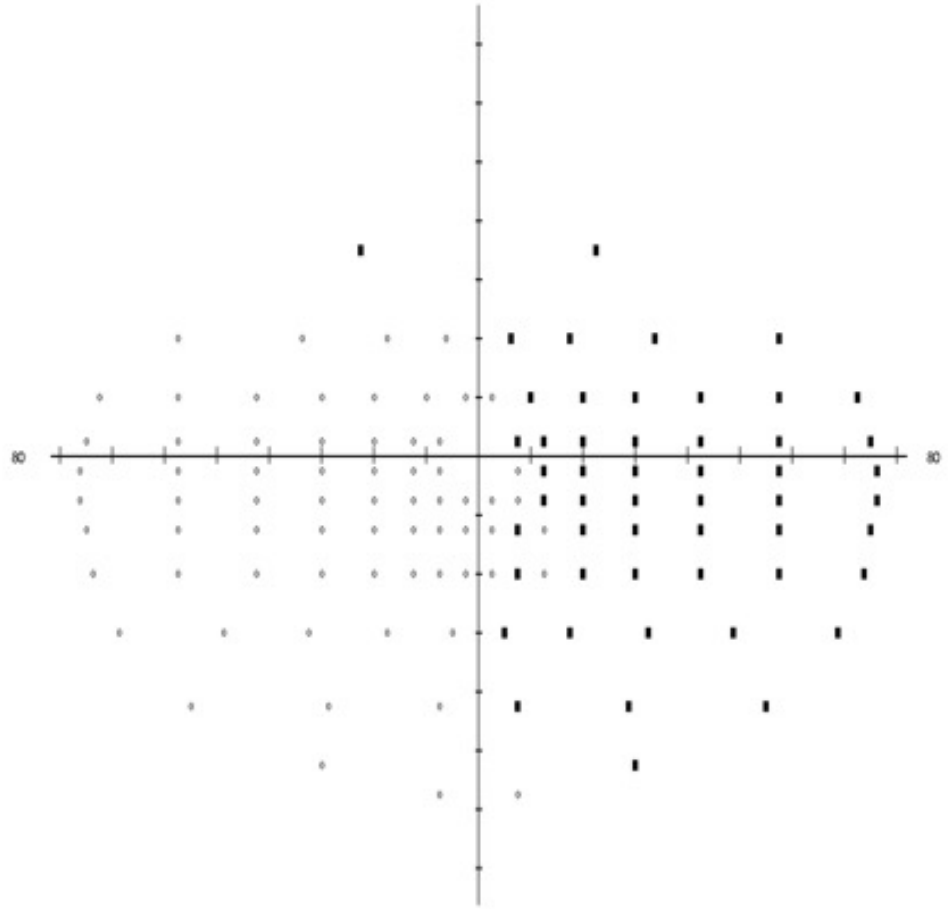
Fixation Monitor: OFF
Fixation Target: Central
Fixation Losses: 0/0
False POS Errors: 0/13
False NEG Errors: 0/13
Test Duration: 05:50

Stimulus: III, White
Background: 31.5 ASB
Strategy: Two Zone
Test Mode: Single Intensity

Pupil Diameter:
Visual Acuity:
RX: DS DC X

Date: 08-07-202
Time: 11:59 AM
Age: 58

Stimulus Intensity: 10 dB



Seen 68/120
Not Seen 52/120
Blind Spot
Esterman Efficiency Score: 56

Case 2

- F, 52 years old
- 8/2019:
  - Presents to ED at 23:00
    - Sudden onset of headache
    - Vomiting
    - Agitation +/- altered memory
    - GH: good health, no meds

Case 2

- Physical examination:
  - L sided facial droop
  - L sided hemiparesis
  - Dysphasia
  - NO right sided neurological deficits

- **Differential diagnosis?**
- **What would you do if they presented in optometric setting?**

Case 2

- Differential diagnosis
  - Subarchanoid haemorrhage
  - Intracranial haemorrhage (MCA)
  - Iscahemic stroke (MCA)

- Optometric setting
  - VA +/- pinhole
  - Pupils
  - EOMs
  - Posterior assessment
  - Visual fields
  - Management- refer to ED

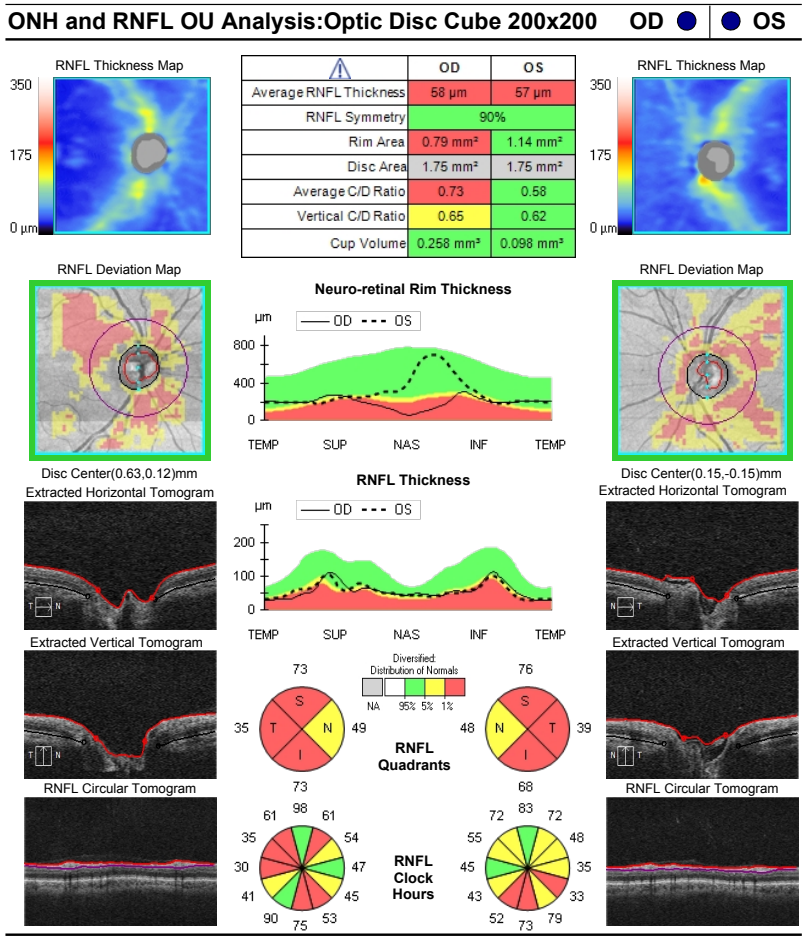
Case 2 examination

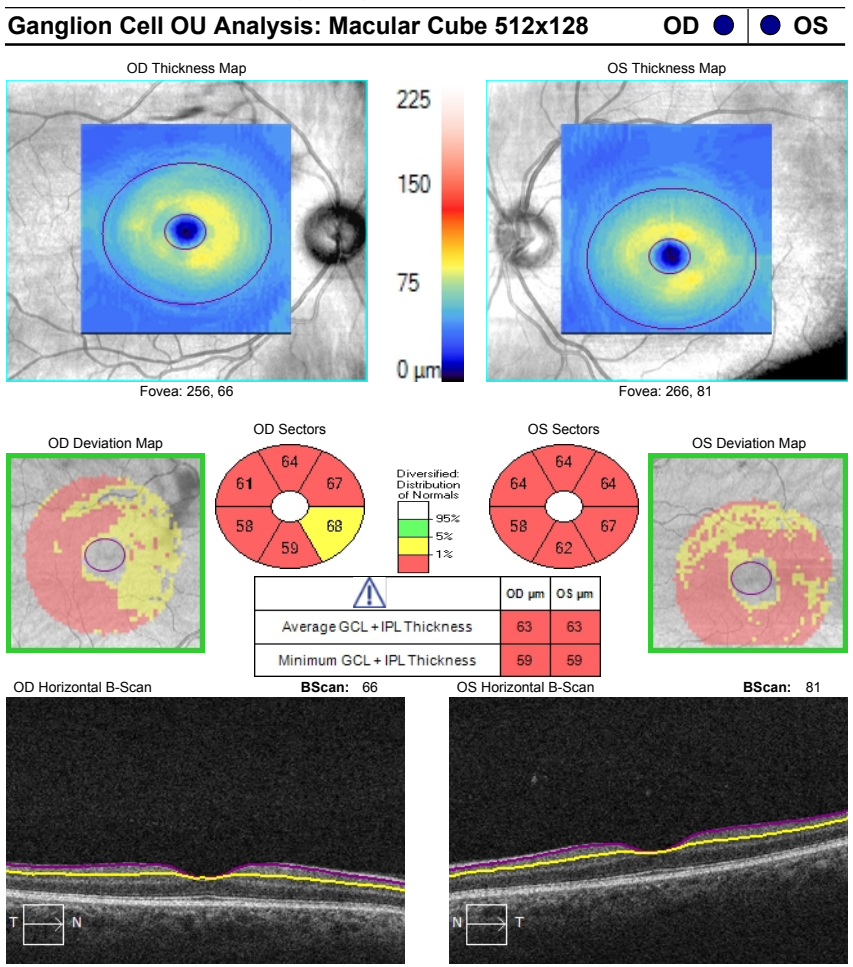
- CT Brain + perfusion performed:
  - Subarachnoid haemmorhage
  - Likely due to R middle cerebral artery bifurcation aneurysm
- Preceded to R pterional craniotomy, clipping of R MCA bifurcation aneurysm, ICH evacuation, EVD insertion, craniectomy

Case 2

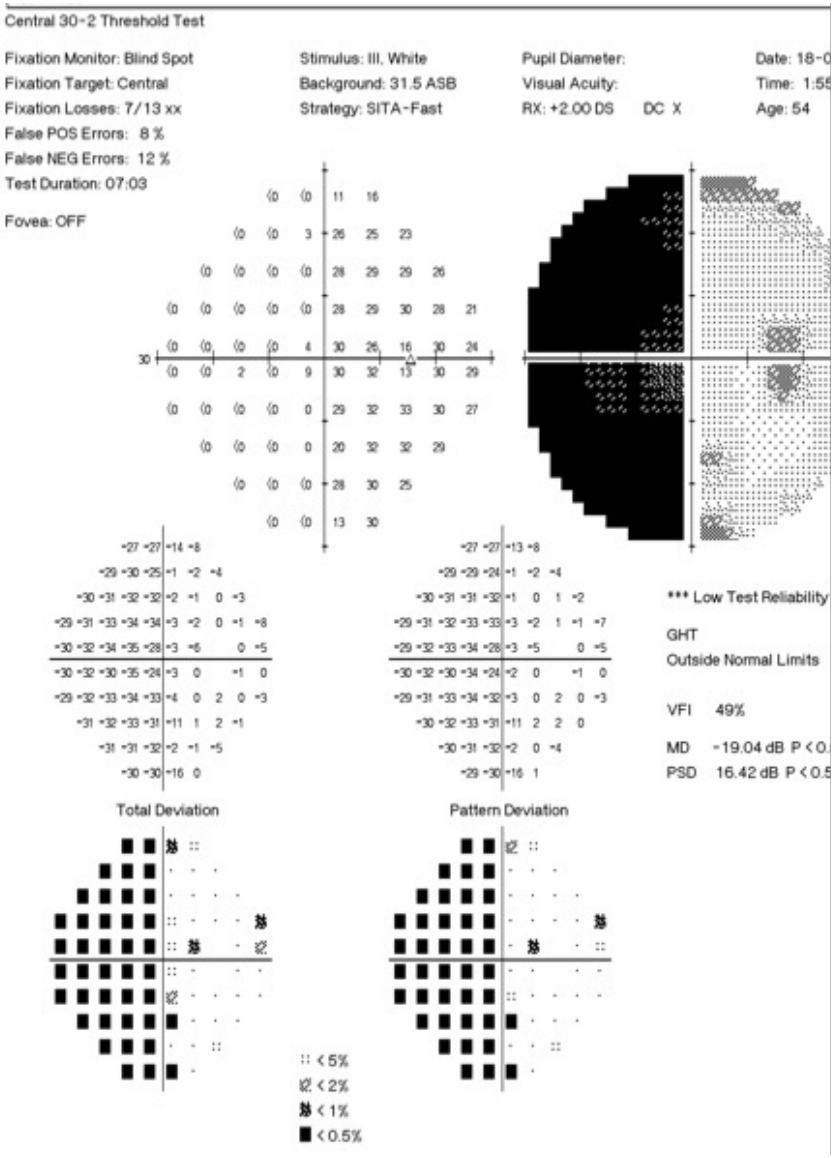
- BCVA:
  - RE -0.25/-1.00x120 6/4.8
  - LE -1.00 6/4.8
  - ADD +1.25 N4
- Pupils: PERRL, no RAPD
- EOMs: nystagmus, full movements
- CDR RE 0.6, L 0.5, temporal pallor L>>R
- IOPs R 18 L 19mmHg

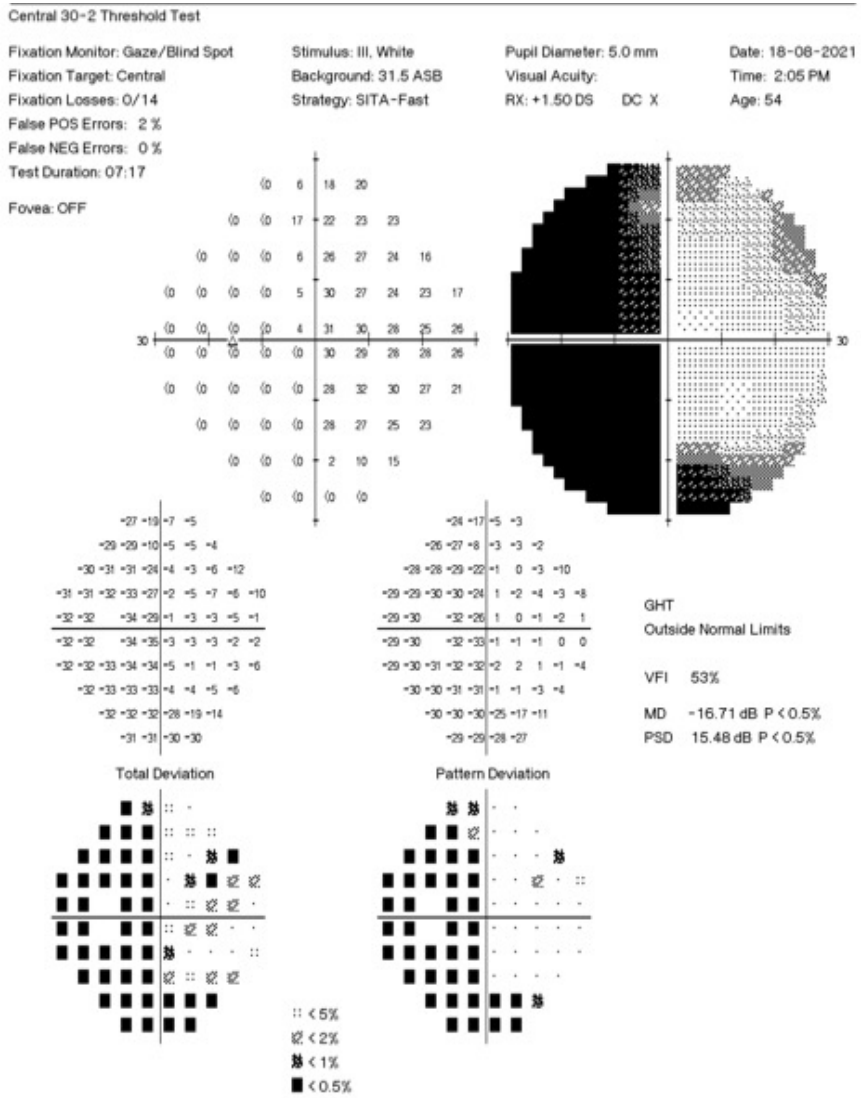
Case 2


ONH and RNFL OU Analysis:Optic Disc Cube 200x200 OD OS
RNFL Thickness Map
350
175
0 µm
RNFL Thickness Map
350
175
0 µm
Average RNFL Thickness 58 µm 57 µm
RNFL Symmetry 90%
Rim Area 0.79 mm² 1.14 mm²
Disc Area 1.75 mm² 1.75 mm²
Average C/D Ratio 0.73 0.58
Vertical C/D Ratio 0.65 0.62
Cup Volume 0.258 mm³ 0.098 mm³
RNFL Deviation Map
RNFL Deviation Map
Neuro-retinal Rim Thickness
µm
OD OS
800
400
0
TEMP SUP NAS INF TEMP
Disc Center(0.63,0.12)mm
Extracted Horizontal Tomogram
RNFL Thickness
µm
OD OS
200
100
0
TEMP SUP NAS INF TEMP
Disc Center(0.15,-0.15)mm
Extracted Horizontal Tomogram
Extracted Vertical Tomogram
Diversified Distribution of Normals
NA 95% 5% 1%
Extracted Vertical Tomogram
RNFL Circular Tomogram
RNFL Quadrants
RNFL Clock Hours
RNFL Circular Tomogram


Ganglion Cell OU Analysis: Macular Cube 512x128 OD OS
OD Thickness Map
225
150
75
0 µm
OS Thickness Map
Fovea: 256, 66
Fovea: 266, 81
OD Deviation Map
OD Sectors
64
61
67
58
68
59
Diversified Distribution of Normals
95%
5%
1%
OS Sectors
64
64
64
58
67
62
OS Deviation Map
Average GCL + IPL Thickness 63 63
Minimum GCL + IPL Thickness 59 59
OD Horizontal B-Scan
BScan: 66
OS Horizontal B-Scan
BScan: 81

Case 2


Central 30-2 Threshold Test
Fixation Monitor: Blind Spot
Fixation Target: Central
Fixation Losses: 7/13 xx
False POS Errors: 8 %
False NEG Errors: 12 %
Test Duration: 07:03
Fovea: OFF
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Fast
Pupil Diameter:
Visual Acuity:
RX: +2.00 DS DC X
Date: 18-0
Time: 1:55
Age: 54
*** Low Test Reliability
GHT
Outside Normal Limits
VFI 49%
MD -19.04 dB P < 0.
PSD 16.42 dB P < 0.5
Total Deviation
Pattern Deviation
: < 5%
: < 2%
: < 1%
: < 0.5%


Central 30-2 Threshold Test
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 0/14
False POS Errors: 2 %
False NEG Errors: 0 %
Test Duration: 07:17
Fovea: OFF
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Fast
Pupil Diameter: 5.0 mm
Visual Acuity:
RX: +1.50 DS DC X
Date: 18-08-2021
Time: 2:05 PM
Age: 54
GHT
Outside Normal Limits
VFI 53%
MD -16.71 dB P < 0.5%
PSD 15.48 dB P < 0.5%
Total Deviation
Pattern Deviation
: < 5%
: < 2%
: < 1%
: < 0.5%

Case 3

- M, 65 yo
- L cerebellar stroke 9/2022
  - Lateral medullary syndrome
- Smoker- 1 pack/day for 45 years
- GH: HTN, lipids, type 2 diabetes
  - Lung Cancer- mets in spine and adrenal gland

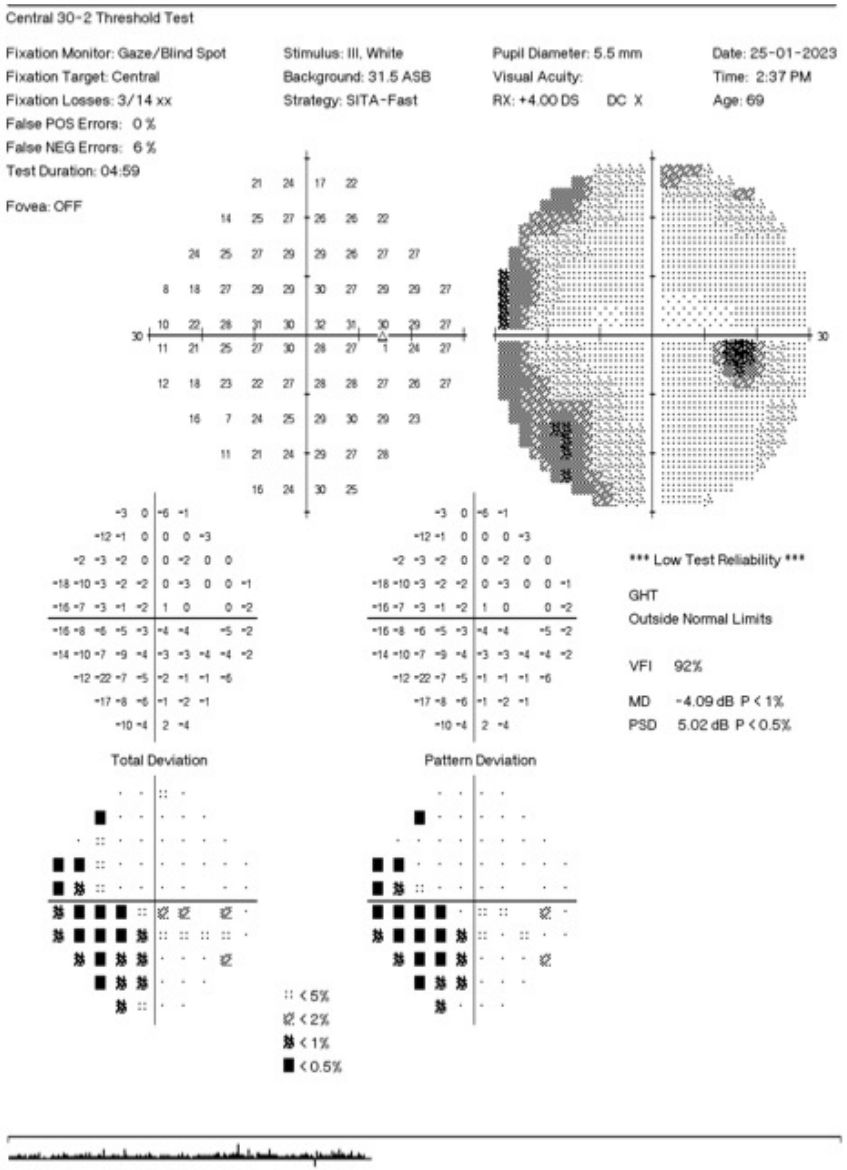
Case 3

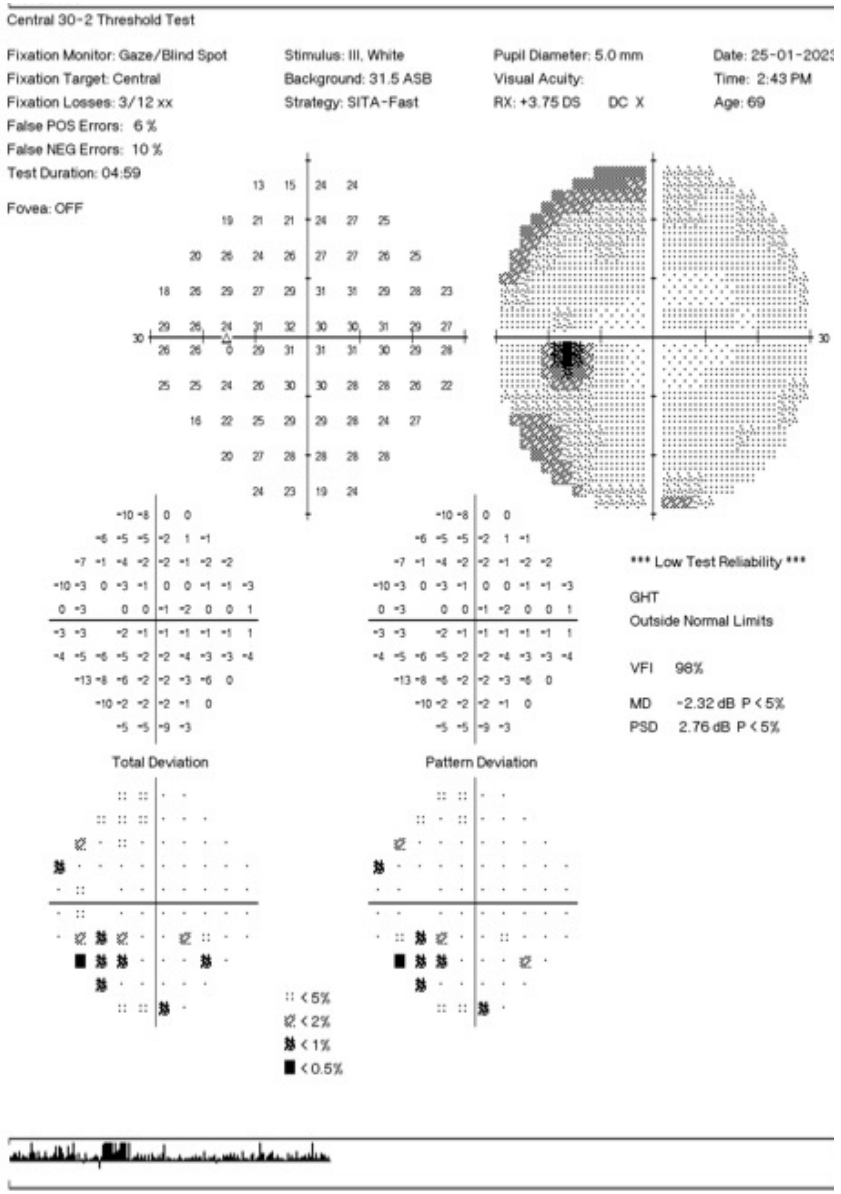
- BCVA
  - RE: +1.00/-0.75x75 6/9.5++
  - LE: +0.50 6.9.5
  - Add +2.50 N6

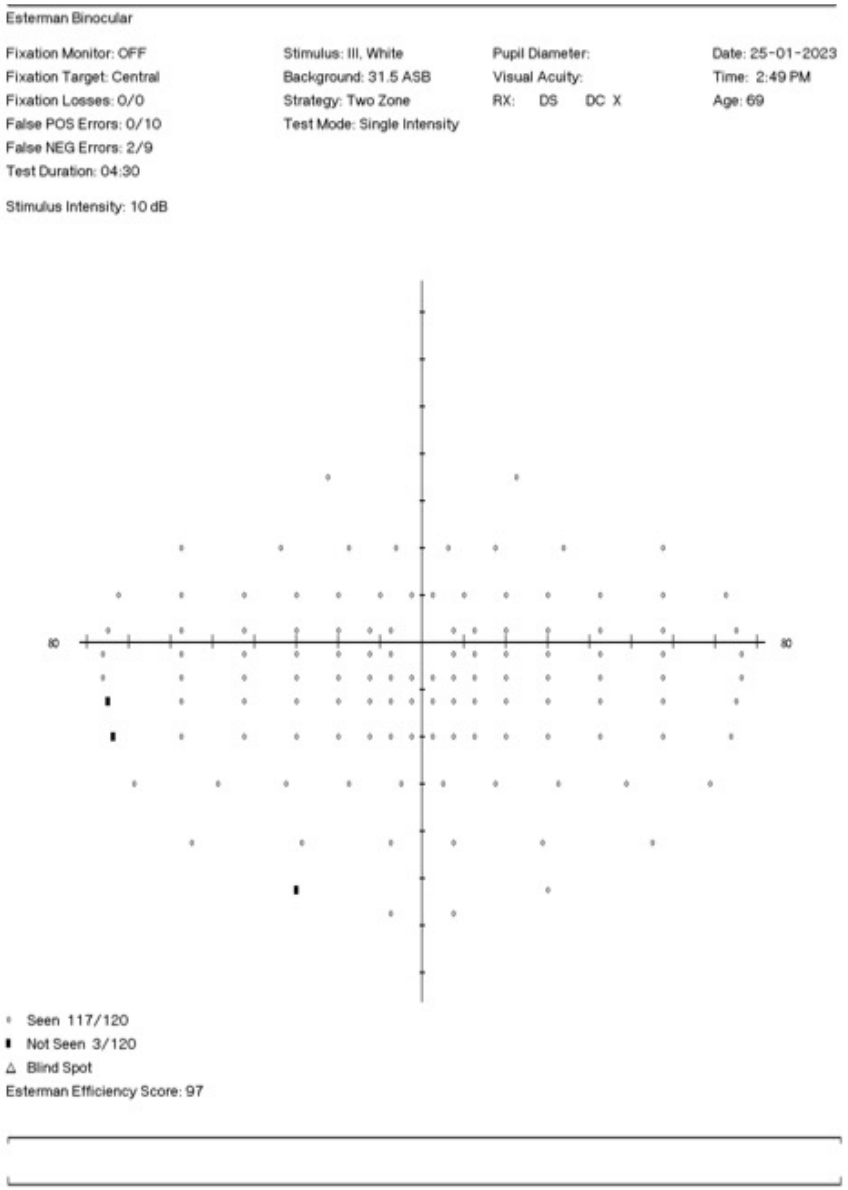
- Nystagmus
- Pupils: Anisocoria R>L 1mm, greater in dark
- No RAPD- **HORNERS**

- CDR 0.2 ou, mac healthy
- Lens; mod cortical cataracts
  - NO 3.0 NC 3.0 C 4.0 P 1.0

Case 3


Central 30-2 Threshold Test
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 3/14 xx
False POS Errors: 0 %
False NEG Errors: 6 %
Test Duration: 04:59
Fovea: OFF
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Fast
Pupil Diameter: 5.5 mm
Visual Acuity:
RX: +4.00 DS DC X
Date: 25-01-2023
Time: 2:37 PM
Age: 69
*** Low Test Reliability ***
GHT
Outside Normal Limits
VFI 92%
MD -4.09 dB P < 1%
PSD 5.02 dB P < 0.5%
Total Deviation
Pattern Deviation
< 5%
< 2%
< 1%
< 0.5%


Central 30-2 Threshold Test
Fixation Monitor: Gaze/Blind Spot
Fixation Target: Central
Fixation Losses: 3/12 xx
False POS Errors: 6 %
False NEG Errors: 10 %
Test Duration: 04:59
Fovea: OFF
Stimulus: III, White
Background: 31.5 ASB
Strategy: SITA-Fast
Pupil Diameter: 5.0 mm
Visual Acuity:
RX: +3.75 DS DC X
Date: 25-01-2023
Time: 2:43 PM
Age: 69
*** Low Test Reliability ***
GHT
Outside Normal Limits
VFI 98%
MD -2.32 dB P < 5%
PSD 2.76 dB P < 5%
Total Deviation
Pattern Deviation
< 5%
< 2%
< 1%
< 0.5%


Esterman Binocular
Fixation Monitor: OFF
Fixation Target: Central
Fixation Losses: 0/0
False POS Errors: 0/10
False NEG Errors: 2/9
Test Duration: 04:30
Stimulus Intensity: 10 dB
Stimulus: III, White
Background: 31.5 ASB
Strategy: Two Zone
Test Mode: Single Intensity
Pupil Diameter:
Visual Acuity:
RX: DS DC X
Date: 25-01-2023
Time: 2:49 PM
Age: 69
80
80
Seen 117/120
Not Seen 3/120
Blind Spot
Esterman Efficiency Score: 97

Case 3

- Does this patient pass the visual driving standards?
- Should this patient return to driving?
- How would you manage the patient?

Questions from chat

- **Do you have specific conditions you put on licenses e.g. no night driving, KM limits?**
  - Night driving- if patient has a concurrent condition that causes glare (cataracts, glaucoma, AMD)
  - KM limits- limit time, mainly due to poor concentration or fatigue. Depending on how long you think the patient can drive and using that to determine distance
- **Can the Melbourne Rapid Test used as a Binocular test?**
  - Likely yes, best to contact VicRoads
  - Make sure if you do use, consider printing out results to attach with forms
- **How long after a stroke would you test VF and what intervals do you recommend testing again?**
  - Minimum 3 months (when neurologist clears them to drive)
    - Patients will often have some recovery at this point
  - Can review again at 6-12 months or when you feel VF is not improving
    - After 3 months recovery is much slower but is possible