Here is a representation of the VF for each eye. Which is OD, and which OS?
Visual Field Defects

Here is a representation of the VF for each eye. Which is OD, and which OS? Remember, VFs are not drawn as if the pt is looking at you; they’re drawn as if you are the pt!
Measured in degrees from fixation, how far does the normal VF extend superiorly, inferiorly, nasally and temporally?
Visual Field Defects

Measured in degrees from fixation, how far does the normal VF extend superiorly, inferiorly, nasally and temporally? (Don’t get too fixated on these specific numbers--different sources will give slightly different values.)
Visual Field Defects

Measured in degrees from fixation, how much of the VF is assessed via the automated perimetry machines found in most ophthalmology practices?
Measured in degrees from fixation, how much of the VF is assessed via the automated perimetry machines found in most ophthalmology practices?

The central 24 degrees
Visual Field Defects

How far in degrees from fixation is the blind spot?

OS

OD

How far in degrees from fixation is the blind spot?
Visual Field Defects

How far in degrees from fixation is the blind spot? About 15 (again, don’t get too hung up on that specific number.)
Visual Field Defects

most anterior location

Anatomic locations for lesions producing VF defects
Visual Field Defects

Retina

next location

Anatomic locations for lesions producing VF defects
Visual Field Defects

- Retina
- Optic nerve

Anatomic locations for lesions producing VF defects
Visual Field Defects

Anatomic locations for lesions producing VF defects

Retina

Optic nerve

Optic chiasm

general term for all locations posterior to the previous one
Visual Field Defects

- Retina
- Optic nerve
- Optic chiasm
- Retrochiasmal

**Anatomic locations for lesions producing VF defects**
Visual Field Defects

- Retina
- Optic nerve
- Optic chiasm
- Retrochiasmal

Two very general categories of retinal dz
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
- Optic nerve
- Optic chiasm
- Retrochiasmal
Visual Field Defects

What is meant by clinically obvious vs clinically subtle retinal dz?
Visual Field Defects

What is meant by clinically obvious vs clinically subtle retinal dz?
In clinically obvious disease, the retina will appear abnormal on DFE, whereas in clinically subtle disease it will look normal.
Visual Field Defects

What is meant by clinically obvious vs clinically subtle retinal dz?
In clinically obvious disease, the retina will appear abnormal on DFE, whereas in clinically subtle disease it will look normal.

What is an example of…
...clinically obvious disease?
Visual Field Defects

What is meant by clinically obvious vs clinically subtle retinal dz?
In clinically obvious disease, the retina will appear abnormal on DFE, whereas in clinically subtle disease it will look normal.

What is an example of... clinically obvious disease? ‘Typical’ retinitis pigmentosa.
What is meant by clinically obvious vs clinically subtle retinal dz?

In clinically obvious disease, the retina will appear abnormal on DFE, whereas in clinically subtle disease it will look normal.

What is an example of... clinically obvious disease? ‘Typical’ retinitis pigmentosa

---clinically subtle disease?
Visual Field Defects

What is meant by clinically obvious vs clinically subtle retinal dz? In clinically obvious disease, the retina will appear abnormal on DFE, whereas in clinically subtle disease it will look normal.

What is an example of... 
...clinically obvious disease? ‘Typical’ retinitis pigmentosa
---clinically subtle disease? Cancer-associated retinopathy
Visual Field Defects

Retina
- Clinically obvious dz
- Clinically subtle dz

Optic nerve
- Two general categories of ON VF defects

Optic chiasm

Retrochiasmal
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
- Optic nerve
  - Depressions
  - Scotomas
- Optic chiasm
- Retrochiasmal
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
- Optic nerve
  - Depressions
    - What's the difference between a depression and a scotoma?
  - Scotomas
- Optic chiasm
- Retrochiasmal

What's the difference between a depression and a scotoma?

A depression is an inward shifting of the outer limit of the visual field, whereas a scotoma is an area of field loss surrounded on all sides by areas of normal sensitivity.
Visual Field Defects

What's the difference between a depression and a scotoma? A depression is an inward shifting of the outer limit of the visual field, whereas a scotoma is an area of field loss surrounded on all sides by areas of normal sensitivity.
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
- Optic nerve
  - Depressions
  - Scotomas
- Optic chiasm
- Retrochiasmal

three specific depressions
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz

- Optic nerve
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Scotomas

- Optic chiasm

- Retrochiasmal
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
- Optic nerve
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Scotomas
- Optic chiasm
- Retrochiasmal

Visual field defects include:
- Nasal step
- Inferior nasal step
- Superior nasal step
- Temporal wedge
Visual Field Defects

Retina
- Clinically obvious dz
- Clinically subtle dz
- Depressions
- Scotomas

Optic nerve
- Nasal step
- Altitudinal
- Temporal wedge

Optic chiasm
- Superior altitudinal
- Inferior altitudinal

Retrochiasmal
Visual Field Defects

Retina
- Clinically obvious dz
- Clinically subtle dz

Optic nerve
- Depressions
- Scotomas
- Nasal step
- Altitudinal
- Temporal wedge

Optic chiasm

Retrochiasmal
Visual Field Defects

Retina
- Clinically obvious dz
- Clinically subtle dz

Optic nerve
- Depressions
  - Nasal step
  - Altitudinal
  - Temporal wedge
- Scotomas
  - three specific scotomas

Optic chiasm

Retrochiasmal
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz

- Optic nerve
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Scotomas
    - Arcuate
    - Central
    - Ceco-central

- Optic chiasm

- Retrochiasmal
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz

- Optic nerve
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Arcuate
    - Central
    - Ceco-central
  - Scotomas

- Optic chiasm

- Retrochiasmal
Visual Field Defects

What’s the difference between a central and a ceco-central scotoma?

What's the difference between a central and a ceco-central scotoma?

A central scotoma involves only fixation, whereas a ceco-central scotoma involves fixation and extends all the way to the blind spot.
Visual Field Defects

Retina
Optic nerve
Optic chiasm
Retrochiasmal

Scotomas

What’s the difference between a central and a ceco-central scotoma? A **central scotoma** involves only fixation, whereas…

Central
Ceco-central

Arcuate

35
What's the difference between a central and a ceco-central scotoma?

A **central scotoma** involves only fixation, whereas a **ceco-central scotoma** involves fixation and extends all the way to the blind spot.
Visual Field Defects

What’s the difference between a central and a ceco-central scotoma?
A central scotoma involves only fixation, whereas…
a ceco-central scotoma involves fixation and extends all the way to the blind spot.

(Take note: Bilateral ceco-central scotomas could be mistaken for bitemporal VF loss!)
Another way to think about the optic nerve head is with respect to its topography. Specifically, the retinal nerve fibers composing the optic nerve can be divided into three groups:
Another way to think about the optic nerve head is with respect to its topography. Specifically, the retinal nerve fibers composing the optic nerve can be divided into three groups:

- Optic nerve head
- Papillomacular bundle
- Optic chiasm
- Retrochiasmal
Another way to think about the optic nerve head is with respect to its topography. Specifically, the retinal nerve fibers composing the optic nerve can be divided into three groups:

1. **Optic nerve head**
2. **Papillomacular bundle**
3. **Optic chiasm**
4. **Retrochiasmal**

A diagram illustrates the connections between these areas, with arrows indicating the flow of nerve fibers.
Another way to think about the optic nerve head is with respect to its topography. Specifically, the retinal nerve fibers composing the optic nerve can be divided into three groups:

- Papillomacular bundle
- Arcuate fibers
- #3?

Optic nerve head

Optic chiasm

Retrochiasmal
Another way to think about the optic nerve head is with respect to its topography. Specifically, the retinal nerve fibers composing the optic nerve can be divided into three groups:

- **Optic nerve head**
  - Papillomacular bundle
  - Arcuate fibers
  - #3?

**Visual Field Defects**

- Clinically obvious dz
- Clinically subtle dz

**Another Way to Think About the Optic Nerve Head**

- Optic chiasm
- Retrochiasmal
Another way to think about the optic nerve head is with respect to its topography. Specifically, the retinal nerve fibers composing the optic nerve can be divided into three groups:

- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve
- Papillomacular bundle
  - Arcuate fibers
  - Nasal radiating fibers

Optic chiasm

Retrochiasmal

Clinically obvious dz:
- Nasal step
- Altitudinal
- Temporal wedge

Clinically subtle dz:
- Arcuate
- Central
- Ceco-central
Visual Field Defects

Which of these VF defects are associated with damage to each group?

- Clinically obvious dz
- Clinically subtle dz

Optic nerve

- Optic nerve head
- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Optic chiasm

Retrochiasmal

Nasal step
Altitudinal
Temporal wedge

Arcuate
Central
Ceco-central
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head

Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Clinically obvious dz

Nasal step
Altitudinal
Temporal wedge

Arcuate
Central
Ceco-central

If a pt presents with a VF defect c/w a P-M bundle lesion, what sorts of optic neuropathy should you consider?

Conditions involving compromised cellular metabolism: Toxins, nutritional deficiencies, inherited mitochondrial dz, etc

Why do conditions affecting metabolism preferentially strike the P-M bundle?
The P-M fibers are small, unmyelinated, and extremely active metabolically. Taken together, these characteristics make them extraordinarily sensitive to anything adversely impacting cellular metabolism.
Visual Field Defects

Which of these VF defects are associated with damage to each group?

- Clinically obvious dz
  - Nasal step
  - Altitudinal
  - Temporal wedge

- Clinically subtle dz
  - Arcuate
  - Central
  - Ceo-central

Optic nerve head

- Papillomacular bundle
  - Arcuate fibers
  - Nasal radiating fibers

If a pt presents with a VF defect c/w a P-M bundle lesion, what sorts of optic neuropathy should you consider?
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Visual Field Defects

Which of these VF defects are associated with damage to each group?

- Clinically obvious dz
- Clinically subtle dz

Optic nerve head

- Papillomacular bundle
  - Arcuate fibers
  - Nasal radiating fibers

Optic chiasm

Nasal step
Altitudinal
Temporal wedge

Arcuate
Central
Ceco-central

If a pt presents with a VF defect c/w a P-M bundle lesion, what sorts of optic neuropathy should you consider? Conditions involving compromised cellular metabolism: Toxins, nutritional deficiencies, inherited mitochondrial dz, etc

Why do conditions affecting metabolism preferentially strike the P-M bundle?
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head

- Papillomacular bundle
  - Arcuate fibers
  - Nasal radiating fibers

Optic chiasm

Nasal step
Altitudinal
temporal wedge

Arcuate
Central
Ceco-central

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Why do conditions affecting metabolism preferentially strike the P-M bundle? The P-M fibers are small, unmyelinated, and extremely active metabolically. Taken together, these characteristics make them extraordinarily sensitive to anything adversely impacting cellular metabolism.
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head
- Clinically obvious dz
  - Papillomacular bundle
  - Arcuate fibers
  - Nasal radiating fibers

Optic chiasm
- Nasal step
- Altitudinal
- Temporal wedge

Retrochiasmal
- Arcuate
- Central
- Ceco-central
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head
- Clinically obvious dz
  - Papillomacular bundle
  - Arcuate fibers
  - Nasal radiating fibers

Optic chiasm

Retrochiasmal

Nasal step
- Altitudinal
- Temporal wedge

Arcuate
- Central
- Ceco-central
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head

Clinically obvious dz

Papillomacular bundle

Arcuate fibers

Nasal radiating fibers

Nasal step
Altitudinal
Temporal wedge

Arcuate
Central
Ceco-central

If a pt presents with a VF defect c/w an arcuate fiber lesion, what condition should you consider first?

Glaucoma

Why does glaucoma preferentially damage arcuate fibers?

It's unclear at this time
Visual Field Defects

Which of these VF defects are associated with damage to each group?

- **Optic nerve head**
  - Clinically obvious dz
    - Papillomacular bundle
    - Arcuate fibers
      - Nasal radiating fibers
  - Nasal step
    - Altitudinal
    - Temporal wedge
  - Arcuate
    - Central
    - Ceco-central

If a pt presents with a VF defect c/w an arcuate fiber lesion, what condition should you consider first?

- Glaucoma
Visual Field Defects

Which of these VF defects are associated with damage to each group?

- Optic nerve head
  - Clinically obvious dz
    - Papillomacular bundle
    - Arcuate fibers
    - Nasal radiating fibers

- Optic chiasm

Nasal step
- Altitudinal
- Temporal wedge

Arcuate
- Central
- Ceco-central

If a pt presents with a VF defect c/w an arcuate fiber lesion, what condition should you consider first? Glaucoma

Why does glaucoma preferentially damage arcuate fibers?
Visual Field Defects

Which of these VF defects are associated with damage to each group?

- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Nasal step
Altitudinal
Temporal wedge

Arcuate
Central
Ceco-central

If a pt presents with a VF defect c/w an arcuate fiber lesion, what condition should you consider first? Glaucoma

Why does glaucoma preferentially damage arcuate fibers?
It’s unclear at this time
Visual Field Defects

Compare the distribution of arcuate-fiber defects with those associated with a P-M bundle dysfunction. What important difference do you see?

Optic chiasm

Retrochiasmal
Visual Field Defects

*Compare the distribution of arcuate-fiber defects with those associated with a P-M bundle dysfunction. What important difference do you see?*

Unlike P-M defects, arcuate fiber bundle defects do not cross (ie, they ‘respect’) the horizontal midline.
Visual Field Defects

Compare the distribution of arcuate-fiber defects with those associated with a P-M bundle dysfunction. What important difference do you see?
Unlike P-M defects, arcuate fiber bundle defects do not cross (ie, they ‘respect’) the horizontal midline.

Why not?
Visual Field Defects

Compare the distribution of arcuate-fiber defects with those associated with a P-M bundle dysfunction. What important difference do you see?
Unlike P-M defects, arcuate fiber bundle defects do not cross (ie, they ‘respect’) the horizontal midline

Why not?
Because fibers on the temporal side of the ONH approach, but do not cross, the horizontal midline. The arcuate fibers arc around the P-M bundle, and meet along a horizontal demarcation line. Thus, damage to these fibers always result in VF defects that are limited to either the superior or the inferior portion of the field.

Optic chiasm

Retrochiasmal
Visual Field Defects

Compare the distribution of arcuate-fiber defects with those associated with a P-M bundle dysfunction. What important difference do you see?
Unlike P-M defects, arcuate fiber bundle defects do not cross (ie, they ‘respect’) the horizontal midline.

Why not?
Because fibers on the temporal side of the ONH approach, but do not cross, the horizontal midline. The arcuate fibers arc around the P-M bundle, and meet along a horizontal demarcation line. Thus, damage to these fibers always result in VF defects that are limited to either the superior or the inferior portion of the field.

What is this ‘horizontal demarcation line’ called?
Visual Field Defects

Compare the distribution of arcuate-fiber defects with those associated with a P-M bundle dysfunction. What important difference do you see?
Unlike P-M defects, arcuate fiber bundle defects do not cross (i.e., they ‘respect’) the horizontal midline.

Why not?
Because fibers on the temporal side of the ONH approach, but do **not** cross, the horizontal midline. The arcuate fibers arc around the P-M bundle, and meet along a horizontal demarcation line. Thus, damage to these fibers always result in VF defects that are limited to either the superior or the inferior portion of the field.

What is this ‘horizontal demarcation line’ called?
The **horizontal raphe**
Visual Field Defects

Which of these VF defects are associated with damage to each group?

- Clinically obvious dz
- Clinically subtle dz

Optic nerve head
- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Optic chiasm

Retrochiasmal

Nasal step
Altitudinal
Temporal wedge
Arcuate
Central
Ceco-central
Which of these VF defects are associated with damage to each group?

- Clinically obvious dz: Papillomacular bundle, Arcuate fibers, Nasal radiating fibers
- Clinically subtle dz: Nasal step, Altitudinal, Temporal wedge
  - Nasal step
  - Altitudinal
  - Temporal wedge
  - Arcuate
  - Central
  - Ceco-central
Visual Field Defects

Which of these VF defects are associated with damage to each group?

- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Nasal step
Altitudinal
Temporal wedge
Arcuate
Central
Ceco-central

If a pt presents with an altitudinal VF defect, what condition should you consider first?

- If the pt is a 50-something vasculopath, it’s likely nonarteritic anterior ischemic optic neuropathy
- If the pt has glaucoma, it likely represents advanced glaucomatous optic neuropathy

How can you differentiate between these two conditions?

There are a number of ways, but the most straightforward would be to inspect the ONH, which will be edematous in NAAION, and severely cupped in advanced glaucoma.
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve
- Arcuate fibers
- Nasal radiating fibers
- Papillomacular bundle

Optic chiasm
- Nasal step
- Altitudinal
- Temporal wedge
- Arcuate
- Central
- Ceo-central

If a pt presents with an altitudinal VF defect, what condition should you consider first?
Two conditions should come to mind:
-- If the pt is a 50-something vasculopath, it’s likely nonarteritic anterior ischemic optic neuropathy
-- If the pt has glaucoma, it likely represents advanced glaucomatous optic neuropathy
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head
- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Clinically obvious dz:
- Nasal step
- Altitudinal
- Temporal wedge
- Arcuate
- Central
- Ceco-central

If a pt presents with an altitudinal VF defect, what condition should you consider first?
Two conditions should come to mind:
-- If the pt is a 50-something vasculopath, it's likely nonarteritic anterior ischemic optic neuropathy
-- If the pt has glaucoma, it likely represents advanced glaucomatous optic neuropathy
Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head
- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Clinically obvious dz

Optic chiasm
- Nasal step
- Altitudinal
- Temporal wedge
- Arcuate
- Central
- Ceco-central

If a pt presents with an altitudinal VF defect, what condition should you consider first?
Two conditions should come to mind:
--If the pt is a 50-something vasculopath, it's likely nonarteritic anterior ischemic optic neuropathy
--If the pt has glaucoma, it likely represents advanced glaucomatous optic neuropathy

How can you differentiate between these two conditions?
Which of these VF defects are associated with damage to each group?

Optic nerve head
- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Nasal step & Temporal wedge
Altitudinal & Central
Altitudinal & Ceco-central

If a pt presents with an altitudinal VF defect, what condition should you consider first?
Two conditions should come to mind:
--If the pt is a 50-something vasculopath, it's likely nonarteritic anterior ischemic optic neuropathy
--If the pt has glaucoma, it likely represents advanced glaucomatous optic neuropathy

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Visual Field Defects

Which of these VF defects are associated with damage to each group?

Optic nerve head

- Papillomacular bundle
- Arcuate fibers
- Nasal radiating fibers

Nasal step
- Altitudinal
- Temporal wedge

Arcuate
- Central
- Ceco-central

If a pt presents with an altitudinal VF defect, what condition should you consider first?

Two conditions should come to mind:
--If the pt is a 50-something vasculopath, it’s likely nonarteritic anterior ischemic optic neuropathy
--If the pt has glaucoma, it likely represents advanced glaucomatous optic neuropathy

How can you differentiate between these two conditions?

There are a number of ways, but the most straightforward would be to inspect the ONH, which will be edematous in NAAION, and severely cupped in advanced glaucoma.
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
- Optic nerve
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Scotomas
    - Arcuate
    - Central
    - Ceco-central
- Optic chiasm
- Retrochiasmal

Four very specific types of chiasmal VF defects
Visual Field Defects

Retina
- Clinically obvious dz
- Clinically subtle dz

Optic nerve
- Depressions
  - Nasal step
  - Altitudinal
  - Temporal wedge
- Scotomas
  - Arcuate
  - Central
  - Ceco-central

Optic chiasm
- Bitemporal hemianopia
- Binasal hemianopia
- Junctional common
- Junctional rare

Retrochiasmal
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Scotomas
    - Arcuate
    - Central
    - Ceco-central

- Optic nerve
  - Optic chiasm
    - Bitemporal hemianopia
    - Binasal hemianopia
    - Junctional common
    - Junctional rare

- Retrochiasmal
  - four fairly specific retrochiasmal anatomic locations associated with VF defects
Visual Field Defects

- **Retina**
  - Clinically obvious dz
  - Clinically subtle dz

- **Optic nerve**
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Scotomas
    - Arcuate
    - Central
    - Ceco-central

- **Optic chiasm**
  - Bitemporal hemianopia
  - Binasal hemianopia
  - Junctional common
  - Junctional rare

- **Retrochiasmal**
  - Optic tract
  - LGN
  - Optic radiations
  - Occipital cortex
Forget all of these specific VF findings for just a minute… In the most general of terms, what can we say about VF defects associated with lesions in each of these locations?
Forget all of these specific VF findings for just a minute… In the most general of terms, what can we say about VF defects associated with lesions in each of these locations?
Visual Field Defects

Retina
- Clinically obvious dz
- Clinically subtle dz

Optic nerve
- Depressions
- Nasal step
- Altitudinal wedge
- Arcuate

Optic chiasm
- Binasal hemianopia
- Junctional common
- Junctional rare

Retrochiasmal
- Optic tract
- LGN
- Optic radiations
- Occipital cortex

Forget all of these specific VF findings for just a minute… In the most general of terms, what can we say about VF defects associated with lesions in each of these locations?

VF defect
- Anything except a vertical meridian cut (unless by pure chance)

?
Visual Field Defects

- Retina:
  - Clinically obvious dz
  - Clinically subtle dz

- Optic nerve:
  - Depressions
  - Nasal step
  - Altitudinal
  - Temporal wedge
  - Arcuate

- Optic chiasm:
  - Binasal hemianopia
  - Junctional common
  - Junctional rare

- Retrochiasmal:
  - Optic tract
  - LGN
  - Optic radiations
  - Occipital cortex

Forget all of these specific VF findings for just a minute… In the most general of terms, what can we say about VF defects associated with lesions in each of these locations?
Visual Field Defects

- **Retina**
  - Clinically obvious dz
  - Clinically subtle dz

- **Optic nerve**
  - Depressions
    - Nasal step
    - Altitudinal wedge
    - Arcuate

- **Optic chiasm**
  - Binasal hemianopia
  - Junctional common
  - Junctional rare

- **Retrochiasmal**
  - Optic tract
  - LGN
  - Optic radiations
  - Occipital cortex

**VF defect**
- Anything except a vertical meridian cut (unless by pure chance)
- Anything except a vertical meridian cut (unless by pure chance)

*Forget all of these specific VF findings for just a minute… In the most general of terms, what can we say about VF defects associated with lesions in each of these locations?*

*With few exceptions, will not cross the vertical meridian*

?
Visual Field Defects

- **Retina**
  - Clinically obvious dz
  - Clinically subtle dz

- **Optic nerve**
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
    - Arcuate

- **Optic chiasm**
  - Binasal hemianopia
  - Junctional common
  - Junctional rare

- **Retrochiasmal**
  - Optic tract
  - LGN
  - Optic radiations
  - Occipital cortex

**VF defect**

- Anything except a vertical meridian cut (unless by pure chance)

Forget all of these specific VF findings for just a minute…In the most general of terms, what can we say about VF defects associated with lesions in each of these locations?

With few exceptions, will not cross the vertical meridian

With few exceptions, must be homonymous hemianopia-like
In basic terms, what is the difference between chiasmal lesions resulting in a bitemporal VF defect vs those producing a binasal defect?
In basic terms, what is the difference between chiasmal lesions resulting in a bitemporal VF defect vs those producing a binasal defect?

**Bitemporal defects** are the result of a lesion impacting the **central** portion of the chiasm, whereas **binasal** defects stem from lesions affecting the **lateral** portions of the chiasm.
In basic terms, what is the difference between chiasmal lesions resulting in a bitemporal VF defect vs those producing a binasal defect?

**Bitemporal hemianopia:** *Central* aspect of chiasm

**Binasal hemianopia:** *Lateral* portions of chiasm

*In basic terms, what is the difference between chiasmal lesions resulting in a bitemporal VF defect vs those producing a binasal defect?*

**Bitemporal** defects are the result of a lesion impacting the *central* portion of the chiasm, whereas **binasal** defects stem from lesions affecting the *lateral* portions of the chiasm.
The nasal retinas are responsible for the temporal visual fields.

Here’s why:

**Bitemporal hemianopia:** *Central* aspect of chiasm

**Binasal hemianopia:** *Lateral* portions of chiasm

In basic terms, what is the difference between chiasmal lesions resulting in a *bitemporal* VF defect vs those producing a *binasal* defect?

*Bitemporal* defects are the result of a lesion impacting the *central* portion of the chiasm, whereas *binasal* defects stem from lesions affecting the *lateral* portions of the chiasm.
Fibers originating in the nasal retinas cross at the chiasm.

Here's why:

**Bitemporal hemianopia:** *Central* aspect of chiasm

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Fibers originating in the nasal retinas cross at the chiasm.

Here’s why:

So a lesion of the central chiasm will bag these fibers, and thus tend to cause bitemporal defects.

Bitemporal hemianopia: **Central** aspect of chiasm

Binasal hemianopia: **Lateral** portions of chiasm

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**Bitemporal hemianopia**: *Central* aspect of chiasm

**Binasal hemianopia**: *Lateral* portions of chiasm

Fibers originating in the temporal retinas **do not cross** at the chiasm.
In basic terms, what is the difference between chiasmal lesions resulting in a bitemporal VF defect vs those producing a binasal defect?

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Fibers originating in the temporal retinas do not cross at the chiasm.

The temporal retinas are responsible for the nasal visual fields.

Nasal VF  Nasal VF

Optic

Chiasm

Bitemporal hemianopia: Central aspect of chiasm

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Here’s why:

So lesions of the central chiasm will miss these fibers…
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So lesions of the central chiasm will miss these fibers... But lesions of the lateral chiasm will bag them, thereby causing binasal defects (note that two lesions are required to do this).

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The temporal retinas are responsible for the nasal visual fields.

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What structures are located at the lateral aspects of the chiasm?

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The temporal retinas are responsible for the nasal visual fields. The nasal VF and nasal VF are connected at the chiasm, Fibers originating in the temporal retinas do not cross at the chiasm.

What structures are located at the lateral aspects of the chiasm? The internal carotid arteries

Here's why:
So lesions of the central chiasm will miss these fibers...But lesions of the lateral chiasm will bag them, thereby causing binasal defects (note that two lesions are required to do this).
Visual Field Defects

- Retina
- Optic nerve
- Optic chiasm
- Retrochiasmal

What is the classic cause of a bitemporal hemianopia?

- Clinically obvious dz
- Clinically subtle dz

What is the classic cause of a bitemporal hemianopia?

- Pituitary adenoma

Is the hemianopia usually inferior, superior or complete?

- Superior

Why usually superior?

- The pituitary gland is below the chiasm, therefore, pituitary lesions affect the inferior chiasmal fibers primarily. These fibers account for the superior VF.

Is it usually congruous or incongruous?

- Incongruous
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Incongruous
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Bitemporal hemianopia
Binasal hemianopia
Junctional common
Junctional rare

Optic tract
LGN
Optic radiations
Occipital cortex
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Is it usually congruous or incongruous?
Incongruous
Visual Field Defects

What is the classic cause of a chiasmal binasal hemianopia?

- Bilateral carotid disease
- Glaucoma
What is the classic cause of a chiasmal binasal hemianopia?
Bilateral carotid atherosclerotic dz compressing the outer chiasm bilaterally.
Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz
- Optic nerve
  - Depressions
  - Scotomas
  - Nasal step
  - Altitudinal
  - Temporal wedge
  - Arcuate
  - Central
  - Ceco-central
- Optic chiasm
  - Bitemporal hemianopia
  - Binasal hemianopia
  - Junctional common
- Retrochiasmal
  - Optic radiations
  - Occipital cortex

**What is the classic cause of a chiasmal binausal hemianopia?**
Bilateral carotid atherosclerotic dz compressing the outer chiasm bilaterally

**What is the actual etiology for the vast majority of real-world binausal defects?**
Visual Field Defects

What is the classic cause of a chiasmal binasal hemianopia?
Bilateral carotid atherosclerotic dz compressing the outer chiasm bilaterally

What is the actual etiology for the vast majority of real-world binasal defects?
Glaucoma
Visual Field Defects

Retina

Optic nerve

Optic chiasm

Retrochiasmal

What does the term junctional refer to anatomically?

Retina

Clinically obvious dz
Clinically subtle dz

Optic nerve

Depressions

Scotomas

Optic chiasm

Bitemporal hemianopia
Binasal hemianopia

Junctional common

Junctional rare

Optic chiasm

Optic nerve

Optic tract

LGN

Optic radiations

Occipital cortex

What does the term junctional refer to anatomically?
What does the term junctional refer to anatomically? The junction between the optic nerve and the chiasm.
Visual Field Defects

- **Retina**
  - Clinically obvious dz
  - Clinically subtle dz

- **Optic nerve**
  - Depressions
    - Nasal step
    - Altitudinal
    - Temporal wedge
  - Scotomas
    - Arcuate
    - Central
    - Ceco-central

- **Optic chiasm**
  - Bitemporal hemianopia
  - Binasal hemianopia
    - **Junctional common**
  - Junctional rare

**What does the term junctional refer to anatomically?**
The junction between the optic nerve and the chiasm

**What does a junctional common VF defect look like?**
Visual Field Defects

**Retina**
- Clinically obvious dz
- Clinically subtle dz

**Optic nerve**
- Depressions
- Scotomas
  - Nasal step
  - Altitudinal
  - Temporal wedge
  - Arcuate
  - Central
  - Ceco-central

**Optic chiasm**
- Bitemporal hemianopia
- Binasal hemianopia
- Junctional common
  - Junctional rare

**Retrochiasmal**
- Optic radiations
- Occipital cortex

*What does the term junctional refer to anatomically?*
The junction between the optic nerve and the chiasm

*What does a junctional common VF defect look like?*
An optic nerve VF defect in one eye and a hemianopic-like defect in the other i.e., it respects the vertical meridian
What does a junctional rare VF defect look like?

- Bitemporal hemianopia
- Binasal hemianopia
- Junctional common
  - Junctional rare

Visual Field Defects

- Retina
  - Clinically obvious dz
  - Clinically subtle dz

- Optic nerve
  - Deppressions
  - Scotomas
  - Nasal step
  - Alitudinal
  - Temporal wedge
  - Arcuate
  - Central
  - Ceco-central

- Optic chiasm
  - Bitemporal hemianopia
  - Binasal hemianopia
  - Junctional common
  - Junctional rare

- Retrochiasmal
  - Optic tract
  - Optic radiations
  - Occipital cortex

- Clinically obvious dz
- Clinically subtle dz
Visual Field Defects

Retina
- Clinically obvious dz
- Clinically subtle dz

Optic nerve
- Depressions
  - Nasal step
  - Altitudinal
  - Temporal wedge
- Scotomas
  - Arcuate
  - Central
  - Ceco-central

Optic chiasm
- Bitemporal hemianopia
- Binasal hemianopia
- Junctional common
  - Junctional rare

Retrochiasmal
- Optic tract
- Optic radiations
- Occipital cortex

What does a junctional rare VF defect look like? A hemianopic-like defect in one eye, but no lesion in the other
Which of the following is \textit{not} associated with bitemporal visual-field loss?

- Sectoral RP
- Glaucoma
- Fuchs coloboma
- Chiasmal lesion
- Toxic/hereditary/nutritional optic neuropathy
Which of the following is not associated with bitemporal visual-field loss?

- Sectoral RP
- Glaucoma
- Fuchs coloboma
- Chiasmal lesion
- Toxic/hereditary/nutritional optic neuropathy

**Glaucoma.** True bitemporal VF loss respects the vertical midline, and is associated almost exclusively with *lesions compressing the chiasm*, specifically the mid-chiasm. Other causes of bitemporal loss do not respect the midline (except by happenstance). **Sectoral RP** is symmetric bilaterally, and thus can affect the temporal VF bilaterally. **Fuchs coloboma** (aka *tilted disc syndrome*) is associated with bitemporal loss that resolves with proper astigmatic correction. **Toxic/hereditary/nutritional optic neuropathy** is associated with bilateral cecocentral VF loss, which can mimic bitemporal loss. Glaucoma almost always affects the nasal VF long before the temporal field is involved--if anything, glaucoma is far more likely to cause binasal VF cuts.
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**Why is the ONH tilted?**

Abnormal closure of the embryonic optic fissure at the optic-nerve/globe junction results in an oblique (tilted) orientation of the ONH. The abnormal closure can also cause a staphyloma in the inferonasal region of the globe. Glaucoma is not typically associated with bitemporal VF loss, as the nasal VF is more likely to be affected before the temporal field is involved--if anything, glaucoma is far more likely to cause binasal VF cuts.

Q

- Which of the following is not associated with bitemporal visual-field loss?
  - Sectoral RP
  - Glaucoma
  - Fuchs coloboma
  - Chiasmal lesion
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Why is the ONH tilted?
Abnormal closure of the embryonic optic fissure at the optic-nerve/globe junction results in an oblique (read: tilted) orientation of the ONH. The abnormal closure also creates a modest staphyloma in the inferonasal region of the globe. temporal field is involved--if anything, glaucoma is far more likely to cause binasal VF cuts.
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Why on earth do these pts get a VF defect?

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Why on earth do these pts get a VF defect?

It’s actually pretty simple. Recall that these eyes have inferonasal staphylomas. This results in an extra-long ‘axial length’ for the photoreceptors overlying the staphyloma. Because of this extra axial length, the correction used during the performance of a visual-field test—a correction determined on the basis of the non-staphylomatous fovea—is not myopic enough for the inferonasal retina. The subsequent uncorrected refractive error produces a refractive scotoma in the superotemporal VF.

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*This implies that the VF deficits could be resolved if the ‘proper’ refractive correction was employed. Does it?*

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This implies that the bitemporal VF loss shouldn’t respect the vertical midline. Does it?

No (except by pure dumb luck)

Glu...
Glaucoma

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