Before you begin: This is a big topic, and big topics beget big slide-sets. There’s natural breaks in a couple of spots (@slides 152- and 355-ish); I placed break time! slides to mark them.
Optic Neuropathy

Typical Optic Neuritis

There’s no single correct way to divide up the optic neuropathies. That said, there’s a compelling argument that you should think of them in terms of these two subgroups. What are they?
There’s no single correct way to divide up the optic neuropathies. That said, there’s a compelling argument that you should think of them in terms of these two subgroups. What are they?
What is the common name for an optic neuropathy 2ndry to an inflammatory process?

Typical Optic Neuritis

Optic Neuropathy

Inflammatory

Noninflammatory
What is the common name for an optic neuropathy 2ndry to an inflammatory process?
Optic neuritis
Again, no single correct answer (and several viable options). But there’s a compelling argument that you should think of them as belonging to one of two subgroups. What are they?
Again, no single correct answer (and several viable options). But there’s a compelling argument that you should think of them as belonging to one of two subgroups. What are they?
What does it mean to say an optic neuritis is typical?

Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Typical

Atypical

Noninflammatory
What does it mean to say an optic neuritis is typical?
It means the underlying dz process involves demyelination.
What does it mean to say an optic neuritis is typical?
It means the underlying dz process involves demyelination

Note: In common clinical parlance, the term typical is reserved for demyelination that is either idiopathic or related to MS
What does it mean to say an optic neuritis is typical?
It means the underlying dz process involves demyelination.

Demographically speaking, who is the typical typical optic neuritis patient?
What does it mean to say an optic neuritis is typical?
It means the underlying disease process involves demyelination.

Demographically speaking, who is the typical typical optic neuritis patient?
A woman between 15 and 45.
What does it mean to say an optic neuritis is typical? It means the underlying disease process involves demyelination.

Demographically speaking, who is the typical typical optic neuritis patient? A woman between 15 and 45 (average age 32)
What does it mean to say an optic neuritis is typical?
It means the underlying disease process involves demyelination.

Demographically speaking, who is the typical typical optic neuritis patient?
A woman between 15 and 45 (average age 32)
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Demographically speaking, who is the typical typical optic neuritis patient?

A woman between 15 and 45 (average age 32)

What does it mean to say an optic neuritis is typical?

It means that it involves demyelination

What proportion of typical optic neuritis pts are women?

Almost 80%!
What does it mean to say an optic neuritis is typical? It means the underlying disease process involves demyelination.

Demographically speaking, who is the typical typical optic neuritis patient? A woman between 15 and 45 (average age 32).

What proportion of typical optic neuritis pts are women? Almost 80%!
Optic neuritis

Typical
(demyelinating)

Noninflammatory

As the title implies, we will have much more to say about typical optic neuritis later in the set.

Optic Neuropathy

What does it mean to say an optic neuritis is typical?

It means the underlying disease process involves demyelination.

Demographically speaking, who is the typical typical optic neuritis patient?

A woman between 15 and 45 (average age 32).

What proportion of typical optic neuritis pts are women?

Almost 80%!
Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Noninflammatory

No single correct answer, yada yada yada.
What are these two groups?
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Noninflammatory

Typical Optic Neuritis

No single correct answer, yada yada yada.
What are these two groups?
**Typical Optic Neuritis**

**Optic Neuropathy**

**Optic neuritis**

- **Typical** (demyelinating)
- **Atypical**
  - **Infectious**
  - **Immune**

*Name 3 infectious causes of atypical ON:*
1) 
2) 
3) 

(There are many others, of course)
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Name 3 **infectious** causes of atypical ON:
1) Syphilis
2) *Bartonella*
3) Lyme

(There are many others, of course)
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Name 3 immune-related causes of atypical ON:
1) 
2) 
3) 

(There are many others, of course)
Optic Neuropathy

Optic neuritis

Typical
(demyelinating)

Atypical

Infectious

Immune

Name 3 immune-related causes of atypical ON:
1) Sarcoid
2) SLE or some other vasculitic process
3) Granulomatosis with polyangiitis

(There are many others, of course)
Optic Neuropathy

Optic neuritis

- Typical (demyelinating)
- Atypical
  - Infectious
  - Immune

Name 3 immune-related causes of atypical ON:
1) Sarcoid
2) SLE or some other vasculitic process
3) Granulomatosis with polyangiitis (formerly known as Wegener’s)

(There are many others, of course)
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Name 3 immune-related causes of atypical ON:
1) Sarcoid
2) SLE or some other vasculitic process
3) Granulomatosis with polyangiitis (formerly known as Wegener’s)

(There are many others, of course)
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Noninflammatory

**Why don't we call it Wegener's?**

(formerly known as Wegener’s)

Name 3 *immune-related* causes:

1) Sarcoid
2) SLE or some other vasculitic process
3) Granulomatosis with polyangiitis

(There are many others, of course)
Optic Neuropathy

Typical Optic Neuritis

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Noninflammatory

Name 3 immune-related causes of atypical ON:
1) Sarcoid
2) SLE or some other vasculitic process
3) Granulomatosis with polyangiitis (formerly known as Wegener’s)

Why don’t we call it Wegener’s? Because Dr Wegener was a Nazi, and is suspected to have committed war crimes

(There are many others, of course)
Optic Neuropathy

- Optic neuritis
  - Typical (demyelinating)
  - Atypical
    - Infectious
    - Immune

Noninflammatory
Optic Neuropathy

- Typical Optic Neuritis
  - Optic neuritis
    - Typical (demyelinating)
    - Atypical
      - Infectious
      - Immune
  - Noninflammatory
    - Ischemic
    - Compressive
    - Toxic/nutritional
    - Congenital/hereditary
    - Traumatic
What is far-and-away the most common type of optic neuropathy? 

Hint…
What is far-and-away the most common type of optic neuropathy?

Hint...It’s not listed on this slide!

Hint...
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Noninflammatory

Ischemic

Compressive

Toxic/nutritional

Congenital/hereditary

Traumatic

What is far-and-away the most common type of optic neuropathy?

Hint…It’s not listed on this slide!

Hint…It’s so common, it gets its own ophthalmic subspecialty!

It’s…
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

What is far-and-away the most common type of optic neuropathy?

Hint…It’s not listed on this slide!

Hint…It’s so common, it gets its own ophthalmic subspecialty!

It’s…**Glaucoma** (don’t forget—glaucoma is an optic neuropathy!)
What exam finding is the sine qua non of unilateral or asymmetric bilateral optic neuropathy?
What exam finding is the sine qua non of unilateral or asymmetric bilateral optic neuropathy?
A relative afferent pupillary defect (RAPD)
What exam finding is the *sine qua non* of unilateral or asymmetric bilateral optic neuropathy? 

**A relative afferent pupillary defect (RAPD)**

What should you do if a presumptive unilateral/asymmetric bilateral ON pt doesn't have an RAPD?

**Typical Optic Neuritis**

Optic Neuropathy

Optic neuritis

- Typical (demyelinating)
  - Infectious
  - Immune

- Atypical

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic
What exam finding is the sine qua non of unilateral or asymmetric bilateral optic neuropathy?
A relative afferent pupillary defect (RAPD)

What should you do if a presumptive unilateral/asymmetric bilateral ON pt doesn't have an RAPD?
You should question the diagnosis
What functional abnormalities are likely to be found in a pt with an optic neuropathy?
- Decreased [two words]
- Abnormal [two diff words]
- Impaired [two diff diff words]
What functional abnormalities are likely to be found in a pt with an optic neuropathy?
--Decreased central acuity
--Abnormal visual fields
--Impaired color vision
Typical Optic Neuritis

Optic Neuropathy

What is the typical pattern of vision loss in typical optic neuritis?

Decreased central acuity
--Abnormal visual fields
--Impaired color vision

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
Optic Neuropathy

What is the typical pattern of vision loss in typical optic neuritis?

- vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.
- VA can be anywhere from 20/20 to NLP; however, most cases are in the 20/40 – 20/200 range.
- Very good—about 90% will be 20/40 or better at one year.

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision
What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

What is the typical pattern of vision loss in typical optic neuritis?

Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

How profound is the vision loss?

VA can be anywhere from 20/20 to NLP; however, most cases are in the 20/40 – 20/200 range.

What is the long-term VA prognosis?

Very good—about 90% will be 20/40 or better at one year.
Optic Neuropathy

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

What is the typical pattern of vision loss in typical optic neuritis?

Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a day, week, or two later.
What is the typical pattern of vision loss in typical optic neuritis? Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

Very good—about 90% will be 20/40 or better at one year.
Optic Neuropathy

What is the typical pattern of vision loss in typical optic neuritis?
Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

This pattern of vision loss and recovery over time in typical optic neuritis bears repeating for emphasis.

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

No question—proceed when ready
**Typical Optic Neuritis**

**Vision in typical optic neuritis**

She will c/o rapid unilateral VA loss that occurs over several days.

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**What functional abnormalities are likely to be found in a pt with an optic neuropathy?**

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

---

**What is the typical pattern of vision loss in typical optic neuritis?**

Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

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- Decreased central acuity
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This pattern of vision loss and recovery over time in typical optic neuritis bears repeating for emphasis.

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
--Decreased central acuity
--Abnormal visual fields
--Impaired color vision

No question—proceed when ready
What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
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- Impaired color vision

What is the typical pattern of vision loss in typical optic neuritis?

Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

How profound is the vision loss?

VA can be anywhere from 20/20 to NLP; however, most cases are in the 20/40 – 20/200 range.

What is the long-term VA prognosis?

Very good—about 90% will be 20/40 or better at one year.
Optic Neuropathy

- Optic neuritis
  - Noninflammatory
  - Typical (demyelinating)
  - Ischemic
  - Compressive
  - Toxic/nutritional
  - Congenital/hereditary
  - Traumatic
  - Atypical
  - Infectious
  - Immune

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

What is the typical pattern of vision loss in typical optic neuritis?
Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

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Optic Neuropathy

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Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

How profound is the vision loss?
VA can be anywhere from 20/20 to NLP; however, most cases are in the 20/40 – 20/200 range.

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
--- Decreased central acuity
--- Abnormal visual fields
--- Impaired color vision
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How profound is the vision loss? VA can be anywhere from 20/20 to NLP; however, most cases are in the 20/40 – 20/200 range.

What is the long-term VA prognosis? Very good—about 90% will be 20/40 or better at one year.

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision
Optic Neuropathy

What is the typical pattern of vision loss in typical optic neuritis?
Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning a week or two later.

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Very good—about 90% will be 20/40 or better at one year.

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
-- Decreased central acuity
-- Abnormal visual fields
-- Impaired color vision

Typical Optic Neuritis
Optic Neuropathy

- What is the typical pattern of vision loss in typical optic neuritis?
  Unilateral vision loss which develops and nadirs over a few days, with spontaneous recovery beginning about a week or two later.

- How profound is the vision loss?
  VA can be anywhere from 20/20 to NLP; however, most cases are in the 20/40 – 20/200 range.

- What is the long-term VA prognosis?
  Very good—about 90% will be 20/40 or better at one year.

- What functional abnormalities are likely to be found in a pt with an optic neuropathy?
  - Decreased central acuity
  - Abnormal visual fields
  - Impaired color vision

Typical optic neuritis

- Optic neuritis: Noninflammatory
  - Typical (demyelinating)
  - Ischemic
  - Compressive
  - Toxic/nutritional
  - Congenital/hereditary
  - Traumatic

- Atypical
  - Infectious
  - Immune
Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
-- Decreased central acuity
-- Abnormal visual fields
-- Impaired color vision

What pattern(s) of VF loss occur in typical optic neuritis?
What functional abnormalities are likely to be found in a pt with an optic neuropathy?

--Decreased central acuity
--Abnormal visual fields
--Impaired color vision

What pattern(s) of VF loss occur in typical optic neuritis?
It can be anything, but is most commonly a central scotoma.
What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Impaired color vision
- Abnormal visual fields

What pattern(s) of VF loss occur in typical optic neuritis?

It can be anything, but is most commonly a central scotoma.
Central scotoma in typical optic neuritis
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Infectious

Immune

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

Dyschromatopsia in typical optic neuritis: Is it red-green, or blue-yellow?

Impaired color vision
Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

What functional abnormalities are likely to be found in a pt with an optic neuropathy?

- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

Impaired color vision

Dyschromatopsia in typical optic neuritis: Is it red-green, or blue-yellow?

Red-green
Optic Neuropathy

- Optic neuritis
  - Typical (demyelinating)
  - Atypical
    - Infectious
    - Immune
  - Noninflammatory
    - Ischemic
    - Compressive
    - Toxic/nutritional
    - Congenital/hereditary
    - Traumatic

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
- Decreased central acuity
- Abnormal visual fields
- Impaired color vision

Dyschromatopsia in typical optic neuritis: Is it red-green, or blue-yellow?
- Red-green

How common is it?

Per the Neuro book, it is "nearly universal"
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Noninflammatory
- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

What functional abnormalities are likely to be found in a pt with an optic neuropathy?
- Decreased central acuity
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Dyschromatopsia in typical optic neuritis: Is it red-green, or blue-yellow?

Red-green

How common is it?
Per the Neuro book, it is “nearly universal”
Optic Neuropathy

Optic neuritis

Typical (demyelinating)

Atypical

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

What is the usual appearance of the ONH in typical optic neuritis?
What is the usual appearance of the ONH in typical optic neuritis?
Pretty unremarkable—only [ ]% of cases present with disc edema
What is the usual appearance of the ONH in typical optic neuritis?
Pretty unremarkable—only 1/3 of cases present with disc edema.
What is the usual appearance of the ONH in typical optic neuritis?
Pretty unremarkable—only 1/3 of cases present with disc edema.

When edema is present, is it usually mild, or florid (ie, severe with associated hemorrhages)?
What is the usual appearance of the ONH in typical optic neuritis?
Pretty unremarkable—only 1/3 of cases present with disc edema

When edema is present, is it usually mild, or florid (i.e., severe with associated hemorrhages)?
Mild
Optic Neuropathy

Optic neuritis

Typical Optic Neuritis

Noninflammatory
- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

\[\text{Is typical optic neuritis associated with ocular pain?}\]
Is typical optic neuritis associated with ocular pain?
Yes—over % will complain of pain
Is typical optic neuritis associated with ocular pain?
Yes—over 90% will complain of pain
Optic Neuropathy

Optic neuritis

Typical
(demyelinating)

Atypical

Noninflammatory

Ischemic
Compressive
Toxic/nutritional
Congenital/hereditary
Traumatic

Infectious

Immune

Is typical optic neuritis associated with ocular pain?
Yes—over 90% will complain of pain provoked by
Is typical optic neuritis associated with ocular pain? Yes—over 90% will complain of pain provoked by eye movements.
Is typical optic neuritis associated with ocular pain? Yes—over 90% will complain of pain provoked by eye movements.

Does the onset of pain typically precede, follow, or coincide with the loss of vision?
Optic Neuropathy

Optic neuritis

Typical

(demyelinating)

Noninflammatory

Ischemic

Compressive

Toxic/nutritional

Congenital/hereditary

Traumatic

Atypical

Infectious

Immune

Is typical optic neuritis associated with ocular pain?
Yes—over 90% will complain of pain provoked by eye movements

Does the onset of pain typically precede, follow, or coincide with the loss of vision?
While it doesn’t have to, it often precedes it
If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

MRI brain and orbits, with contrast. That's it.

The purpose of the MRI is to look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).
If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done? MRI brain and orbits, with contrast. That’s it.
If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?
MRI brain and orbits, with contrast. That’s it.

What is the purpose of the MRI?
If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done? MRI brain and orbits, with contrast. That’s it.

*What is the purpose of the MRI?*
To look for white-matter changes, the presence of which increases the likelihood of developing two diff words.
If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done? MRI brain and orbits, with contrast. That’s it.

What is the purpose of the MRI? To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).
Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Typical

Atypical

Noninflammatory

- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary

Infectious

Immune

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).

What was the name of the study that followed typical optic neuritis pts over many years, and (among other things) assessed their risk of developing MS?

The Optic Neuritis Treatment Trial (ONTT)

Per the ONTT, what proportion of typical optic neuritis pts develop MS by 15 years if...

- There were no white matter changes on MRI: 1/4
- Even one white matter change was present: 3/4

If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

MRI brain and orbits, with contrast. That's it.

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To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).
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What was the name of the study that followed typical optic neuritis pts over many years, and (among other things) assessed their risk of developing MS? The Optic Neuritis Treatment Trial (ONTT).

Per the ONTT, what proportion of typical optic neuritis pts develop MS by 15 years if...

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Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Typical

Atypical

Noninflammatory

- Ischemic
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MRI brain and orbits, with contrast. That's it.

What is the purpose of the MRI?

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).

What was the name of the study that followed typical optic neuritis pts over many years, and (among other things) assessed their risk of developing MS?

The Optic Neuritis Treatment Trial (ONTT)

Is the ONTT one of those trials I’m expected to know by name?

Yes it is

Per the ONTT, what proportion of typical optic neuritis pts develop MS by 15 years if...

- there were no white matter changes on MRI: 1/4
- if even one white matter change was present: 3/4
If a typical patient presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

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To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).

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The Optic Neuritis Treatment Trial (ONTT)

Is the ONTT one of those trials I'm expected to know by name?

Yes it is

Per the ONTT, what proportion of typical optic neuritis patients develop MS by 15 years if...

- there were no white matter changes on MRI: 1/4
- if even one white matter change was present: 3/4

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).
Typical Optic Neuritis

Optic Neuropathy

Optic neuritis

Typical

Atypical

Typical

(demyelinating)

Infectious

Immune

Ischemic

Compressive

Toxic/nutritional

Congenital/hereditary

Traumatic

Optic Neuritis

If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done? MRI brain and orbits, with contrast. That’s it.

What is the purpose of the MRI? To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).

What was the name of the study that followed typical optic neuritis pts over many years, and (among other things) assessed their risk of developing MS? The Optic Neuritis Treatment Trial (ONTT)

Per the ONTT, what proportion of typical optic neuritis pts develop MS by 15 years if…

…there were no white matter changes on MRI:

1/4

If even one white matter change was present:

3/4
Optic Neuropathy

Typical Optic Neuropathy

Optic neuritis

- Typical (demyelinating)
- Atypical

Noninflammatory
- Infectious
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What was the name of the study that followed typical optic neuritis pts over many years, and (among other things) assessed their risk of developing MS?
The Optic Neuritis Treatment Trial (ONTT)

Per the ONTT, what proportion of typical optic neuritis pts develop MS by 15 years if…
…there were no white matter changes on MRI: 1/4

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)
**Optic Neuropathy**

**Optic neuritis**

- Typical
- Atypical

**Noninflammatory**
- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

**Typical Optic Neuritis**

If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

MRI brain and orbits, with contrast. That's it.

What is the purpose of the MRI?

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(phenotypic)

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Why is knowing the likelihood of developing MS important?

Because it influences decision-making vis a vis whether to initiate tx that can forestall MS onset (and may improve dz course).
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We will have much more to say about MS later in the set.
The ONTT evaluated what sort of drug as tx for typical optic neuritis?

- **Steroids** were used.
  - IV methylprednisolone: 250 qid x 3 days, then pred 1 mg/kg/d x 11d, then tapered off.
  - PO prednisone: 1 mg/kg/d x 14 days, then tapered off.

With respect to vision, to what extent did steroids provide a long-term benefit?

None. The final VA outcome of the Steroid group was no different than that of the control group.

Did steroids have any positive effects on **vision**?

The IV group regained their final (best) vision a week or two faster than the control group— although to reiterate for emphasis, their final VA was not better than that of the controls. (The PO steroid group did not enjoy even this modest benefit.)

Did steroids have any positive effects on **MS risk**?

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So PO pred @1 mg/kg/d doesn't help, and may harm, optic neuritis pts.
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‘Megadose’? How much pred are we talking about here?
Like, 1000 mg a day.

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IV steroids delayed the onset of MS in pts who had 2+ white-matter lesions at presentation. But as was the case with VA, eventually this outcome difference between the IV steroid and control groups disappeared—by 3 years post-event, there was no difference in the rate of MS development between these groups.

Did steroids have any negative effects?
Indeed they did—the PO pred group had an increased risk of recurrence of optic neuritis.

Does this mean PO pred is contraindicated in typical optic neuritis?
No, subsequent studies found that megadose PO steroids hasten VA recovery without increasing the risk of recurrence

‘Megadose’? How much pred are we talking about here?
A gram a day (same as the IV dose of methylprednisolone in the ONTT)

So PO pred @1 mg/kg/d doesn’t help—and seems to harm—optic neuritis pts.
If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

**As a review:** Who is the typical typical optic neuritis pt?

**What is the purpose of the MRI?**
To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).
If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done? MRI brain and orbits, with contrast. That’s it.

As a review: Who is the typical typical optic neuritis pt? Female, young adult.

What is the purpose of the MRI? To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).
**Typical Optic Neuritis**

If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

How does a case of typical optic neuritis typically present?

**As a review: Who is the typical typical optic neuritis pt?**

- Female
- Young adult
- VA loss
- Nadirs over
- Recovery starts
- Pain with
- Disc edema

**What is the purpose of the MRI?**

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).
If a typical patient presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

MRI brain and orbits, with contrast. That’s it.

What is the purpose of the MRI?
To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

As a review: Who is the typical typical optic neuritis pt?
Female
Young adult
VA loss unilateral
Nadir over several days
Recovery starts <1 month
Pain with eye movement
Disc edema absent or mild

Typical Optic Neuritis

Optic Neuropathy

Noninflammatory
- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary

Atypical

Typical (demyelinating)
If the pt deviates from the typical pattern...

If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

MRI brain and orbits, with contrast. That's it.

What is the purpose of the MRI?

To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS).

No question—proceed when ready.
Optic Neuropathy

Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...

If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?

MRI brain and orbits, with contrast. That's it.

What is the purpose of the MRI?
To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

How does a case of typical optic neuritis typically present?
As a review: Who is the typical typical optic neuritis pt?

Female
Young adult
VA loss unilateral
Nadirs over several days
Recovery starts <1 month
Pain with eye movement
Disc edema absent or mild

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

No question—proceed when ready
Optic Neuropathy

Optic neuritis
- Noninflammatory
- Atypical
- Infectious/immune
- Ischemic
- Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

If a typical pt presents with what seems to be a typical case of typical optic neuritis, what sort of workup should be done?
- MRI brain and orbits, with contrast. That's it.

What is the purpose of the MRI?
- To look for white-matter changes, the presence of which increases the likelihood of developing multiple sclerosis (MS)

Typical Optic Neuritis

Typical (demyelinating)?

- Female
- Young adult
- VA loss unilateral
- Nadirs over several days
- Recovery starts <1 month
- Pain with eye movement
- Disc edema absent or mild

Atypical

- Male
- Older
- VA loss bilateral
- Progressive VA loss
- No recovery after a month
- Lack of pain
- Disc edema severe/florid

If a typical pt presents with what seems to be a typical case of typical optic neuritis, but it deviates from the typical pattern…
- You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies

As a review: Who is the typical optic neuritis pt?

No question—proceed when ready
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies

Optic neuritis

- Typical
  - Male
  - Older
  - VA loss bilateral
  - Progressive VA loss
  - No recovery after a month
  - Lack of pain
  - Disc edema severe/florid

- Atypical
  - Compressive
  - Toxic/nutritional
  - Congenital/hereditary
  - Traumatic

- Not idiopathic or MS-related

Infectious

Immune

No question—proceed when ready
Optic Neuropathy

Optic neuritis

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Typical Optic Neuritis

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

Atypical

Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

Infectious
Immune

What etiologies?

Not idiopathic or MS-related

(Cont)

?
If the pt or the presentation deviates from the typical pattern…
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

What etiologies?
- Syphilis
- Bartonella
- Lyme testing (if endemic)
- Sarcoid
- SLE

(Cont)
- Granulomatosis w/ polyangiitis
- LHON
- Meningeal process
- NMO(SD)
- MOGAD
Optic Neuropathy

Optic neuritis

Typical (demyelinating) but not idiopathic or MS-related

Atypical

Infectious

Immune

If the pt or the presentation deviates from the typical pattern…
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

What etiologies? What studies?

Syphilis: unknown
Bartonella
Lyme testing (if endemic)
Sarcoid
SLE

(Cont)
Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: ?
Lyme testing (if endemic)
Sarcoid
SLE

(Cont)
Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid
Optic Neuropathy

Optic neuritis

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Typical Optic Neuritis

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

Atypical

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic)
Sarcoid
SLE

(Cont)
Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD

Typical (demyelinating but not idiopathic or MS-related)

Infectious

Immune

Not idiopathic or MS-related
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern…
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Optic neuritis

Typical (demyelinating) but

Not idiopathic or MS-related

Infectious

Immune

Atypical

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): ?
Sarcoid
SLE

(Cont)
Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD
Optic Neuropathy

Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern... You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Neuropathy

Optic neuritis

Typical (demyelinating) but

Not idiopathic or MS-related

Infectious

Immune

Atypical

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid
SLE

(Cont)
If the pt or the presentation deviates from the typical pattern…
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Typical Optic Neuritis

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: ?
SLE

(Cont)
Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD
Optic Neuropathy

Optic neuritis

Typical

(demyelinating but not idiopathic or MS-related)

Atypical

Infectious

Immune

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

Compressive
-- Toxic/nutritional
-- Congenital/hereditary
-- Traumatic

Meningeal process

NMO (SD)

MOGAD

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: Chest XR or CT; +/- Gallium/PET
SLE

(Cont)
Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO (SD)
MOGAD

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.
Optic Neuropathy

**Optic neuritis**

- **Typical Optic Neuritis**
  - Male
  - Older
  - VA loss bilateral
  - Progressive VA loss
  - No recovery after a month
  - Lack of pain
  - Disc edema severe/florid

- **Atypical**
  - Toxic/nutritional
  - Congenital/hereditary
  - Traumatic

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

**What etiologies? What studies?**

- **Syphilis**: Serum and CSF RPR/TPPA
- **Bartonella**: IgM titers
- **Lyme testing (if endemic)**: Serum/CSF ELISA
- **Sarcoid**: Chest XR or CT; +/- Gallium/PET
- **SLE**: ?

(Cont)

- **Granulomatosis w/ polyangiitis**
- **LHON**
- **Meningeal process**
- **NMO(SD)**
- **MOGAD**
If the pt or the presentation deviates from the typical pattern... You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: Chest XR or CT; +/- Gallium/PET
SLE: ESR, ANA, Anti-DNA

(Cont)
Granulomatosis w/ polyangiitis
LHON
Meningeal process
NMO(SD)
MOGAD
Optic Neuropathy

Optic neuritis

Typical
- Male
- Older
- VA loss bilateral
- Progressive VA loss
- No recovery after a month
- Lack of pain
- Disc edema severe/florid

Atypical
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: Chest XR or CT; +/- Gallium/PET
SLE: ESR, ANA, Anti-DNA

(Cont)
- Granulomatosis w/ polyangiitis: ?
- LHON
- Meningeal process
- NMO(SD)
- MOGAD

Typical (demyelinating) but not idiopathic or MS-related

Infectious

Immune
If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

**Typical Optic Neuritis**

- Male
- Older
- VA loss bilateral
- Progressive VA loss
- No recovery after a month
- Lack of pain
- Disc edema severe/florid

**Atypical**

- Toxic/nutritional
- Congenital/hereditary
- Traumatic

---

**Optic Neuritis**

- Not idiopathic or MS-related
- Infectious
- Immune

---

**What etiologies? What studies?**

- **Syphilis**: Serum and CSF RPR/TPPA
- **Bartonella**: IgM titers
- **Lyme testing (if endemic)**: Serum/CSF ELISA
- **Sarcoid**: Chest XR or CT; +/- Gallium/PET
- **SLE**: ESR, ANA, Anti-DNA

(Cont)

- **Granulomatosis w/ polyangiitis**: ANCA
- **LHON**
- **Meningeal process**
- **NMO(SD)**
- **MOGAD**
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Typical (demyelinating)
- Not idiopathic or MS-related

Atypical
- Infectious
- Immune

What etiologies? What studies?
- Syphilis: Serum and CSF RPR/TPPA
- Bartonella: IgM titers
- Lyme testing (if endemic): Serum/CSF ELISA
- Sarcoid: Chest XR or CT; +/- Gallium/PET
- SLE: ESR, ANA, Anti-DNA

(Cont)
- Granulomatosis w/ polyangiitis: ANCA
- LHON: ?
- Meningeal process
- NMO(SD)
- MOGAD

Male
- Older
- VA loss bilateral
- Progressive VA loss
- No recovery after a month
- Lack of pain
- Disc edema severe/florid
If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies

Typical Optic Neuritis

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: Chest XR or CT; +/- Gallium/PET
SLE: ESR, ANA, Anti-DNA

Granulomatosis w/ polyangiitis: ANCA
LN: Genetic testing
Meningeal process
NMO(SD)
MOGAD

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

Compressive
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

Not idiopathic or MS-related
Infectious
Immune

Optic neuritis

Optic neuropathy

Typical (demyelinating but not idiopathic or MS-related)
Atypical

(Cont)
Optic Neuropathy

**Optic neuritis**

- **Typical (demyelinating)**
  - Not idiopathic or MS-related
  - Infectious
  - Immune

- **Atypical**
  - Compressive
    - Toxic/nutritional
    - Congenital/hereditary
    - Traumatic
  - Ischemic
  - Congenital/hereditary
  - Traumatic

If the pt **or** the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies

**What etiologies? What studies?**

- **Syphilis**: Serum and CSF RPR/TPPA
- **Bartonella**: IgM titers
- **Lyme testing (if endemic)**: Serum/CSF ELISA
- **Sarcoid**: Chest XR or CT; +/- Gallium/PET
- **SLE**: ESR, ANA, Anti-DNA

**Male**
**Older**
**VA loss bilateral**
**Progressive VA loss**
**No recovery after a month**
**Lack of pain**
**Disc edema severe/florid**

**What etiologies? What studies?**

- **(Cont)**
  - Granulomatosis w/ polyangiitis: ANCA
  - LHON: Genetic testing
  - Meningeal process: ?
  - NMO(SD)
  - MOGAD
If the pt or the presentation deviates from the typical pattern... You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

**Typical Optic Neuritis**

- Male
- Older
- VA loss bilateral
- Progressive VA loss
- No recovery after a month
- Lack of pain
- Disc edema severe/florid

**Atypical**

- Toxic/nutritional
- Congenital/hereditary
- Traumatic

**Optic neuritis**

- Not idiopathic or MS-related
- Infectious
- Immune

What etiologies? What studies?

- Syphilis: Serum and CSF RPR/TPPA
- Bartonella: IgM titers
- Lyme testing (if endemic): Serum/CSF ELISA
- Sarcoid: Chest XR or CT; +/- Gallium/PET
- SLE: ESR, ANA, Anti-DNA

(Cont)

- Granulomatosis w/ polyangiitis: ANCA
- LHON: Genetic testing
- Meningeal process: LP with cytology
- NMO(SD)
- MOGAD
If the pt or the presentation deviates from the typical pattern... You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Typical Optic Neuritis

Neuropathy

Optic neuritis

- Typical
- Atypical

Not idiopathic or MS-related

Infectious

Immune

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
_Bartonella_: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: Chest XR or CT; +/- Gallium/PET
SLE: ESR, ANA, Anti-DNA

(Cont)
Granulomatosis w/ polyangiitis: ANCA
LHON: Genetic testing
Meningeal process: LP with cytology
NMO(SD): ?
MOGAD
**Optic Neuropathy**

**Optic neuritis**

- **Atypical**
  - Infectious
  - Immune

- **Typical** (demyelinating but not idiopathic or MS-related)

---

**What etiologies? What studies?**

- **Syphilis**: Serum and CSF RPR/TPPA
- **Bartonella**: IgM titers
- **Lyme testing (if endemic)**: Serum/CSF ELISA
- **Sarcoid**: Chest XR or CT; +/- Gallium/PET
- **SLE**: ESR, ANA, Anti-DNA

**Male**
- Older
- VA loss bilateral
- Progressive VA loss
- No recovery after a month
- Lack of pain
- Disc edema severe/florid

**Atypical**

- Toxic/nutritional
- Congenital/hereditary
- Traumatic

**What if the pt or the presentation deviates from the typical pattern…**

You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

**Typical Optic Neuritis**

(Cont)

- **Granulomatosis w/ polyangiitis**: ANCA
- **LHON**: Genetic testing
- **Meningeal process**: LP with cytology
- **NMO(SD)**: Serum AQP4-IgG, spinal MRI
- **MOGAD**
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern, you should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

What etiologies? What studies?
Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: Chest XR or CT; +/- Gallium/PET
SLE: ESR, ANA, Anti-DNA

(Cont)
Granulomatosis w/ polyangiitis: ANCA
LHON: Genetic testing
Meningeal process: LP with cytology
NMO(SD): Serum AQP4-IgG, spinal MRI
MOGAD: ?
Optic Neuropathy

Optic neuritis

- Atypical
- Infectious
- Immune

If the pt or the presentation deviates from the typical pattern...
You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies.

Typical Optic Neuritis

- Male
- Older
- VA loss bilateral
- Progressive VA loss
- No recovery after a month
- Lack of pain
- Disc edema severe/florid

What etiologies? What studies?

Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA
Sarcoid: Chest XR or CT; +/- Gallium/PET
SLE: ESR, ANA, Anti-DNA

(Cont)
Granulomatosis w/ polyangiitis: ANCA
LHON: Genetic testing
Meningeal process: LP with cytology
NMO(SD): Serum AQP4-IgG, spinal MRI
MOGAD: Serum MOG-IgG
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern… You should question the dx of typical (demyelinating) optic neuritis, and institute a workup for infectious/autoimmune etiologies

Neuropathy

Optic neuritis

Typical
(demyelinating) but

Atypical

No

Typical (demyelinating) but

Not idiopathic or MS-related

Infectious

Immune

What etiologies? What studies?

Syphilis: Serum and CSF RPR/TPPA
Bartonella: IgM titers
Lyme testing (if endemic): Serum/CSF ELISA

We will address these conditions in considerable detail later in the set

NMO(SD): Serum AQP4-IgG, spinal MRI
MOGAD: Serum MOG-IgG

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

Compressive
– Toxic/nutritional
– Congenital/hereditary
– Traumatic

(Cont)

Granulomatosis w/ polyangiitis: ANCA
LHON: Genetic testing
Meningeal process: LP with cytology
Typical Optic Neuritis

If the pt or the presentation deviates from the typical pattern…
You should question the dx of typical (demyelinating) optic neuritis,
and institute a workup for infectious/autoimmune etiologies

Optic neuritis

Neuropathy

Male
Older
VA loss bilateral
Progressive VA loss
No recovery after a month
Lack of pain
Disc edema severe/florid

But first let’s take a minute to drill down on MS

Typical (demyelinating but not idiopathic or MS-related)

- Infectious
- Immune

What etiologies? What studies?
- Syphilis: Serum and CSF RPR/TPPA
- Bartonella: IgM titers
- Lyme testing (if endemic): Serum/CSF ELISA
- Sarcoid: Chest XR or CT; +/- Gallium/PET
- SLE: ESR, ANA, Anti-DNA
- Granulomatosis w/ polyangiitis: ANCA
- LHON: Genetic testing
- NMO(SD): Serum AQP4-IgG, spinal MRI
- MOGAD: Serum MOG-IgG

(Cont)
- Meningeal process: LP with cytology
- Toxic/nutritional
- Congenital/hereditary
- Traumatic

We will address these conditions in considerable detail later in the set
(This is a good point in the set to take a break)
Typical Optic Neuritis

CDMS: Basics

What does CDMS stand for in this context?
What does CDMS stand for in this context?
Clinically-definite multiple sclerosis
CDMS: Basics

What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time
CDMS: Basics

What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time

Is there a gender predilection?
What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time

Is there a gender predilection?
Yes, it is more common in M vs F
What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time

Is there a gender predilection?
Yes, it is more common in women
CDMS: Basics

What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time

Is there a gender predilection?
Yes, it is more common in women (two to three times more common, in fact)
What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time

Is there a gender predilection?
Yes, it is more common in women (2-3 times more common, in fact)
What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

In a nutshell, what is MS?
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time

Is there a gender predilection?
Yes, it is more common in women (2-3 times more common, in fact)

Is there an age predilection?
**CDMS: Basics**

What does CDMS stand for in this context?
Clinically-definite multiple sclerosis

*In a nutshell, what is MS?*
An inflammatory neurodegenerative disorder of the CNS that produces progressive disability over time

*Is there a gender predilection?*
Yes, it is more common in women (2-3 times more common, in fact)

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Yes, it is more common in young adults

**Typical Optic Neuritis**
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It is more prevalent among people who live closer to the equator
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What is the classic two-word description of the typical clinical course in MS?
‘Relapsing-remitting’
CDMS: Manifestations

- Nonocular
- Ocular

Are ocular manifestations common in MS?
CDMS: Manifestations

Typical Optic Neuritis

Nonocular  Ocular

Are ocular manifestations common in MS?
Indeed they are—optic neuritis occurs in % of MS cases
Are ocular manifestations common in MS? Indeed they are—optic neuritis occurs in 75% of MS cases.
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Indeed they are—optic neuritis occurs in 75% of MS cases (and is the presenting symptom in %).
Are ocular manifestations common in MS? Indeed they are—optic neuritis occurs in 75% of MS cases (and is the presenting symptom in 25%)
CDMS: Manifestations

Nonocular

Ocular

- Optic neuritis S/S
- ?
- ?
- ?

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Three non-neuritis ocular manifestations are often encountered as well—what are they?
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Three non-neuritis ocular manifestations are often encountered as well—what are they?
Typical Optic Neuritis

CDMS: **Manifestations**

Nonocular

In a nutshell, what is a nystagmus and/or oscillation?

Ocular

- Optic neuritis S/S
- **Nystagmus/oscillations**
- Diplopia
- Uveitis
In a nutshell, what is a nystagmus and/or oscillation?
Both are involuntary eye-movement patterns that involve displacement of gaze off of its intended target, followed by a refixation movement.
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What is the difference between a nystagmus and an oscillation?
**Typical Optic Neuritis**

CDMS: Manifestations

**Nonocular**

*In a nutshell, what is a nystagmus and/or oscillation?*
Both are involuntary eye-movement patterns that involve displacement of gaze off of its intended target, followed by a refixation movement.

*What is the difference between a nystagmus and an oscillation?*
In a nystagmus, the velocity of the displacement movement is by definition slow, whereas in an oscillation it’s by definition fast.

**Ocular**

- Optic neuritis S/S
- **Nystagmus/oscillations**
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- Uveitis
Typical Optic Neuritis

CDMS: Manifestations

Nonocular

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**CDMS: Manifestations**

### Nonocular

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*In a nystagmus, the velocity of the displacement movement is by definition slow*, whereas in an oscillation it’s by definition fast.

*But I thought jerk nystagmus was fast, and pendular nystagmus was slow. What’s the deal?*

### Ocular

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But I thought jerk nystagmus was fast, and pendular nystagmus was slow. What’s the deal?
You thought correct—jerk is fast, pendular slow. But these terms refer to the speed of the refixation movement—the initial displacement is slow in both.
In a nutshell, what is a nystagmus and/or oscillation? Both are involuntary eye-movement patterns that involve displacement of gaze off of its intended target, followed by a refixation movement.

What is the difference between a nystagmus and an oscillation? In a nystagmus, the velocity of the displacement movement is by definition slow, whereas in an oscillation it’s by definition fast.

Is nystagmus/oscillations a common, or rare occurrence in MS?
In a nutshell, what is a nystagmus and/or oscillation?
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Is nystagmus/oscillations a common, or rare occurrence in MS?
Common (especially nystagmus)
**CDMS: Manifestations**

**Nonocular**

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*Is nystagmus/oscillations a common, or rare occurrence in MS?*
Common (especially nystagmus)

*Is there a particular direction (ie, horizontal, vertical, rotary) in which the nystagmus tends to manifest?*

**Ocular**

- Optic neuritis S/S
- **Nystagmus/oscillations**
- Diplopia
- Uveitis
CDMS: Manifestations

Typical Optic Neuritis

Nonocular

In a nutshell, what is a nystagmus and/or oscillation?
Both are involuntary eye-movement patterns that involve displacement of gaze off of its intended target, followed by a refixation movement

What is the difference between a nystagmus and an oscillation?
In a nystagmus, the velocity of the displacement movement is by definition slow, whereas in an oscillation it’s by definition fast

Is nystagmus/oscillations a common, or rare occurrence in MS?
Common (especially nystagmus)

Is there a particular direction (ie, horizontal, vertical, rotary) in which the nystagmus tends to manifest?
No—it can be any direction (and either jerk or pendular)

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis
CDMS: Manifestations

Typical Optic Neuritis

Nonocular

Is diplopia a common manifestation of MS?

Ocular

- Optic neuritis S/S
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CDMS: Manifestations

Nonocular

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*Is diplopia a common manifestation of MS? Indeed it is*
Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)?

- Optic neuritis S/S
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Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6.
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Step-back II: The EOM control pathway has four levels or subsections. What are they?
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--?
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--The Supranuclear pathways
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--The Nuclear level: The CN3, 4 and 6 nuclei themselves
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CDMS: Manifestations

Typical Optic Neuritis

Nonocular

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Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6.

Step-back II: The EOM control pathway has four levels or subsections. What are they?

-- The **Supranuclear pathways**

- The Internuclear pathway

**Broadly speaking, what constitutes the supranuclear pathways?**

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis
Is diplopia a common manifestation of MS?
Indeed it is

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)?
3, 4 and 6

Step-back II: The EOM control pathway has four levels or subsections. What are they?
-- The Supranuclear pathways
  - The Internuclear pathway

Broadly speaking, what constitutes the supranuclear pathways?
Inputs to the nuclei from centers in the cortex, cerebellum, vestibular system, etc. These locations are ‘supra’ in that they carry signals to the nuclei.
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Broadly speaking, what constitutes the supranuclear pathways? Inputs to the nuclei from centers in the cortex, cerebellum, vestibular system, etc. These locations are ‘supra’ in that they carry signals to the nuclei. Examples of supranuclear dysfunction include *Parinaud syndrome*, *PSP*, and *convergence* or *divergence excess/insufficiency*.
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What does PSP stand for in this context?
Is diplopia a common manifestation of MS?
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What does PSP stand for in this context?
Progressive supranuclear palsy

Typical Optic Neuritis

CDMS: Manifestations

Nonocular

Ocular

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Nystagmus/oscillations
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It should be noted that, generally speaking, diplopia isn’t a feature of supranuclear pathway lesions.

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Typical Optic Neuritis

CDMS: Manifestations

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This is because most supranuclear-pathway lesions affect three words.

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Nystagmus/oscillations
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It should be noted that, generally speaking, diplopia isn’t a feature of supranuclear pathway lesions. This is because most supranuclear-pathway lesions affect both eyes symmetrically.

Examples of supranuclear dysfunction include Parinaud syndrome, PSP, and convergence or divergence excess/insufficiency.
Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)?

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**Typical Optic Neuritis**

CDMS: **Manifestations**

**Nonocular**

- Is diplopia a common manifestation of MS? Indeed it is.

**Ocular**

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
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### Taking a step back

Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6.

### Step-back II

The EOM control pathway has four levels or subsections. What are they?

--- The **Supranuclear** pathways

- The Internuclear pathway

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Examples of supranuclear dysfunction include Parinaud syndrome, PSP, and **convergence or divergence excess/insufficiency**.
Is diplopia a common manifestation of MS?
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Step-back II: The EOM control pathway has four levels or subsections:
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--The Internuclear pathway
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Which two cranial nerve nuclei share an internuclear connection of well-established clinical importance?
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What is the name of the internuclear connection shared by these two nuclei?

The Internuclear pathway

Typical Optic Neuritis

CDMS: Manifestations

Nonocular

Ocular

- Optic neuritis S/S
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Which two cranial nerve nuclei share an internuclear connection of well-established clinical importance? 3 and 6.

What is the name of the internuclear connection shared by these two nuclei? The medial longitudinal fasciculus (MLF).
**CDMS: Manifestations**

**Nonocular**

*Is diplopia a common manifestation of MS? Indeed it is*

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6

Step-back II: The EOM control pathways
--- The **Supranuclear** pathways
--- The **Internuclear** pathway
--- The **Nuclear** level: The CN3, 4 and 6 nuclei themselves
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**Ocular**

- Optic neuritis S/S
- Nystagmus/oscillations
- **Diplopia**
- Uveitis

---

Which two cranial nerve nuclei share an internuclear connection of well-established clinical importance? 3 and 6

What is the name of the internuclear connection shared by these two nuclei? The medial longitudinal fasciculus (MLF)

Damage to the MLF results in what clinical condition?
CDMS: Manifestations

Nonocular

Is diplopia a common manifestation of MS? Indeed it is

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6

Step-back II: The EOM control pathway consists of four levels or subsections.
-- The Supranuclear pathways
-- The Internuclear pathway
-- The Nuclear level: The CN3, 4 and 6 nuclei themselves
-- The Infranuclear pathway

Which two cranial nerve nuclei share an internuclear connection of well-established clinical importance? 3 and 6

What is the name of the internuclear connection shared by these two nuclei? The medial longitudinal fasciculus (MLF)

Damage to the MLF results in what clinical condition? An internuclear ophthalmoplegia (INO)

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

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In a nutshell, how does a unilateral INO manifest?
Upon attempted lateral gaze, the adducting eye adducts slowly (or not at all), while the abducting eye abducts fully, but displays an end-point nystagmus. Additionally, the eye on the abducting side may be exotropic in primary gaze.

How does a bilateral INO manifest?
With the same motility difficulties, but on attempted lateral gaze in either direction. Both eyes are often exotropic in primary, resulting in a WEBINO (acronym for "w"all-e"xed b"ilateral INO). If you see a young person with a WEBINO, think MS first.
Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6.

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Damage to the MLF results in what clinical condition? An internuclear ophthalmoplegia (INO).

In a nutshell, how does a unilateral INO manifest? Upon attempted lateral gaze, the adducting eye adducts slowly (or not at all), while the abducting eye abducts fully, but displays an end-point nystagmus.

How does a bilateral INO manifest? With the same motility difficulties, but on attempted lateral gaze in either direction. Both eyes are often exotropic in primary, resulting in a WEBINO (acronym for all-ed bilateral INO).

If you see a young person with a WEBINO, think MS first.
**Typical Optic Neuritis**

**CDMS: Manifestations**

**Nonocular**

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--- The Nuclear level: The CN3, 4 and 6 nuclei themselves
--- The Infranuclear pathway

Which two cranial nerve nuclei share an internuclear connection of well-established clinical importance? 3 and 6.

What is the name of the internuclear connection shared by these two nuclei? The medial longitudinal fasciculus (MLF).

Damage to the MLF results in what clinical condition? An internuclear ophthalmoplegia (INO).

**Ocular**

--- Optic neuritis S/S
--- Nystagmus/oscillations
--- Diplopia

In a nutshell, how does a unilateral INO manifest? Upon attempted lateral gaze, the adducting eye adducts slowly (or not at all), while the abducting eye abducts fully, but displays an end-point nystagmus. Additionally, the eye on the abducting side may be exotropic in primary gaze.

How does a bilateral INO manifest? With the same motility difficulties, but on attempted lateral gaze in either direction. Both eyes are often exotropic in primary, resulting in a WEBINO (acronym for **w**hole **e**xotropic **b**ilateral INO).

If you see a young person with a WEBINO, think MS first.
Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6.

Step-back II: The EOM control pathway has four levels or subsections. What are they?
--The Supranuclear pathways
--The Internuclear pathway
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Damage to the MLF results in what clinical condition? An internuclear ophthalmoplegia (INO).

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Damage to the MLF results in what clinical condition? An internuclear ophthalmoplegia (INO)

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Upon attempted lateral gaze, the adducting eye adducts slowly (or not at all), while the abducting eye abducts fully, but displays an end-point nystagmus. Additionally, the eye on the abducting side may be exotropic in primary gaze.

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How does a bilateral INO manifest?
With the same motility difficulties, but on attempted lateral gaze in either direction. Both eyes are often exotropic in primary, resulting in a WEBINO (acronym for "walled bilateral INO").
Is diplopia a common manifestation of MS?
Indeed it is

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)?
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With the same motility difficulties, but on attempted lateral gaze in either direction. Both eyes are often exotropic in primary, resulting in a WEBINO (acronym for wall-eyed bilateral INO).

Typical Optic Neuritis

CDMS: Manifestations

Nonocular

Ocular

Optic neuritis S/S
Nystagmus/oscillations
Diplopia
Typical Optic Neuritis

Right gaze  Primary  Left gaze
Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6.

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-- The **Internuclear** pathway
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-- The **Infranuclear** pathway

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With the same motility difficulties, but on attempted lateral gaze in *either* direction. Both eyes are often exotropic in primary, resulting in a WEBINO (acronym for *wall-eyed bilateral INO*).

If you see a young person with a WEBINO, think MS!

Damage to the MLF results in what clinical condition?
An **internuclear ophthalmoplegia** (INO)
Typical Optic Neuritis

CDMS: Manifestations

What constitutes the infranuclear pathway?

The infranuclear pathway is the part of the cranial nerve that is located after the nuclei and before the neuromuscular junction. It includes:

1. The axons as they run through the brainstem to enter the subarachnoid space.
2. The 'cranial nerve' portion as it passes through the subarachnoid space into the cavernous sinus and then the orbit to the neuromuscular junction.
3. The junction itself.
4. The extraocular muscles themselves.

The infranuclear pathway starts at the cranial-nerve nuclei and their fascicles located within the brainstem. Given this, it shouldn’t come as a surprise that, generally speaking, lesions of the nuclei and/or fascicles do not present with isolated extraocular muscle abnormalities; the ophthalmoparesis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.
CDMS: Manifestations

Typical Optic Neuritis

What constitutes the infranuclear pathway?
Everything after the nuclei: the axons as they run through the brainstem to enter the subarachnoid space; the ‘cranial nerve’ portion as it passes through the subarachnoid space into the cavernous sinus and then the orbit to the neuromuscular junction; the junction itself; and finally the EOMs themselves.

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Step-back II: The EOM control pathway has four levels or subsections. What are they?

--The Supranuclear pathways
--The Internuclear pathway
--The Nuclear level: The CN3, 4 and 6 nuclei themselves
--The Infranuclear pathway

Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)?

3, 4 and 6

Note that the only portion of the infranuclear pathway that is located within the CNS is the fascicular portion, i.e., the axon bundle that has left the CN nucleus, but is still within the substance of the brainstem. (It is only after these fibers have entered the subarachnoid space that they are formally designated a ‘nerve’.)

The cranial-nerve nuclei and their fascicles are located within the brainstem. Given this, it shouldn’t come as a surprise that, generally speaking, lesions of the nuclei and/or fascicles do not present with isolated EOM abnormalities; i.e., the ophthalmoparesis is almost always accompanied by nonocular signs and symptoms of CNS damage—that is, a stroke-like presentation.
CDMS: Manifestations

What constitutes the infranuclear pathway?

Everything after the nuclei: the axons as they run through the brainstem to enter the subarachnoid space, the ‘cranial nerve’ portion as it passes through the subarachnoid space into the cavernous sinus and then the orbit to the neuromuscular junction; the junction itself; and finally the EOMs themselves.

Note that the only portion of the infranuclear pathway that is located within the CNS is the portion, ie, the axon bundle that has left the CN nucleus, but is still within the substance of the brainstem.

--The Infranuclear pathway
Is diplopia a common manifestation of MS? Indeed it is.

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--The Supranuclear pathways
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Note that the only portion of the infranuclear pathway that is located within the CNS is the fascicular portion, i.e., the axon bundle that has left the CN nucleus, but is still within the substance of the brainstem.
Typical Optic Neuritis

Aqueduct

3rd nerve nucleus

Red nucleus

Cerebral peduncle

Third nerve fascicle

Cranial nerve fascicle
CDMS: **Manifestations**

**Typical Optic Neuritis**

*What constitutes the infranuclear pathway?*

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**The Infranuclear pathway**
**Typical Optic Neuritis**

**CDMS: Manifestations**

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**The Infranuclear pathway**
Nonocular Ocular

Optic neuritis S/S
Nystagmus/oscillations
Diplopia
Uveitis

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What term is used to describe conditions presenting with motility dysfunction secondary to fascicle damage + non-ocular CNS findings?

Fascicular syndrome

Four fascicular syndromes involve the CN3 fascicle—what are they?
--Weber syndrome
--Benedikt syndrome
--Claude syndrome
--Nothnagel syndrome

Three fascicular syndromes involve the CN6 fascicle—what are they?
--Millard-Gubler syndrome
--Foville syndrome
--Raymond syndrome
CDMS: Manifestations

What constitutes the infranuclear pathway? Everything after the nuclei: the axons as they run through the brainstem to enter the subarachnoid space; the ‘cranial nerve’ portion as it passes through the subarachnoid space into the cavernous sinus and then the orbit to the neuromuscular junction; the junction itself; and finally the Extraocular Muscles (EOMs) themselves.

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---The Infranuclear pathway

What term is used to describe conditions presenting with motility dysfunction secondary to fascicle damage and non-ocular CNS findings? Fascicular syndrome
Typical Optic Neuritis

CDMS: Manifestations

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--The Infranuclear pathway

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**The Infranuclear pathway**

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**Typical Optic Neuritis**

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CDMS: Manifestations

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CDMS: Manifestations

**Typical Optic Neuritis**

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Is diplopia a common manifestation of MS? Indeed it is.

Taking a step back: Which three cranial nerves are responsible for controlling eye position (and thus are implicated in diplopia)? 3, 4 and 6.

Step-back II: The EOM control pathway has four levels or subsections. What are they?
-- The Supranuclear pathways
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-- The Infranuclear pathway

At last: Which of these portions of the EOM control pathway can be affected in MS?
CDMS: Manifestations

Typical Optic Neuritis

Nonocular

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At last: Which of these portions of the EOM control pathway can be affected in MS? Recall that MS was defined as a neurodegenerative disorder of the CNS. The last portion of the EOM pathway that is located within the CNS is the nerve fascicles. Thus, MS damage can (and does) occur in the supranuclear, internuclear, and nuclear portions, as well as the fascicular section of the infranuclear portion.
CDMS: **Manifestations**

**Typical Optic Neuritis**

- MS conveys an increased risk of uveitis. How much?
  - Ocular
    - Optic neuritis S/S
    - Nystagmus/oscillations
    - Diplopia
    - **Uveitis**
Typical Optic Neuritis

CDMS: Manifestations

Nonocular

MS conveys an increased risk of uveitis. How much? MS pts are # times more likely to experience uveitis than are non-MS individuals!

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis
CDMS: Manifestations

Typical Optic Neuritis

Nonocular

Ocular

Optic neuritis S/S
Nystagmus/oscillations
Diplopia
Uveitis

MS conveys an increased risk of uveitis. How much? MS pts are 10 times more likely to experience uveitis than are non-MS individuals!
CDMS: Manifestations

Nonocular

MS conveys an increased risk of uveitis. How much?
MS pts are 10 times more likely to experience uveitis than are non-MS individuals!

What proportion of MS pts will develop uveitis at some point?

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis
CDMS: Manifestations

Typical Optic Neuritis

Nonocular

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What proportion of MS pts will develop uveitis at some point?
About 1/3

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis
**Typical Optic Neuritis**

**CDMS: Manifestations**

**Nonocular**

*MS conveys an increased risk of uveitis. How much?*

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*What proportion of MS pts will develop uveitis at some point?*  
About 1/3

*In those MS pts who develop it: Does it tend to precede, or follow, their MS diagnosis?*

**Ocular**

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis
CDMS: Manifestations

Nonocular

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To follow

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

Typical Optic Neuritis
CDMS: *Manifestations*

Nonocular

*MS conveys an increased risk of uveitis. How much?*

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What proportion of MS pts will develop uveitis at some point?
About 1/3

In those MS pts who develop it: Does it tend to precede, or follow, their MS diagnosis?

To follow, **but**: As many as % of MS pts will manifest uveitis up to an amount of time prior to their eventual MS diagnosis!

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis
MS conveys an increased risk of uveitis. How much? MS pts are 10 times more likely to experience uveitis than are non-MS individuals!

What proportion of MS pts will develop uveitis at some point? About 1/3

In those MS pts who develop it: Does it tend to precede, or follow, their MS diagnosis? To follow, but: As many as 25% of MS pts will manifest uveitis up to 10 years prior to their eventual MS diagnosis!
CDMS: Manifestations

Nonocular

MS conveys an increased risk of uveitis. How much?
MS pts are 10 times more likely to experience uveitis than are non-MS individuals!

What proportion of MS pts will develop uveitis at some point?
About 1/3

In those MS pts who develop it: Does it tend to precede, or follow, their MS diagnosis?
To follow, but: As many as 25% of MS pts will manifest uveitis up to 10 years prior to their eventual MS diagnosis!

MS has several HLA associations, one of which conveys a higher risk of developing uveitis. Which one?

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis
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HLA-DR15
**Typical Optic Neuritis**

**CDMS: Manifestations**

- **Nonocular**
- **Ocular**
  - Optic neuritis S/S
  - Nystagmus/oscillations
  - Diplopia
  - Uveitis

*MS conveys an increased risk of uveitis. How much? MS pts are 10 times more likely to experience uveitis than are non-MS individuals!*

*Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they?*

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CDMS: Manifestations

Nonocular

Typical Optic Neuritis

Ocular

Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia

Uveitis

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Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they?

- Anterior
- Intermediate
- Posterior
- Panuveitis
**CDMS: Manifestations**

**Typical Optic Neuritis**

**Nonocular**

- MS conveys an increased risk of uveitis. How much?
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**Ocular**

- Optic neuritis S/S
  - Nystagmus/oscillations
  - Diplopia
  - Uveitis

*Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they? How is each defined?*

-- Anterior: ?

-- Intermediate

-- Posterior

-- Panuveitis
**CDMS: Manifestations**

### Nonocular

*MS conveys an increased risk of uveitis. How much?*  
MS pts are 10 times more likely to experience uveitis than are non-MS individuals!

*Taking a step back: There are four types of uveitis, based on the location of the inflammation. What are they? How is each defined?*

--- **Anterior:** The primary location of inflammation is the anterior chamber and/or anterior vitreous

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--- **Panuveitis**

### Ocular

- **Optic neuritis S/S**
- **Nystagmus/oscillations**
- **Diplopia**

- **Uveitis**

--- **two words** and/or **two words**
**CDMS: Manifestations**

**Nonocular**

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**Ocular**

- Optic neuritis S/S
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**Uveitis**

**Typical Optic Neuritis**
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CDMS: Manifestations

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**Typical Optic Neuritis**
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**Nonocular**

**Ocular**

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Optic neuritis S/S
Nystagmus/oscillations
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- Nystagmus/oscillations
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**Typical Optic Neuritis**
**CDMS: Manifestations**

Typical Optic Neuritis

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**Ocular**

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- Nystagmus/oscillations
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**Ocular**

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

**Typical Optic Neuritis**
CDMS: Manifestations

Nonocular

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Which form is most likely to occur in MS?

Intermediate uveitis
**CDMS: Manifestations**

**Nonocular Manifestations**

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

**Ocular Manifestations**

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**Is intermediate uveitis in MS a unilateral, or bilateral condition?**
It is bilateral

**Which form is most likely to occur in MS?**
Intermediate uveitis
CDMS: Manifestations

Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

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Which form is most likely to occur in MS?
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Is intermediate uveitis in MS a unilateral, or bilateral condition?
It is bilateral in almost all (>95%) cases

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Which form is most likely to occur in MS?
Intermediate uveitis

Is intermediate uveitis in MS a unilateral, or bilateral condition?
It is bilateral in almost all (>95%) cases

Two specific manifestations (i.e., signs) of intermediate uveitis are classically associated with MS—which ones?
--Vitritis, which tends to be mild
--Periphlebitis
CDMS: Manifestations

Nonocular

Ocular

Optic neuritis S/S
Nystagmus/oscillations
Diplopia
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**MS is a risk factor for developing intermediate uveitis. Is the reverse true as well, ie, are individuals with intermediate uveitis at higher risk of developing MS?**
Yes, about 15% of intermediate-uveitis pts will develop MS.
CDMS: Manifestations

Nonocular S/S

Ocular S/S

Optic neuritis

Nystagmus/oscillations

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Yes, about % of intermediate-uveitis pts will develop MS
CDMS: Manifestations

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Which form is most likely to occur in MS?
Intermediate uveitis
CDMS: Manifestations

Nonocular

- Optic neuritis S/S
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**Typical Optic Neuritis**
**Typical Optic Neuritis**

**CDMS: Manifestations**

- **Nonocular**
  - Optic neuritis S/S
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-Periphlebitis

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Intermediate uveitis
CDMS: Manifestations

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Typical Optic Neuritis

-- Intermediate: The primary location of inflammation is the main vitreous cavity, +/- the peripheral retina
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CDMS: Manifestations

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Speaking of dz severity: In general, does MS-associated intermediate uveitis tend to be milder, or more severe than the idiopathic version?
Milder

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CDMS: Typical Optic Neuritis
CDMS: **Manifestations**

### Nonocular
- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
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**Typical Optic Neuritis**

---
The Neuro book divvies the nonocular S/S of MS into five groups—what are they?

Nonocular:
- ?
- ?
- ?
- ?
- ?

Ocular:
- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

Typical Optic Neuritis
CDMS: Manifestations

**Typical Optic Neuritis**

**Nonocular**
- Motor
- Sensory
- Motor
- Cerebellar
- Mental
- Sphincter

**Ocular**
- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

*The Neuro book divvies the nonocular S/S of MS into five groups—what are they?*
What motor symptoms are commonly encountered in MS?

Nonocular

Motor

Cerebellar

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis
What motor symptoms are commonly encountered in MS? Weakness of the extremities or facial musculature can occur, as can hemi- or paraplegia.
What sensory symptoms commonly occur in MS?
CDMS: Manifestations

Typical Optic Neuritis

Nonocular
- Motor
- Cerebellar

Ocular
- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

Sensory
- Mental

What sensory symptoms commonly occur in MS? Paresthesias of the face and/or body
CDMS: Manifestations

Nonocular

- Motor
- Cerebellar
- Sensory
  - Mental
  - Subcortical

Ocular

- Optic neuritis S/S
- Nystagmus/oscillations
- Diplopia
- Uveitis

What sensory symptoms commonly occur in MS?
Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as ‘bandlike’.)
What sensory symptoms commonly occur in MS?
Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as 'bandlike')
**CDMS: Manifestations**

- **Nonocular**
  - Motor
  - Cerebellar
  - Sensory
  - Mental

- **Ocular**
  - Optic neuritis S/S
  - Nystagmus/oscillations
  - Diplopia
  - Uveitis

---

**What sensory symptoms commonly occur in MS?**
Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as ‘bandlike’)

**Speaking of sensory symptoms in MS: What is Lhermitte’s sign?**
Shock-like sensations precipitated by a movement
What sensory symptoms commonly occur in MS?
Paresthesias of the face and/or body (classic presentation: paresthesia of the trunk described as ‘bandlike’)

Speaking of sensory symptoms in MS: What is Lhermitte’s sign?
Shock-like sensations precipitated by neck flexion
Which sphincter are we talking about here?
Which sphincter are we talking about here?
The bladder sphincter
CDMS: Manifestations

Typical Optic Neuritis

Nonocular

Motor

Cerebellar

Sensory

Mental

Sphincter

Ocular

Optic neuritis S/S

Nystagmus/oscillations

Diplopia

Uveitis

Which sphincter are we talking about here?
The bladder sphincter

What bladder sphincter-related symptoms occur in MS?
Which sphincter are we talking about here?
The bladder sphincter

What bladder sphincter-related symptoms occur in MS?
Incontinence, frequency, and/or urgency
What mental *manifestations are commonly encountered in MS?*
What mental manifestations are commonly encountered in MS? Primarily emotional issues: Lability; depression; irritability.
What sorts of cerebellar-related symptoms do MS pts experience?
What sorts of cerebellar-related symptoms do MS pts experience? Ataxia, dysarthria, and intentional tremor (among others)
Typical Optic Neuritis

CDMS: *Evaluation*

- Labs
- Imaging

*What lab test cinches a diagnosis of MS?*
Typical Optic Neuritis

CDMS: Evaluation

Labs

Imaging

*What lab test cinches a diagnosis of MS?*
There ain’t none
Typical Optic Neuritis

CDMS: Evaluation

Labs

Imaging

What lab test cinches a diagnosis of MS?
There ain’t none

What imaging finding is pathognomonic for MS?
**Typical Optic Neuritis**

**CDMS: Evaluation**

- **Labs**
  - *What lab test cinches a diagnosis of MS?*
  - There ain’t none

- **Imaging**
  - *What imaging finding is pathognomonic for MS?*
  - Same as labs—no such thing exists
Typical Optic Neuritis

CDMS: *Evaluation*

What lab test cinches a diagnosis of MS?
There ain’t none

Remember, MS is a *clinical* diagnosis—labs and imaging are contributory, but of themselves cannot make it!

Same as labs—no such thing exists
OK, so what lab(s) are contributory vis a vis diagnosing MS?
OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of **two words** in the **a body fluid**

Typical Optic Neuritis

CDMS: *Evaluation*

Labs

Imaging
CDMS: **Evaluation**

**Typical Optic Neuritis**

Labs

Imaging

*OK, so what lab(s) are contributory vis a vis diagnosing MS? The finding of oligoclonal bands in the CSF*
OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of oligoclonal bands in the CSF

Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?
OK, so what lab(s) are contributory vis a vis diagnosing MS? The finding of oligoclonal bands in the CSF

Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?
IgG
OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of oligoclonal bands in the CSF

*Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?*
IgG

*What proportion of CDMS pts manifest these CSF bands?*
OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of oligoclonal bands in the CSF

Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?
IgG

What proportion of CDMS pts manifest these CSF bands?
Over 90%
OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of oligoclonal bands in the CSF

Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?
IgG

What proportion of CDMS pts manifest these CSF bands?
Over 90%

Are similar bands found in the serum of CDMS pts?
OK, so what lab(s) are contributory vis a vis diagnosing MS?
The finding of oligoclonal bands in the CSF

Which immunoglobulin form (IgA, IgE, IgG, etc) do the bands take?
IgG

What proportion of CDMS pts manifest these CSF bands?
Over 90%

Are similar bands found in the serum of CDMS pts?
No
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?
Typical Optic Neuritis

CDMS: Evaluation

Labs

Imaging

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?
Typical Optic Neuritis

CDMS: Evaluation

Labs

Imaging

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

FLAIR
Typical Optic Neuritis

CDMS: Evaluation

Labs

Imaging

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

FLAIR

What does FLAIR stand for in this context?
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI? MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it? FLAIR

What does FLAIR stand for in this context? Fluid-attenuated inversion recovery
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/wo gadolinium), there is an image-type that is especially useful—what is it?

FLAIR

Do MS lesions enhance with gadolinium?
Typical Optic Neuritis

CDMS: Evaluation

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?
FLAIR

Do MS lesions enhance with gadolinium?
Yes
Typical Optic Neuritis

CDMS: Evaluation

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?
FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?
Typical Optic Neuritis

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?

uni- vs multifocal; white- vs gray matter lesions
Typical Optic Neuritis

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?
FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?
Multifocal white-matter lesions
**Typical Optic Neuritis**

**CDMS: Evaluation**

**Imaging**

**Labs**

*Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?*

MRI

*In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—which is it?*

FLAIR

*Other than optic-nerve changes, what imaging findings are typically encountered in MS?*

Multifocal white-matter lesions, *usually in shape*
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?
FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?
Multifocal white-matter lesions, usually ovoid in shape
**Typical Optic Neuritis**

**CDMS: Evaluation**

**Labs**

**Imaging**

*Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?*

MRI

*In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?*

FLAIR

*Other than optic-nerve changes, what imaging findings are typically encountered in MS?*

Multifocal white-matter lesions, **usually ovoid in shape and in location**
**Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?**

MRI

*In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?*

FLAIR

*Other than optic-nerve changes, what imaging findings are typically encountered in MS?*

Multifocal white-matter lesions, *usually ovoid in shape* and periventricular in location
MRI of a patient with multiple sclerosis (MS) shows demyelinating plaques. A, T1-weighted, postgadolinium MRI scan demonstrates enhancing white matter lesions bilaterally, as well as “black holes” (*arrows*). B, T2-weighted MRI scan shows periventricular, multifocal, hyperintense white matter lesions consistent with demyelination. C, FLAIR scan confirms periventricular ovoid white matter lesions.
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?

MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?

FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?

Multifocal white–matter lesions, usually ovoid in shape and periventricular in location

What is the eponymous name for these ovoid lesions?
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?
FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?
Multifocal white–matter lesions, usually ovoid in shape and periventricular in location

What is the eponymous name for these ovoid lesions?
Dawson’s fingers
Typical Optic Neuritis

MS: Dawson’s fingers
Typical Optic Neuritis

Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI? MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it? FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS? Multifocal white-matter lesions, usually ovoid in shape and periventricular in location

What proportion of CDMS pts manifest these findings?
Which (if either) is the preferred imaging modality for detecting MS-associated abnormalities—CT, or MRI?
MRI

In addition to the usual series (T1; T2; w/w/o gadolinium), there is an image-type that is especially useful—what is it?
FLAIR

Other than optic-nerve changes, what imaging findings are typically encountered in MS?
Multifocal white-matter lesions, usually ovoid in shape and periventricular in location

What proportion of CDMS pts manifest these findings?
About 90%
Typical Optic Neuritis

CDMS: *Treatment*

Steroids

DMT

*Do steroids still have a role in managing MS?*
**Typical Optic Neuritis**

**CDMS: Treatment**

**Steroids**

**DMT**

*Do steroids still have a role in managing MS?*

Mos def—they are the go-to therapy for acute exacerbations
Do steroids still have a role in managing MS?
Mos def—they are the go-to therapy for acute exacerbations

Is the dose low, or high?
Do steroids still have a role in managing MS?
Mos def—they are the go-to therapy for acute exacerbations

*Is the dose low, or high?*
High
Do steroids still have a role in managing MS?
Mos def—they are the go-to therapy for acute exacerbations

Is the dose low, or high? Is the preferred route PO, IM, or IV?
High.
Do steroids still have a role in managing MS?
Mos def—they are the go-to therapy for acute exacerbations

Is the dose low, or high? Is the preferred route PO, IM, or IV?
High. IV.
Typical Optic Neuritis

CDMS: Treatment

Steroids

DMT

What does DMT stand for in this context?
What does DMT stand for in this context? Disease-modifying therapy
What does DMT stand for in this context? 
Disease-modifying therapy

There are three classes of DMTs—what are they?
--?
--?
--?
What does DMT stand for in this context?
Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators
What does DMT stand for in this context?
Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators

One immunomodulator is notorious for causing macular edema—which one?
What does DMT stand for in this context?
Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators

One immunomodulator is notorious for causing macular edema—
which one?
Fingolimod
What does DMT stand for in this context?
Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators

One immunomodulator is notorious for causing macular edema—which one?
Fingolimod

By what name is fingolimod-associated macular edema known?
What does DMT stand for in this context? Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators

One immunomodulator is notorious for causing macular edema—which one?
Fingolimod

By what name is fingolimod-associated macular edema known? It is called ‘fingolimod-associated macular edema’ (FAME)
What does DMT stand for in this context?
Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators

One immunomodulator is notorious for causing macular edema—which one?
Fingolimod

By what name is fingolimod-associated macular edema known?
It is called ‘fingolimod-associated macular edema’ (FAME)

What is the tx for FAME?
What does DMT stand for in this context? Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators

One immunomodulator is notorious for causing macular edema—which one?
Fingolimod

By what name is fingolimod-associated macular edema known? It is called ‘fingolimod-associated macular edema’ (FAME)

What is the tx for FAME? Cessation of the medication
What does DMT stand for in this context?
Disease-modifying therapy

There are three classes of DMTs—what are they?
--Interferons
--Monoclonal antibodies
--Immunomodulators

One immunomodulator is notorious for causing macular edema—which one?
Fingolimod

By what name is fingolimod-associated macular edema known?
It is called ‘fingolimod-associated macular edema’ (FAME)

What is the tx for FAME? Is it effective?
Cessation of the medication.
CDMS: **Treatment**

**Steroids**

**DMT**

*What does DMT stand for in this context?*
Disease-modifying therapy

*There are three classes of DMTs—what are they?*
--- Interferons
--- Monoclonal antibodies
--- Immunomodulators

*One immunomodulator is notorious for causing macular edema— which one?*
Fingolimod

*By what name is fingolimod-associated macular edema known?*
It is called ‘fingolimod-associated macular edema’ (FAME)

*What is the tx for FAME? Is it effective?*
Cessation of the medication. Yes.
Typical Optic Neuritis

50 Ways to Take a Break

(This is a good point in the set to take a break)
Optic neuritis

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself:

No question—proceed when ready
Typical Optic Neuritis

Does this pt have ‘clinically isolated Optic neuritis’?

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or…

aka clinically isolated syndrome (CIS)

No question—proceed when ready
Does she have MS?

Does this pt have ‘clinically isolated Optic neuritis’?

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or…does she have MS?'

aka clinically isolated syndrome (CIS)

No question—proceed when ready
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or...does she have MS?'

But the *Neuro* book places great emphasis on asking two additional questions: 1) ‘Does this pt have clinically isolated optic neuritis, or...’
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or...does she have MS?’

But the *Neuro* book places great emphasis on asking two additional questions:

1) ‘Does this pt have clinically isolated optic neuritis, or...does she have (or) what *NMO* stands for (or) what *NMOSD* stands for?’
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or…does she have MS?’

But the *Neuro* book places great emphasis on asking two additional questions:

1) ‘Does this pt have clinically isolated optic neuritis, or…does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?

**Typical Optic Neuritis**

**MS**

(\textit{or}) \textbf{NMOSD}?

\textit{Does she have} \textbf{NMO}?

\textit{Does this pt have} ‘\textit{clinically isolated Optic neuritis}’?
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or…does she have MS?’

But the *Neuro* book places great emphasis on asking two additional questions:
1) ‘Does this pt have clinically isolated optic neuritis, or…does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?’
   
   **And:**

2) ‘Does this pt have clinically isolated optic neuritis, or…does she have what MOGAD stands for?’
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or…does she have MS?'

But the *Neuro* book places great emphasis on asking two additional questions:

1) ‘Does this pt have clinically isolated optic neuritis, or…does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?

And:

2) ‘Does this pt have clinically isolated optic neuritis, or…does she have myelin oligodendrocyte glycoprotein IgG-associated disorder?'
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or...does she have MS?'

But the *Neuro* book places great emphasis on asking two additional questions:

1) ‘Does this pt have clinically isolated optic neuritis, or...does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?'

2) ‘Does this pt have clinically isolated optic neuritis, or...does she have myelin oligodendrocyte glycoprotein IgG-associated disorder?'

Why the emphasis on these two questions/conditions?
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or...does she have MS?"

The Neuro book places great emphasis on asking two additional questions:

1) ‘Does this pt have clinically isolated optic neuritis, or...does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?

2) ‘Does this pt have clinically isolated optic neuritis, or...does she have myelin oligodendrocyte glycoprotein IgG-associated disorder?"

Why the emphasis on these two questions/conditions?
For several reasons related to dz management:
--?
--?
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or...does she have MS?'

**The Neuro book places great emphasis on asking two additional questions**

1) ‘Does this pt have clinically isolated optic neuritis, or...does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?'

2) ‘Does this pt have clinically isolated optic neuritis, or...does she have myelin oligodendrocyte glycoprotein IgG-associated disorder (MOGAD)?'

Why the emphasis on these two questions/conditions?

For several reasons related to dz management:

--Differences in pathophysiology means tx for NMO(SD), MOG and MS differ; and

--?
Typical Optic Neuritis

Does she have NMO?

Does she have MOGAD?

Does this pt have ‘clinically isolated’ Optic neuritis’?

As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or…does she have MS?’

Why the emphasis on these two questions/conditions?

For several reasons related to dz management:
--Differences in pathophysiology means tx for NMO(SD), MOG and MS differ; and
--Some MS txs are ineffective in one—and worse, are deleterious in the other

The Neuro book places great emphasis on asking two additional questions: 1) ‘Does this pt have clinically isolated optic neuritis, or…does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?’ And: 2) ‘Does this pt have clinically isolated optic neuritis, or…does she have myelin oligodendrocyte glycoprotein IgG-associated disorder?’
As we have seen, when assessing a typical optic neuritis pt it is vital to ask oneself: ‘Does this pt have clinically isolated optic neuritis, or...does she have MS?"

But the *Neuro* book places great emphasis on asking two additional questions:

1) ‘Does this pt have clinically isolated optic neuritis, or...does she have neuromyelitis optica (or neuromyelitis optica spectrum disorder)?

And:

2) ‘Does this pt have clinically isolated optic neuritis, or...does she have myelin oligodendrocyte glycoprotein IgG-associated disorder?"

**Why the emphasis on these two questions/conditions?**

For several reasons related to dz management:

-- Differences in pathophysiology means tx for NMO(SD), MOG and MS differ; and

-- Some MS txs are ineffective in MOG —and worse, are deleterious in NMO(SD)
By what eponymous name is NMO also known?
By what eponymous name is NMO also known?
Devic’s dz
By what eponymous name is NMO also known?
Devic’s dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other?
By what eponymous name is NMO also known? Devic’s dz

*NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other?* Longitudinally extensive transverse myelitis
By what eponymous name is NMO also known?

Devic’s dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other?

Longitudinally extensive transverse myelitis aka Devic’s dz

What is transverse myelitis?

Inflammation of the spinal cord

How does transverse myelitis present clinically?

As a symmetric para- or quadriparesis, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?

They usually occur within weeks to months of each other, but can be separated by several years

How does transverse myelitis manifest on MRI?

As a hyperintense signal on T2 imaging
By what eponymous name is NMO also known?

Devic’s dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other?

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**What is transverse myelitis?**
Inflammation of the spinal cord

**How does transverse myelitis present clinically?**
What is the other?
Longitudinally extensive

**transverse myelitis**

---

**By what eponymous name is NMO also known?**
Devic's dz

**NMO**
a.k.a. Devic's dz

**What is the other?**
Longitudinally extensive

**transverse myelitis**
Typical Optic Neuritis

NMO
aka Devic's dz

NMOSD

MS

MOGAD

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Inflammation of the spinal cord

How does transverse myelitis present clinically?
As a symmetric para- or quadriplegia, often with sensory loss

What is the other?
Longitudinally extensive

transverse myelitis
What is transverse myelitis?
Inflammation of the spinal cord

How does transverse myelitis present clinically?
As a symmetric para- or quadriparesis, often with sensory loss

But MS can also present with paresis + sensory loss. How is this any different?

What is the other?
Longitudinally extensive... *transverse myelitis*
By what eponymous name is NMO also known? Devic’s dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other? Longitudinally extensive transverse myelitis aka Devic’s dz

What is transverse myelitis? Inflammation of the spinal cord

How does transverse myelitis present clinically? As a symmetric para- or quadriplegia, often with sensory loss

But MS can also present with paresis + sensory loss. How is this any different? The difference is the symmetry. Whereas NMO presents with bilaterally symmetric motor and/or sensory loss, symmetric deficits are distinctly uncommon in MS.
Typical Optic Neuritis

What is transverse myelitis?
Inflammation of the spinal cord

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As a symmetric para- or quadriparesis, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?

What is the other?
Longitudinally extensive...
What is transverse myelitis?
Inflammation of the spinal cord

How does transverse myelitis present clinically?
As a symmetric para- or quadriparesis, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?
They usually occur within  weeks to  months of each other
Typical Optic Neuritis

NMO
aka Devic's dz

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Inflammation of the spinal cord

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What is the other?
Longitudinally extensive transverse myelitis

NMOSD
MS
MOGAD
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They usually occur within weeks to months of each other, but can be separated by several years.
**NMOSD**

**NMO**
aka *Devic’s dz*

**MS**

**MOGAD**

---

**Typical Optic Neuritis**

By what eponymous name is NMO also known?

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Longitudinally extensive transverse myelitis
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Typical Optic Neuritis

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How does transverse myelitis manifest on MRI?
As a hyperintense signal on T2 imaging
Sagittal T2-weighted MRI of the spinal cord in a patient with NMOSD depicting a hyperintense lesion
What is transverse myelitis?
Inflammation of the spinal cord

How does transverse myelitis present clinically?
As a symmetric para- or quadriparesis, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?
They usually occur within weeks to months of each other, but can be separated by several years

How does transverse myelitis manifest on MRI?
As a hyperintense signal on T2 imaging

What is the other?
Longitudinally extensive transverse myelitis

How extensive (ie, long) are these lesions?
Typical Optic Neuritis

What is transverse myelitis?
Inflammation of the spinal cord

How does transverse myelitis present clinically?
As a symmetric para- or quadriplegia, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally?
They usually occur within weeks to months of each other, but can be separated by several years

How does transverse myelitis manifest on MRI?
As a hyperintense signal on T2 imaging

Longitudinally extensive transverse myelitis

How extensive (ie, long) are these lesions?
2-3 vertebral segments or so
Sagittal T2-weighted MRI of the spinal cord in a patient with NMOSD depicting a hyperintense lesion over more than 3 vertebral segments.
Typical Optic Neuritis

NMOSD

MS

NMO  aka Devic’s dz

MOGAD

What is transverse myelitis?

So, the spinal cord lesions in NMO are longitudinally extensive…Perchance, is the same true of the optic nerve lesions in NMO?

What is the other?

Longitudinally extensive transverse myelitis

How extensive (ie, long) are these lesions?

2-3 vertebral segments or so
By what eponymous name is NMO also known? Devic’s dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other? Longitudinally extensive transverse myelitis aka Devic’s dz

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How does transverse myelitis manifest on MRI? As a hyperintense signal on T2 imaging

So, the spinal cord lesions in NMO are longitudinally extensive…Perchance, is the same true of the optic nerve lesions in NMO?

Indeed it is! Further, in addition to longer, the optic nerve lesions in NMO tend to be more posterior than those found in typical optic neuritis.

What does chiasmal involvement portend vis a vis exam findings in NMO? It raises the possibility that bitemporal and/or homonymous hemianopic VF defects might be found anterior vs posterior
By what eponymous name is NMO also known? Devic’s dz

NMO involves two separate and specific inflammatory processes. One is optic neuritis. What is the other? Longitudinally extensive transverse myelitis aka Devic’s dz

What is transverse myelitis? Inflammation of the spinal cord

How does transverse myelitis present clinically? As a symmetric para- or quadriparesis, often with sensory loss

How are the optic neuritis and transverse myelitis episodes related temporally? They usually occur within weeks to months of each other, but can be separated by several years

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MRI findings in NMOSD-associated optic neuritis: Enhancement is **bilateral, extensive, and posterior**.

MRI findings in MS-associated optic neuritis: Enhancement is **unilateral, short, and anterior**.
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Thirteen-year-old girl presenting with bilateral visual loss due to NMO-associated optic neuritis. Axial FLAIR brain imaging showed optic chiasm involvement (white arrow).
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No, it tends to be worse

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It is not—in fact, it is common for at least one eye to end up with VA < 20/200
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**NMOSD**

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**MS**

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What is the Optic Nerve Lesion in NMO(SD)?
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Does it involve the optic nerve or the optic tract?
- Indeed it is! Further, in addition to being longer, the optic nerve lesions in NMO tend to be more posterior than those found in typical optic neuritis

What is NMO(SD)?
- NMOSD
- Devic's dz

What is the eponymous name for NMO?
- Devic’s dz

NMO
aka Devic’s dz

NMOSD

MS

MOGAD
NMO is an antibody-mediated autoimmune condition. What is the target of the antibodies?
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What does this protein do?
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What does this protein do?
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They maintain oligodendrocyte viability—so, astrocyte loss → oligodendrocyte loss
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What do oligodendrocytes do? They provide myelin in the CNS—oligodendrocyte loss = demyelination
**Typical Optic Neuritis**

NMO is an antibody-mediated autoimmune condition. What is the target of the antibodies?
The protein aquaporin-4 (AQP4) is the main water channel protein in astroglial cells.

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Is lab testing available to detect antibodies against AQP4? Yes, and they form part of the diagnostic criteria for NMO.

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What is the area postrema? 
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How does area postrema syndrome present clinically? 
With intractable episodes of one or both of the following:
--?
--?
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Area postrema syndrome

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How does area postrema syndrome present clinically?
With intractable episodes of one or both of the following:
--Hiccups
--Nausea/vomiting
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*How long do hiccups have to last to be considered ‘intractable’?*
At least 30 days or so.
Typical Optic Neuritis

NMOSD

+ area postrema syndrome

NMO aka Devic’s dz

MS

MOGAD

Speaking of intractable hiccups…Only two conditions addressed in the BCSC can present with them. One is NMOSD; what is the other?
Typical Optic Neuritis

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Wallenberg syndrome

NMOSD involves optic neuritis and longitudinally extensive transverse myelitis. Area postrema syndrome.

What is the noneponymous name for Wallenberg syndrome?
Lateral medullary syndrome

What is the classic ocular finding in Wallenberg syndrome?
Horner syndrome

Wallenberg’s hallmark nonocular symptom is sensory. What is it?
Loss of pain and temperature sensation to the ipsilateral face and contralateral body

What other signs/symptoms are common in Wallenberg syndrome?
--Cerebellar signs: Disequilibrium, ataxia, nystagmus, skew deviation
--Speech and swallowing difficulties

Occlusion of what vessel is implicated in Wallenberg syndrome?
The ipsilateral vertebral or (less commonly) posterior inferior cerebellar artery
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NMOSD + transverse myelitis + area postrema syndrome, aka Devic's disease.

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Hiccups

---Nausea/Vomiting

NMOSD involves three separate and specific inflammatory processes.

Optic neuritis and longitudinally extensive transverse myelitis.

Area postrema syndrome.

What is the area postrema?

A portion of the posterior medulla.

How does area postrema syndrome present clinically?

With intractable episodes of one or both of the following:

- Hiccups
- Nausea/vomiting

How long do hiccups have to last to be considered 'intractable'?

At least 30 days or so.

NMO

aka Devic's dz

Wallenberg syndrome

What is the noneponymous name for Wallenberg syndrome?

Lateral medullary syndrome

What is the classic ocular finding in Wallenberg syndrome?

Horner syndrome

Wallenberg's hallmark nonocular symptom is

sensory vs motor
Typical Optic Neuritis

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How does an area postrema syndrome present clinically?
With intractable episodes of hiccups and nausea/vomiting.

How does Wallenberg syndrome present clinically?
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Typical Optic Neuritis

NMO
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MS

MOGAD
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NMOSD + transverse myelitis + area postrema syndrome

aka Devic's dz

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Loss of pain and temperature sensation to the ipsilateral face and contralateral body

What other signs/symptoms are common in Wallenberg syndrome?

-- Cerebellar signs: Disequilibrium, ataxia, nystagmus, skew deviation
-- Speech and swallowing difficulties

Occlusion of what vessel is implicated in Wallenberg syndrome?

The ipsilateral vertebral or (less commonly) posterior inferior cerebellar artery

Two specific types
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NMOSD aka Devic's dz

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**For more on Wallenberg syndrome, see slide-set N3**

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Like NMO, does NMOSD involve antibodies against the AQP4 protein?

Indeed it does. Also as with NMO, is Ab positivity a diagnostic criteria for NMOSD?

Indeed it is.

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NMOSD
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MOGAD

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--The spinal cord
--The optic nerve

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**NMOSD**

**Is NMOSD a common cause of demyelinating dz?**

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NMOSD is a common cause of demyelinating d\z? Not in North America, but it accounts for about half the cases in Asia and the West Indies.
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+ transverse myelitis
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How are NMO and NMOSD treated?
Typical Optic Neuritis

NMOSD
+ area postrema syndrome

NMO
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+ transverse myelitis

MS

MOGAD

Optic neuritis

How are NMO and NMOSD treated?
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Acute exacerbations are treated with steroids
How are NMO and NMOSD treated?
Acute exacerbations are treated with steroids – dose, and duration
How are NMO and NMOSD treated?
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**NMOSD**

- + area postrema syndrome

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**Optic neuritis**

**Typical Optic Neuritis**

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What class of medicine has been shown to reduce the risk of recurrence?
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What happens if an NMO(SD) pt is misdiagnosed as having MS and is started on DMT?
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Acute disseminated encephalomyelitis (ADEM)

In a nutshell, what is ADEM?

An acute autoimmune demyelinating condition affecting the brain and/or spinal cord

Is it more common in children, or adults?

Children

Is there a gender predilection?

Yes, it is more common in males

There is a geographic predilection—what is it?

It is more prevalent among people who live farther from the equator
NMOSD + area postrema syndrome

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Like MS

Like MS

Like MS

Like MS
NMOSD
+ area postrema syndrome

In a nutshell, what is ADEM?
An acute autoimmune demyelinating condition affecting the brain and/or spinal cord

Is it more common in children, or adults? 
Children

Is there a gender predilection?
Yes, it is more common in males

There is a geographic predilection—what is it?
It is more prevalent among people who live farther from the equator

Not like MS

MOG involves two separate and specific inflammatory processes. One is optic neuritis. What is the other? Acute disseminated encephalomyelitis (ADEM)
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How does it present clinically?
NMOSD

+ area postrema syndrome

Typical Optic Neuritis

MOG

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How does it present clinically?
With multifocal neurologic deficits in concert with encephalopathic signs/symptoms
Typical Optic Neuritis

NMOSD

MS

+ area postrema syndrome

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How does it present clinically?
With multifocal neurologic deficits

What are the more common neurologic deficits?
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Typical Optic Neuritis

**NMOSD**

+ area postrema syndrome

**MS**

+ MOG

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**What is the other?**
Acute disseminated encephalomyelitis

**How does it present clinically?**
With **multifocal neurologic deficits**

**How does it present radiologically?**
With large, bilateral, diffuse lesions involving both gray and white matter structures including the brainstem

---

**What are the more common neurologic deficits?**
--Extremity weakness
--Ataxia
NMOSD + area postrema syndrome

**Typical Optic Neuritis**

MS

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What are the S/S of encephalopathy?
Encephalopathic signs/symptoms

Stupor (or even frank coma); irritability; confusion
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NMOSD + area postrema syndrome

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(A) ADEM. Axial FLAIR showing bilateral, globular, hyperintense lesions in cortical gray matter (among other locations)
(A) **ADEM.** Axial FLAIR showing bilateral, globular, hyperintense lesions in cortical gray matter (among other locations). (B) For comparison, FLAIR showing Dawson’s fingers typical of MS
MOG involves two separate and specific inflammatory processes. One is optic neuritis. What is the other?
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What is the most common presenting sign of MOG?
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What is the most common presenting sign of MOG? Optic neuritis

The ONH in MOG-associated optic neuritis—is it normal-to-mildly edematous, as is typical in typical optic neuritis? No, it tends to be much worse
**MOG involves two separate and specific inflammatory processes. One is optic neuritis.**

*What is the other?*

Acute disseminated encephalomyelitis (ADEM)

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Unlike the lesions of MS, MOG presents with
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Unlike the periventricular white-matter lesions of MS, MOG presents with gray-matter lesions.
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How does MOG present radiologically?

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How does MOG present radiologically?
Unlike the periventricular white-matter lesions of MS, MOG presents with gray-matter lesions, as well as diffuse lesions involving the brainstem. However, it has no pathognomonic radiographic features, and often cannot be differentiated from ADEM.
MOG involves two separate and specific inflammatory processes. One is optic neuritis. What is the other? Acute disseminated encephalomyelitis (ADEM)

What is the most common presenting sign of MOG? Optic neuritis

How does MOG present radiologically? Unlike the periventricular white-matter lesions of MS, MOG presents with gray-matter lesions, as well as diffuse lesions involving the brainstem.

Regarding VA loss in MOG—does it tend to be on the mild-to-moderate side a la typical optic neuritis, or severe as in NMO(SD)?

Severe

Indeed it does

How about long-term visual prognosis: good, or nah? Good
Typical Optic Neuritis

NMOSD
+ area postrema syndrome

NMO
aka Devic's dz

MOG

MOGAD

MS

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Does it exhibit spontaneous recovery a la typical optic neuritis, or nah like NMO(SD)?

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Spontaneous recovery is the rule

How does MOG present radiologically?
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Does it exhibit spontaneous recovery a la typical optic neuritis, or nah like NMO(SD)?

Spontaneous recovery is the rule

How about long-term visual prognosis: good, or nah?

Good
Typical Optic Neuritis

MOG + area postrema syndrome  
aka Devic's dz

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Severe

Does it exhibit spontaneous recovery a la typical optic neuritis, or nah like NMO(SD)?
Spontaneous recovery is the rule

How about long-term visual prognosis: good, or nah?
Good

How does MOG present radiologically?
Unlike the periventricular white-matter lesions of MS, MOG presents with gray-matter lesions, as well as diffuse lesions involving the brainstem.
MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies?
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What does this protein do?
MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies?
It’s all there in the name—a glycoprotein on myelin oligodendrocytes.

What does this protein do?
At the time of this writing, this has yet to be elucidated. But whatever the protein does, it is mission-critical to maintaining oligodendrocyte viability.
MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies? It’s all there in the name—a glycoprotein on myelin oligodendrocytes.

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MOG is an antibody-mediated autoimmune condition. What is the target of the antibodies? It’s all there in the name—a glycoprotein on myelin oligodendrocytes.

Is lab testing available to detect these antibodies? Yes, and they form part of the diagnostic criteria for MOG.

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It’s all there in the name—a glycoprotein on myelin oligodendrocytes.

What does this protein do?

At the time of this writing, this has yet to be elucidated. But whatever the protein does, it is mission-critical to maintaining oligodendrocyte viability, because like NMO (and typical optic neuritis), MOG is a demyelinating dz.

Is lab testing available to detect these antibodies?
Yes, and they form part of the diagnostic criteria for MOG.
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

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To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

- Laterality
- Bilateral presentation
To recap: The following findings push you *away* from typical optic neuritis/MS and *toward* MOG or NMO(SD), but do not help differentiate between the two:

-- Bilateral presentation
--?
--?
--?
--?
--?
To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

-- Bilateral presentation

-- Severity

-- Vision loss
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:
--Bilateral presentation
--Severe vision loss
--?
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--Bilateral presentation
--Severe vision loss
--Chronicity of episodes
--?
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:
--Bilateral presentation
--Severe vision loss
--Recurrent episodes
--?
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--Bilateral presentation
--Severe vision loss
--Recurrent episodes

NMO aka Devic’s dz

--? 
--? 

Optic Neuritis
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:
--Bilateral presentation
--Severe vision loss
--Recurrent episodes
--Longitudinally extensive ON enhancement
--?
--?
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

--Bilateral presentation
--Severe vision loss
--Recurrent episodes
--Longitudinally extensive ON enhancement
--A lack of lesions on MRI
--?
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

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--Severe vision loss
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--A lack of periventricular white matter lesions on MRI
--A lack of oligoclonal bands in the CSF

These findings push you away from MOG and towards NMO(SD):
--MRI brain
--?
--?
--?
--?
--?
--?
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These findings push you **away** from MOG and **towards** NMO(SD):

---

- MRI brain unremarkable
- ?
- ?
- ?
- ?
- ?

**NMOSD**

**NMO**

aka *Devic’s dz*

**MS**

**MOG/AD**
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

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These findings push you away from MOG and towards NMO(SD):

--MRI brain unremarkable
--No spontaneous recovery
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

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These findings push you **away** from MOG and **towards** NMO(SD):

--MRI brain unremarkable
--No spontaneous VA recovery
--No pain with eye movements
--Hx transverse myelitis
--Hx area postrema syndrome
--?
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

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--MRI brain unremarkable
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--Poor visual outcome
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

--Bilateral presentation
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--MRI brain unremarkable
--No spontaneous VA recovery
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--Poor visual outcome

Warning: Don’t misinterpret the meaning of this list! If a listed characteristic is present, it greatly increases the likelihood of NMO(SD) over the other two entities. But if the characteristic is not present, this shouldn’t be taken to exclude NMO(SD).

--A lack of oligoclonal bands in the CSF

No question—proceed when ready
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

--- Bilateral presentation
--- Severe vision loss
--- Recurrent episodes
--- Longitudinally extensive ON enhancement
--- A lack of periventricular white matter lesions on MRI
--- A lack of oligoclonal bands in the CSF

These findings push you away from MOG and towards NMO(SD):

--- MRI brain unremarkable
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--- Hx transverse myelitis
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--A lack of oligoclonal bands in the CSF
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

--Bilateral presentation
--Severe vision loss
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--A lack of periventricular white matter lesions on MRI
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--A lack of oligoclonal bands in the CSF

No question—proceed when ready
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:
--Bilateral presentation
--Severe vision loss
--Recurrent episodes
--Longitudinally extensive ON enhancement
--A lack of periventricular white matter lesions on MRI
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These findings push you away from MOG and towards NMO(SD):
--MRI brain unremarkable
--No spontaneous VA recovery
--No pain with eye movements
--Hx transverse myelitis
--Hx area postrema syndrome
--Poor visual outcome

These findings push you away from NMO(SD) and towards MOG:
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--?
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--?
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:
--Bilateral presentation
--Severe vision loss
--Recurrent episodes
--Longitudinally extensive ON enhancement
--A lack of periventricular white matter lesions on MRI
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These findings push you away from MOG and towards NMO(SD):
--MRI brain unremarkable
--No spontaneous VA recovery
--No pain with eye movements
--Hx transverse myelitis
--Hx area postrema syndrome
--Poor visual outcome

These findings push you away from NMO(SD) and towards MOG:
--MRI brain with changes
--?
--?
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--?
To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:

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To recap: The following findings push you away from typical optic neuritis/MS and toward MOG or NMO(SD), but do not help differentiate between the two:
--Bilateral presentation
--Severe vision loss
--Recurrent episodes
--Longitudinally extensive ON enhancement
--A lack of periventricular white matter lesions on MRI
--A lack of oligoclonal bands in the CSF

These findings push you away from NMO(SD) and towards MOG:
--MRI brain with gray-matter changes on MRI
--MRI brain unremarkable
--No spontaneous VA recovery
--No pain with eye movements
--Hx transverse myelitis
--Hx area postrema syndrome
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These findings push you away from MOG and towards NMO(SD):
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To recap: The following findings push you **away** from typical optic neuritis/MS and **toward** MOG or NMO(SD), but do not help differentiate between the two:

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- Bilateral presentation
- Severe vision loss
- Recurrent episodes
- Longitudinally extensive ON enhancement
- A lack of periventricular white matter lesions on MRI
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These findings push you **away** from NMO(SD) and **toward** MOG:

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Typical Optic Neuritis

MOGAD

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--Disc edema
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These findings push you away from NMO(SD) and towards MOG:

--MRI brain with gray-matter changes
--Perineural enhancement on MRI
--Hx ADEM
--Severe disc edema
--Steroid responsive/dependence

To recap: The following findings push you away from MOG and towards NMO(SD):

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Typical Optic Neuritis

NMOSD

MS

NMO
aka Devic’s dz

MOGAD

Optic neuritis

(Warning: Soapbox speech ahead)
Can typical optic neuritis present bilaterally? Yes. Can it be chronic? Yes. But you (speaking to errbody who isn’t a fellowship-trained neuro-oph) shouldn’t make that call, because such cases are zebras, if not unicorns.

No question
(Warning: Soapbox speech ahead)
Can typical optic neuritis present bilaterally? Yes. Can it be chronic? Yes. But you (speaking to errbody who isn’t a fellowship-trained neuro-oph) shouldn’t make that call, because such cases are zebras, if not unicorns. So don’t select ‘bilateral typical optic neuritis’ or ‘chronic typical optic neuritis’ as answers on the OKAP or WQEs, don’t utter those words when taking the Boards, and most importantly, don’t write them on a pt’s chart until and unless Neuro-Oph has written them first.