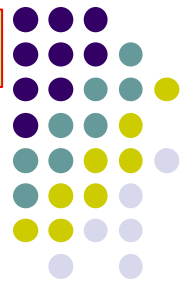


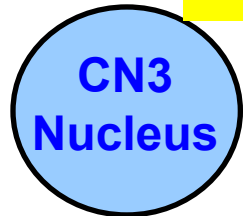
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



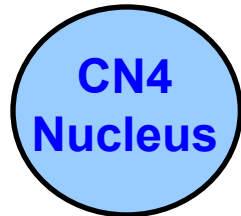
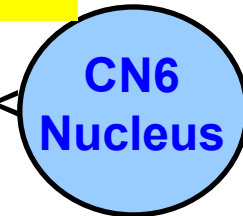
Supranuclear

Nuclear

Internuclear



MLF

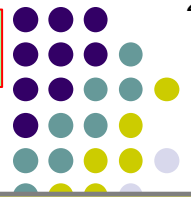


Infranuclear

- Fascicular
- Subarachnoid
- Cavernous sinus
- Orbital
- Neuromuscular junction
- Extraocular muscle

This slide encapsulates one way to think about the motility disorders. If it is unfamiliar, I strongly suggest you review the slide-set entitled '*Motility disorders: Overview*' before proceeding. Now on with the show!

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

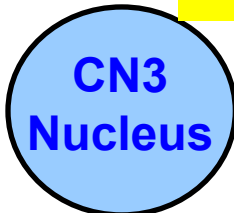


Supranuclear

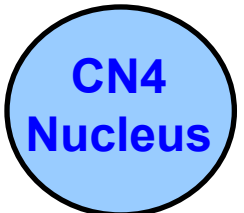
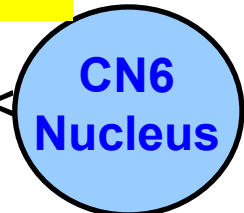
What does **isolated** mean in this context?

Internuclear

Nuclear



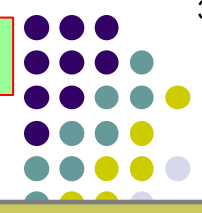
MLF



Infranuclear

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Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

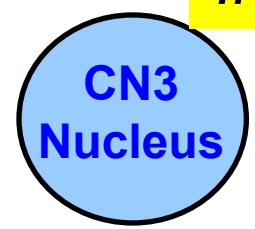


Supranuclear

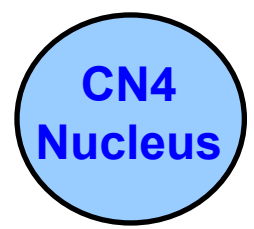
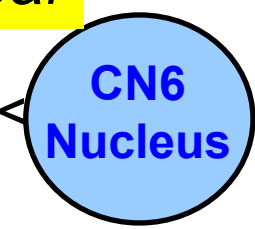
What does **isolated** mean in this context?
It means 'absent nonocular CNS signs'

Internuclear

Nuclear



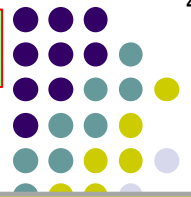
MLF



Infranuclear

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- Cavernous sinus
- Orbital
- Neuromuscular junction
- Extraocular muscle

Motility Disorders: *Nontraumatic Isolated, Unilateral CN6 Palsy*



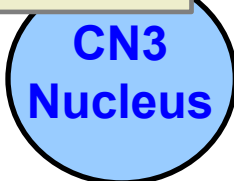
Supranuclear

What does 'isolated and unilateral' imply re etiology?

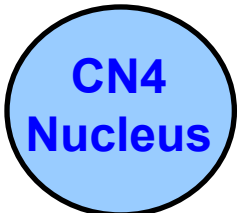
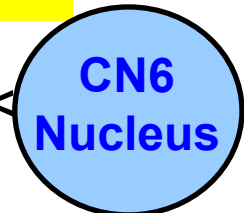
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Internuclear

Nuclear



MLF



Infranuclear

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Motility Disorders: *Nontraumatic Isolated, Unilateral CN6 Palsy*



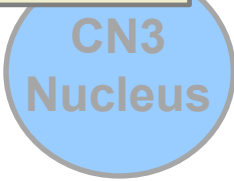
~~Supranuclear~~

What does 'isolated and unilateral' imply re etiology?
It implies the lesion is infranuclear, somewhere along the path from the subarachnoid to the orbital portions

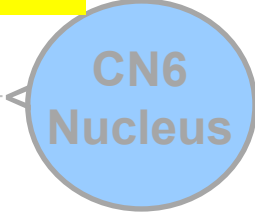
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~~Intranuclear~~

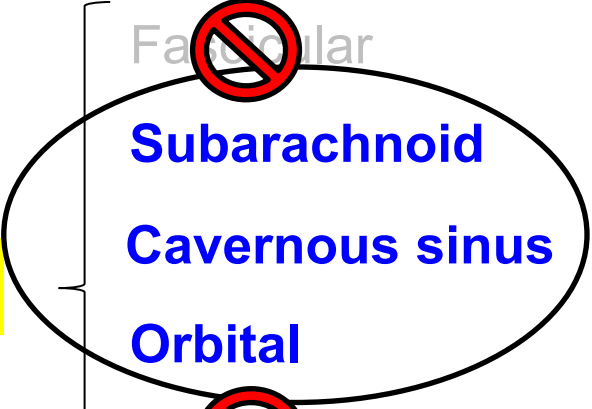
~~Nuclear~~



MLF



Infranuclear



~~Fascicular~~

~~Neuromuscular junction~~

~~Extracocular muscle~~

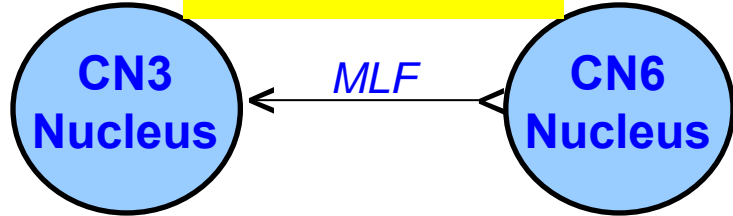
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Supranuclear

Nuclear

Internuclear

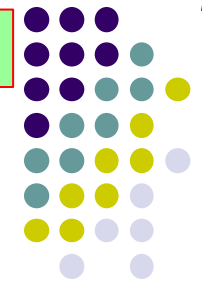


Infranuclear

- Fascicular
- Subarachnoid
- Cavernous sinus
- Orbital
- Neuromuscular junction
- Extraocular muscle

Among the ocular motor nerves, where does CN6 rank in terms of becoming palsied?

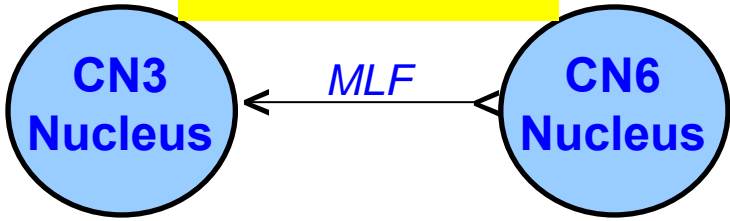
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Supranuclear

Nuclear

Internuclear



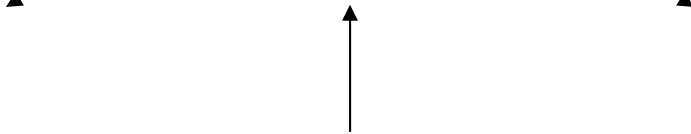
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Among the ocular motor nerves, where does CN6 rank in terms of becoming palsied?
#1

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

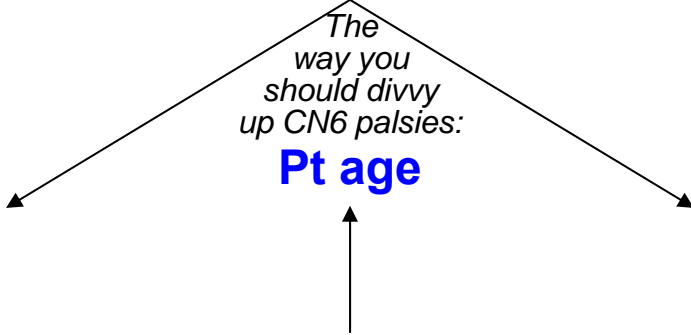
The way you should divvy up CN6 palsies:



When thinking about CN6 palsies, you should consider them as falling into one of two categories. On what basis is this division made?

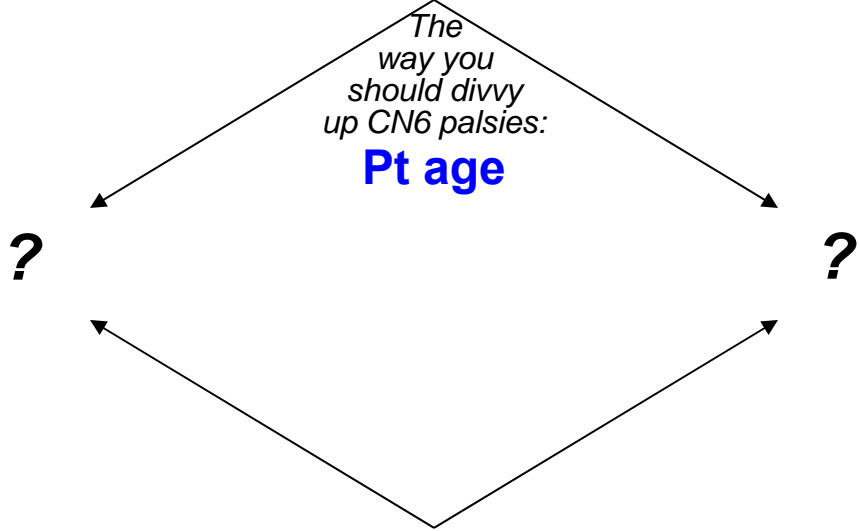


Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



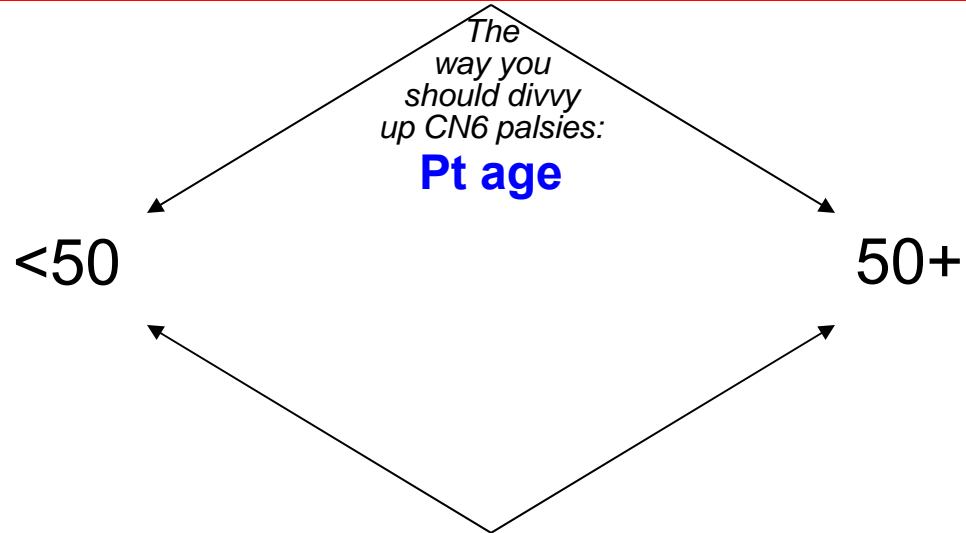
When thinking about CN6 palsies, you should consider them as falling into one of two categories. On what basis is this division made?
Pt age

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

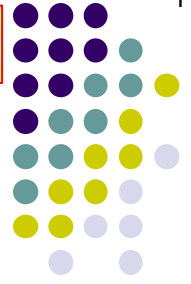


What age is the dividing line between the two categories?

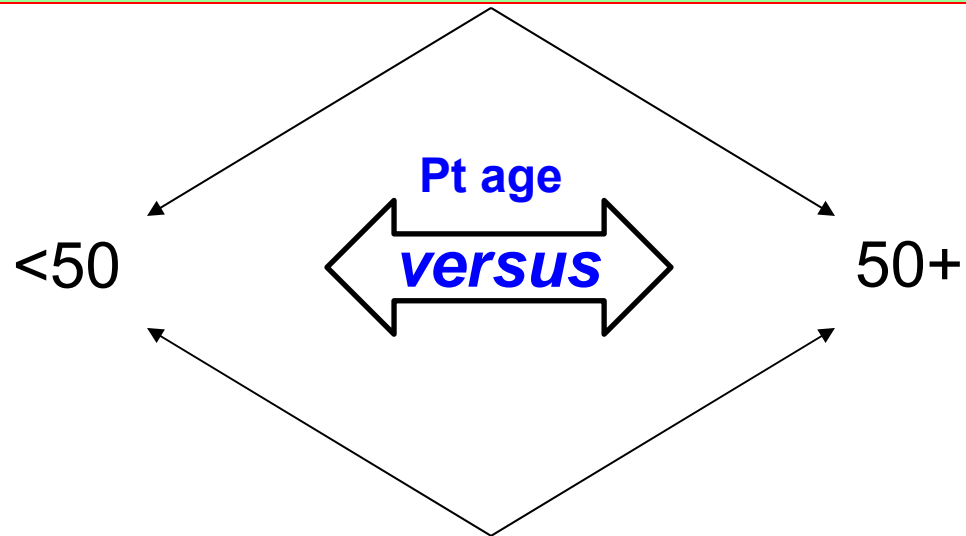
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



What age is the dividing line between the two categories?
50

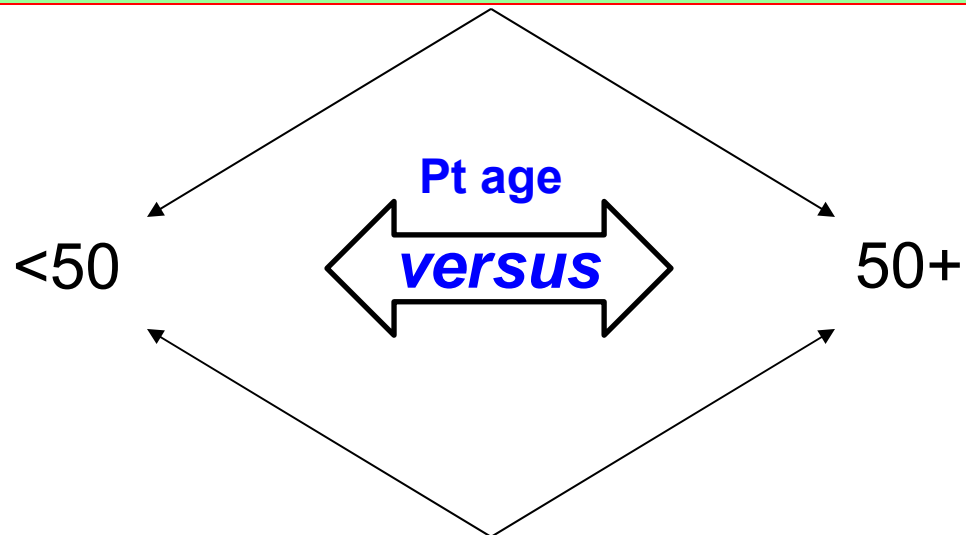


Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Why divvy CN6 palsies up by pt age? That is, what attribute differentiates CN6 palsies in under-50 folk vs 50+ folk?

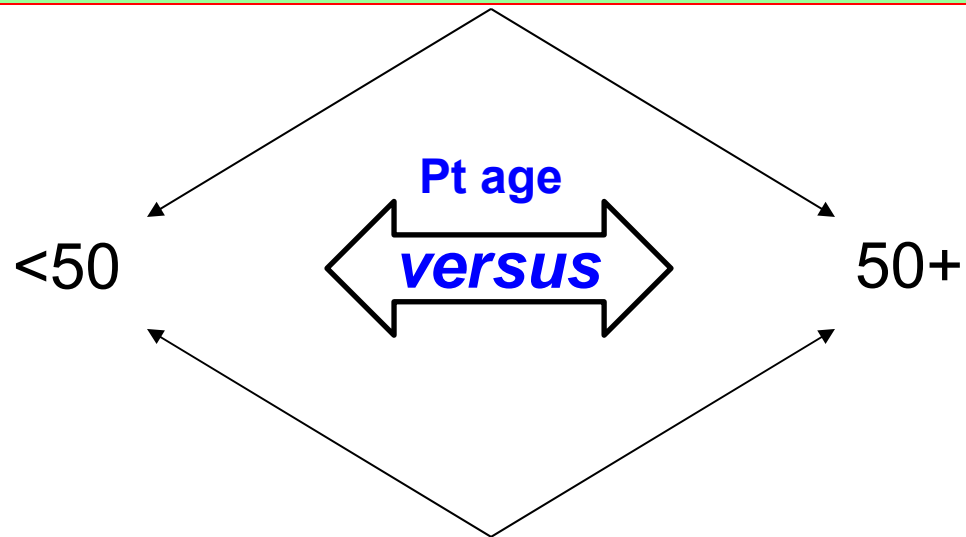
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Why divvy CN6 palsies up by pt age? That is, what attribute differentiates CN6 palsies in under-50 folk vs 50+ folk?

The attribute is etiology. In folks 50+, the vast majority of CN6 palsies are word, whereas those in folks <50 are **not** same word,

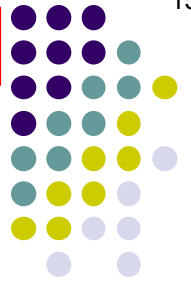
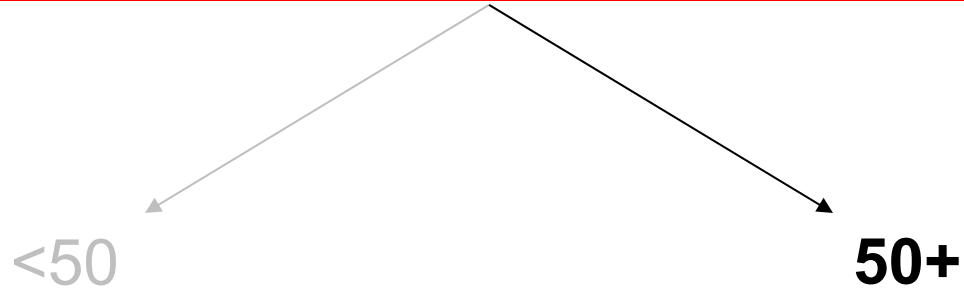
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Why divvy CN6 palsies up by pt age? That is, what attribute differentiates CN6 palsies in under-50 folk vs 50+ folk?

The attribute is etiology. In folks 50+, the vast majority of CN6 palsies are ischemic, whereas those in folks <50 are **not** ischemic

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



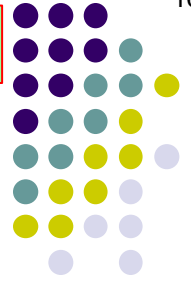
What are the risk factors for a CN6 ischemic mononeuropathy?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

<50

50+

What are the risk factors for a CN6 ischemic mononeuropathy?
The usual vasculopathic ones--DM, HTN and abnormal lipids



Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

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*If a vasculopathic 50+ year old presents with an isolated CN6 palsy,
what workup is indicated?*

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

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Other than a complete eye exam and general medical assessment (ie, BP, BS and lipid evals), nothing

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

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50+

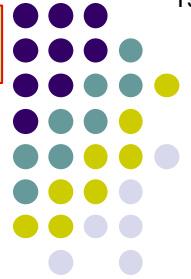
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What about imaging?



Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

<50

50+

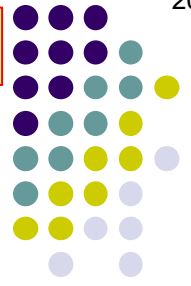
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What about imaging?

It is not indicated



Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

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What is the natural course of an ischemic 6th?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

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50+

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What is the natural course of an ischemic 6th?

It will resolve by 3 months

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

<50

50+

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If a vasculopathic 50+ year old presents with an isolated CN6 palsy, what workup is indicated?

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It is not indicated

What is the natural course of an ischemic 6th?

It will resolve by 3 months

How should one proceed if a presumed ischemic 6th fails to largely resolve by 3 months?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

<50

50+

What are the risk factors for a CN6 ischemic mononeuropathy?
The usual vasculopathic ones--DM, HTN and abnormal lipids

If a vasculopathic 50+ year old presents with an isolated CN6 palsy, what workup is indicated?

Other than a complete eye exam and general medical assessment (ie, BP, BS and lipid evals), nothing

What about imaging?

It is not indicated (unless it fails to resolve by 3 months)

What is the natural course of an ischemic 6th?

It will resolve by 3 months

How should one proceed if a presumed ischemic 6th fails to largely resolve by 3 months?

By obtaining expedited imaging for what apparently is **not** an ischemic 6th

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

<50

50+

Finally: Two questions must be addressed before you assume a CN6 palsy in a 50+ vasculopath is 'merely' ischemic, and therefore nothing to be concerned about:

--
--

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

<50

50+

Finally: Two questions must be addressed before you assume a CN6 palsy in a 50+ vasculopath is 'merely' ischemic, and therefore nothing to be concerned about:

--Does the pt has a hx of **one word** ?

--Are signs/symptoms suggestive of **abb.** present?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

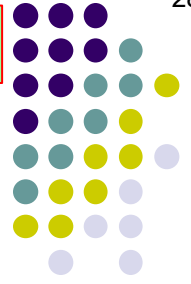
<50

50+

Finally: Two questions must be addressed before you assume a CN6 palsy in a 50+ vasculopath is 'merely' ischemic, and therefore nothing to be concerned about:

- Does the pt has a hx of cancer ?
- Are signs/symptoms suggestive of GCA present?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



<50
The
way you
should divvy
up CN6 palsies in pts <50:

50+

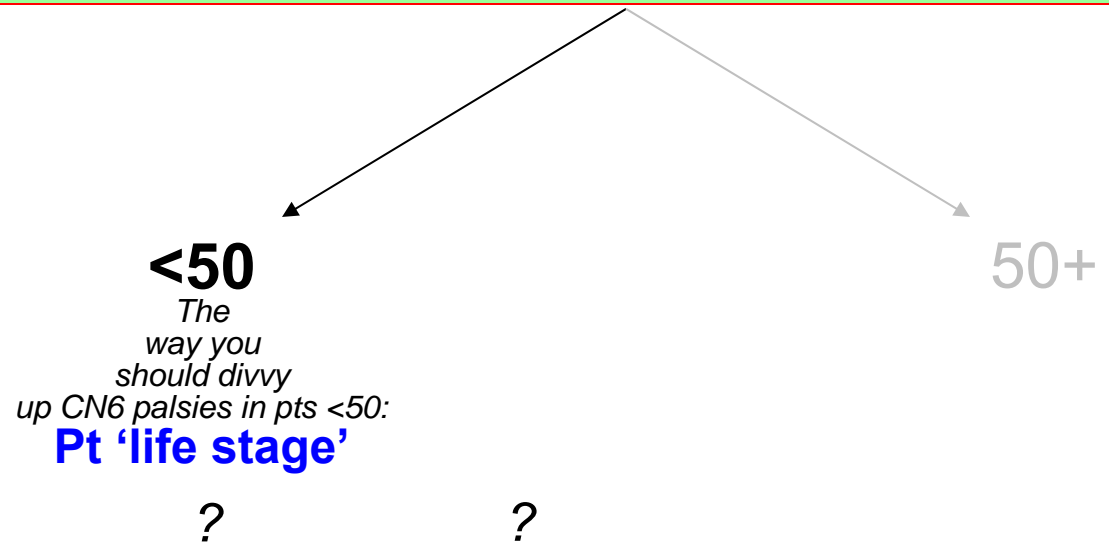
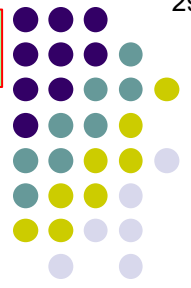
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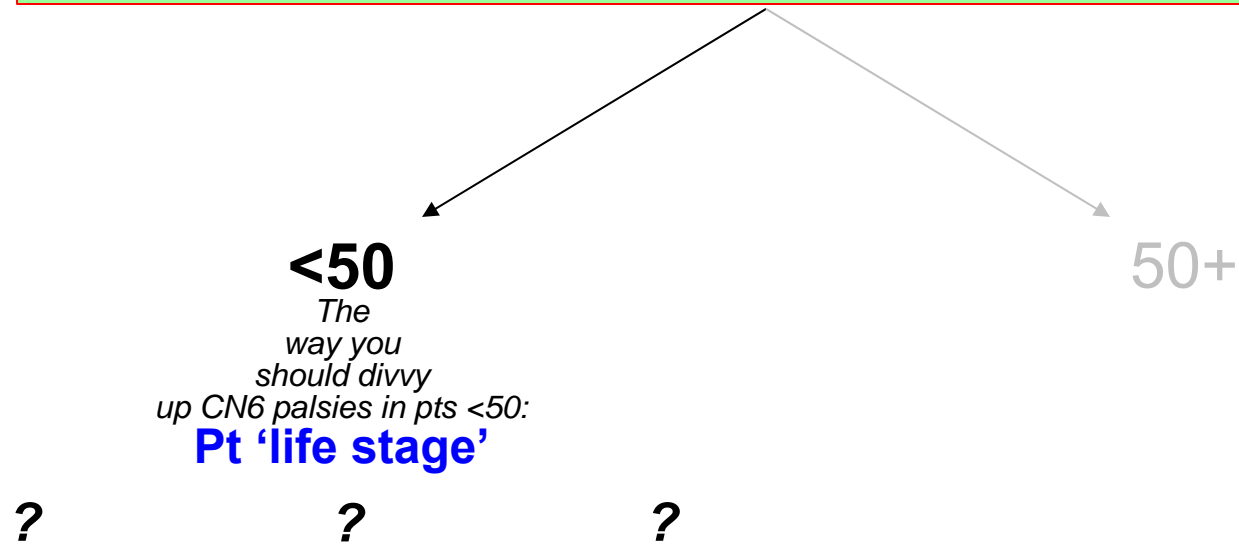
When thinking about CN6 palsies in individuals <50, you should consider them as falling into one of three categories. On what basis are these divisions made?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



When thinking about CN6 palsies in individuals <50, you should consider them as falling into one of three categories. On what basis are these divisions made?
Pt 'life stage'

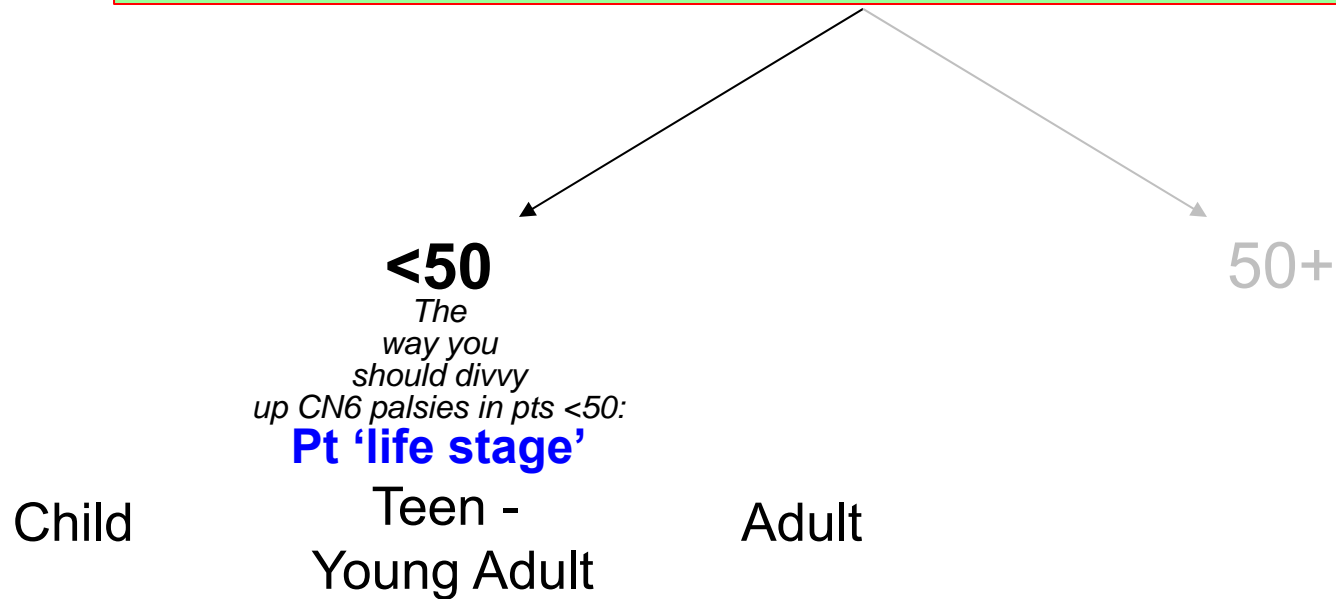
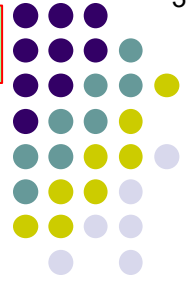
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



When thinking about CN6 palsies in individuals <50, you should consider them as falling into one of three categories. On what basis are these divisions made?
Pt 'life stage'

What are these three life stages?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



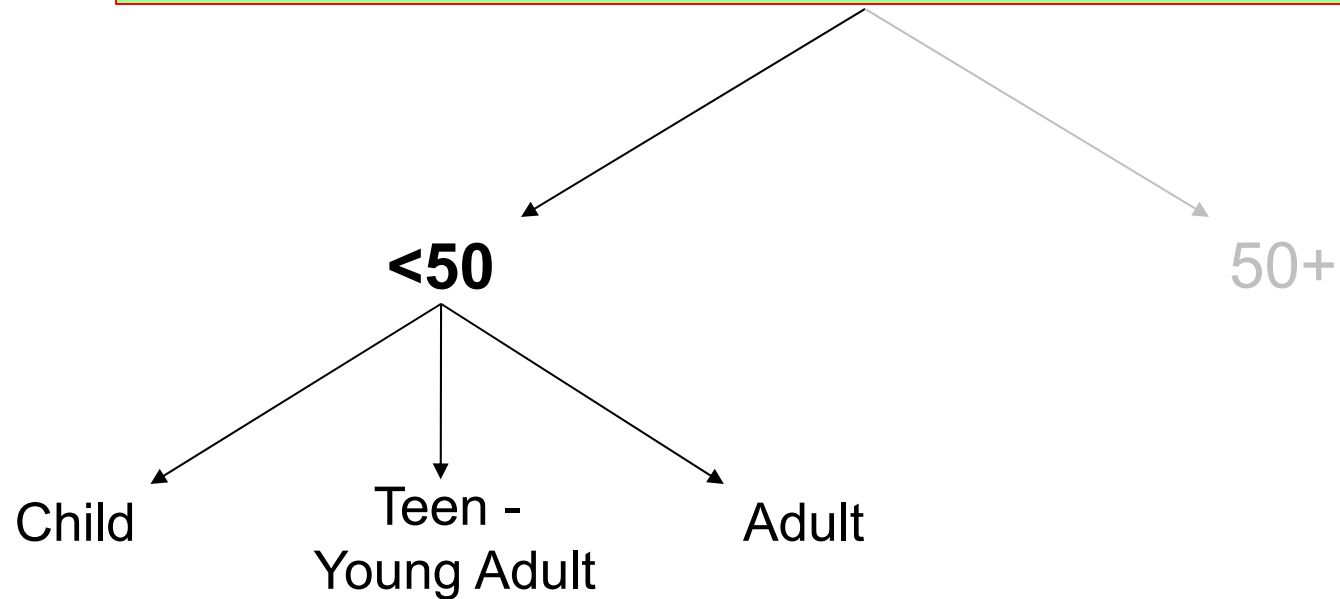
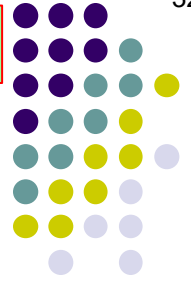
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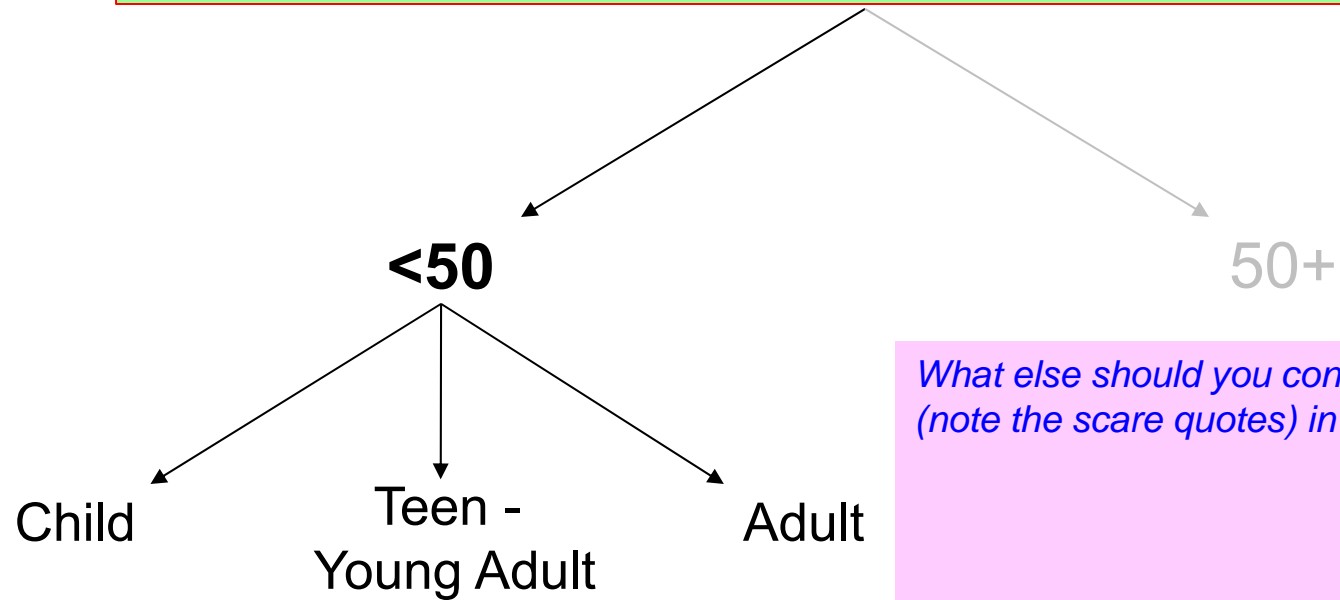
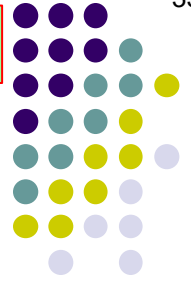
Childhood, teen/young adulthood, and adult

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



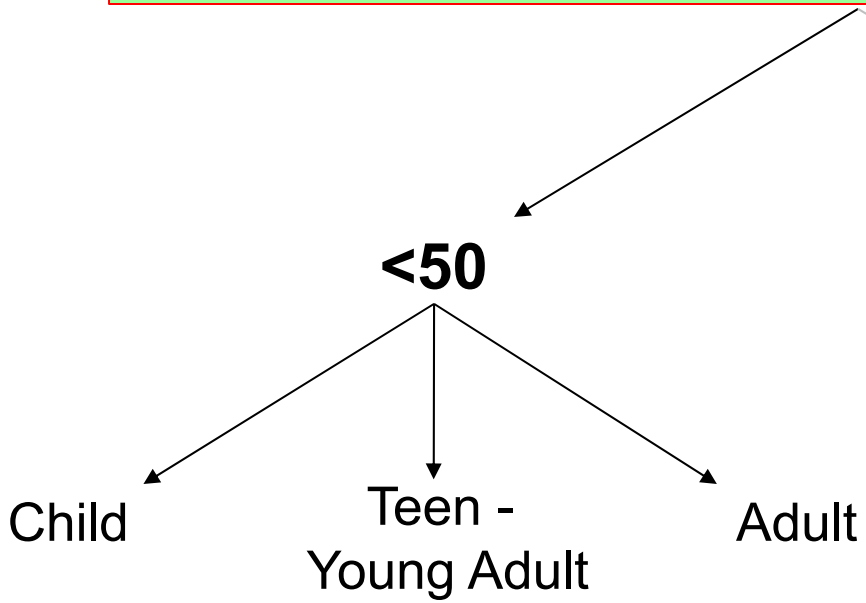
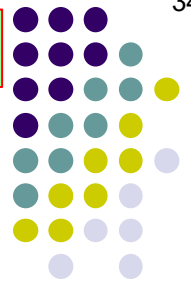
Note: While not completely clear on this score, the BCSC *Neuro* book seems to suggest that all of these pts should be imaged forthwith

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



What else should you consider about a 'CN6 palsy' (note the scare quotes) in individuals under 50?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

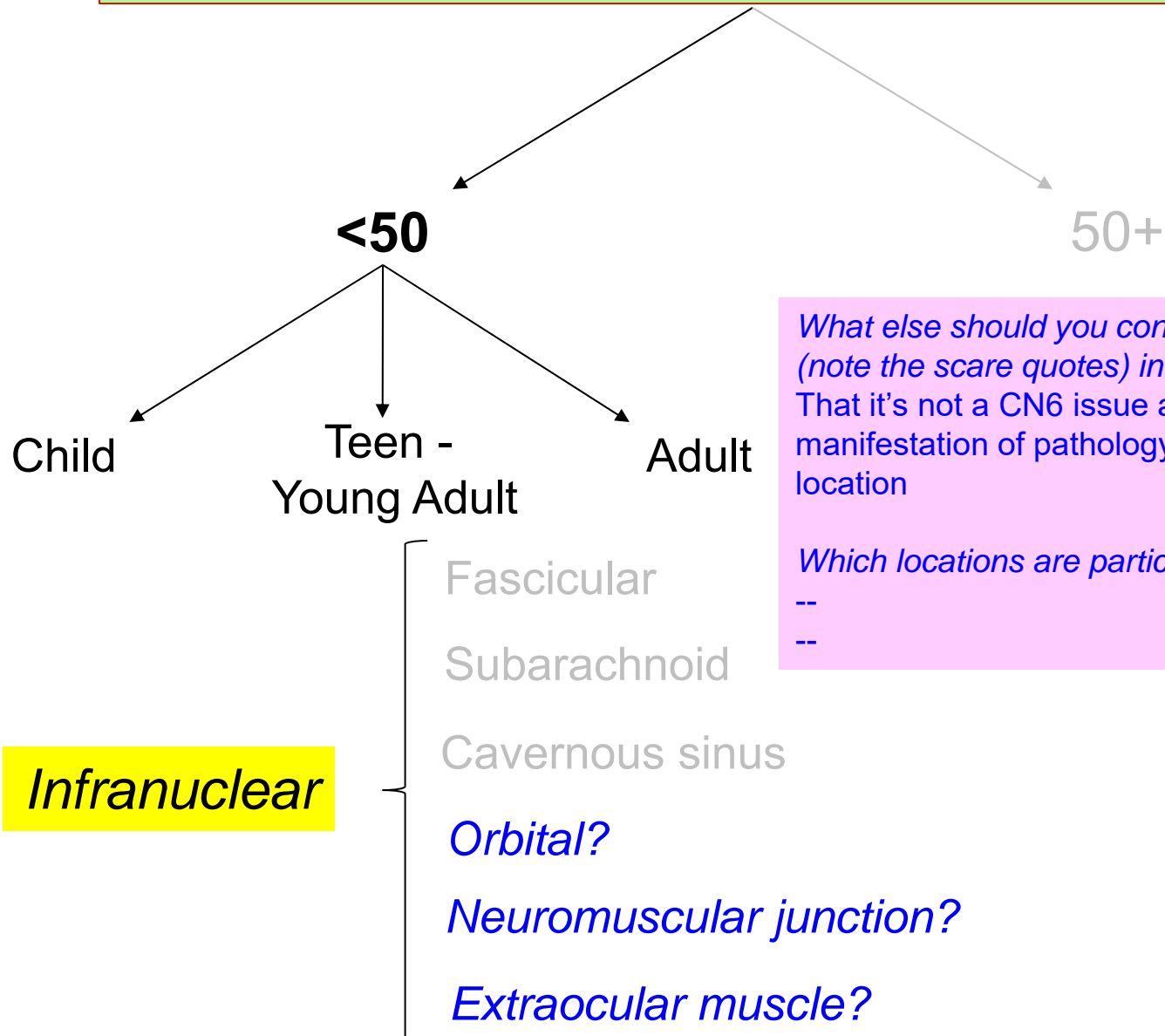
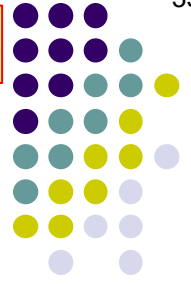


What else should you consider about a 'CN6 palsy' (note the scare quotes) in individuals under 50? That it's not a CN6 issue at all, but rather a manifestation of pathology at some other infranuclear location

Infranuclear

- Fascicular
- Subarachnoid
- Cavernous sinus
- Orbital
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Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

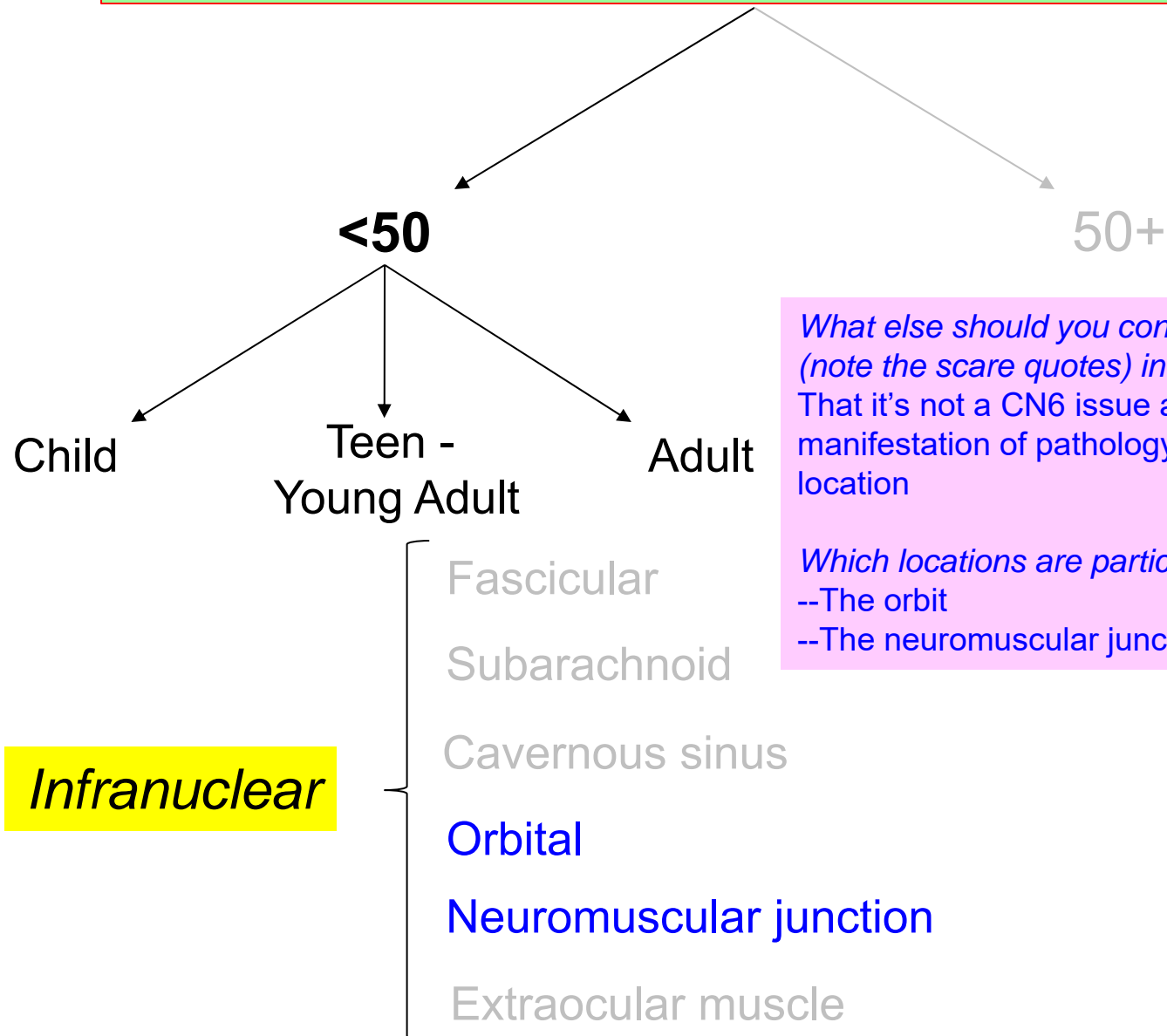
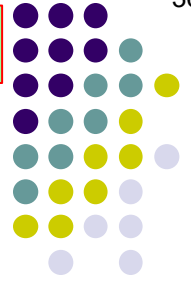


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Which locations are particularly likely to be involved?

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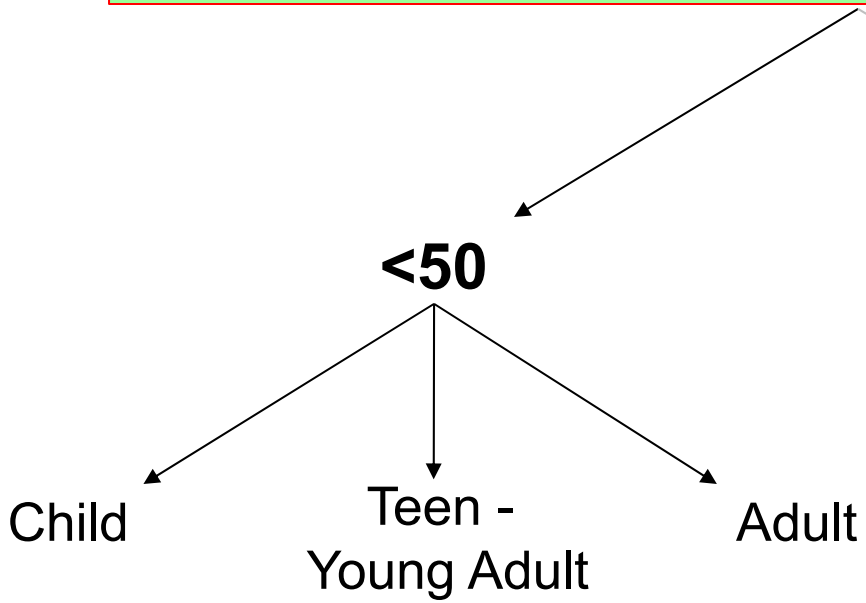
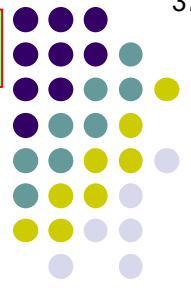
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



What else should you consider about a 'CN6 palsy' (note the scare quotes) in individuals under 50? That it's not a CN6 issue at all, but rather a manifestation of pathology at some other infranuclear location

Which locations are particularly likely to be involved?
 --The orbit
 --The neuromuscular junction

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



What else should you consider about a 'CN6 palsy' (note the scare quotes) in individuals under 50?
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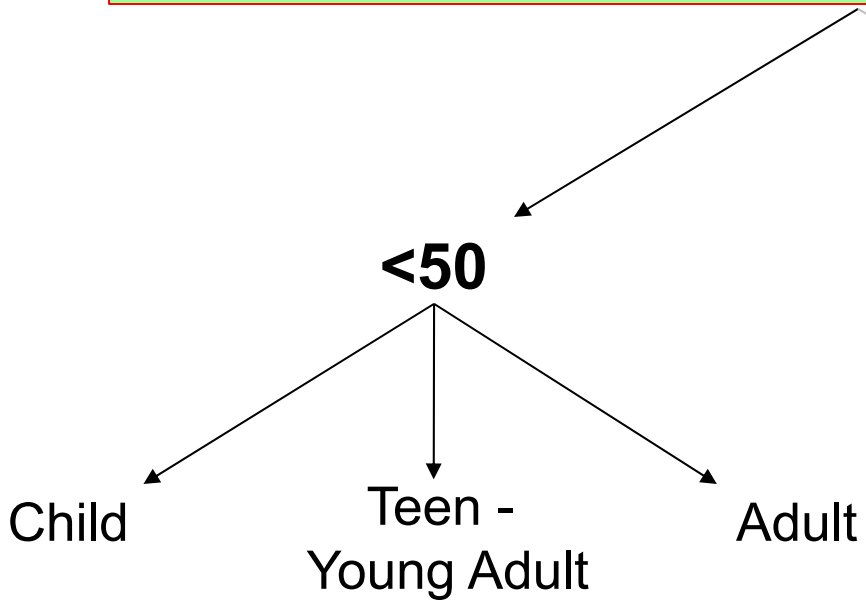
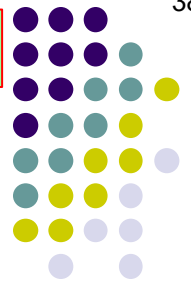
Which locations are particularly likely to be involved?
The orbit
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Infranuclear

- Fascicular
- Subarachnoid
- Cavernous
- Orbital**
- Neuromus
- Extraocula

What sort of orbital process might be implicated?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



What else should you consider about a 'CN6 palsy' (note the scare quotes) in individuals under 50?
 That it's not a CN6 issue at all, but rather a manifestation of pathology at some other infranuclear location

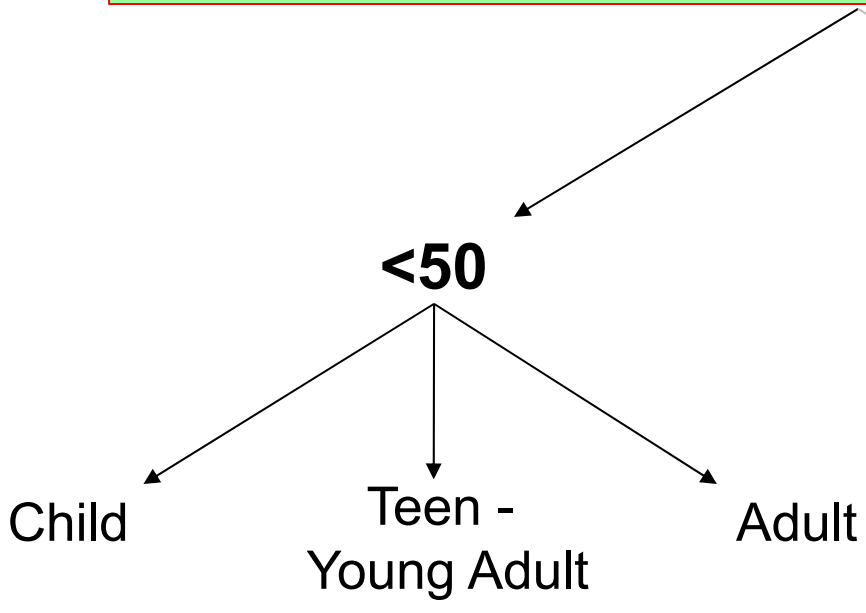
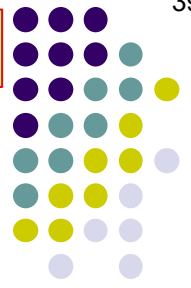
Which locations are particularly likely to be involved?
The orbit
 --The neuromuscular junction

Infranuclear

- Fascicular
- Subarachnoid
- Cavernous
- Orbital**
- Neuromuscular
- Extraocular

What sort of orbital process might be implicated?
 A restrictive one, eg, thyroid eye dz

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



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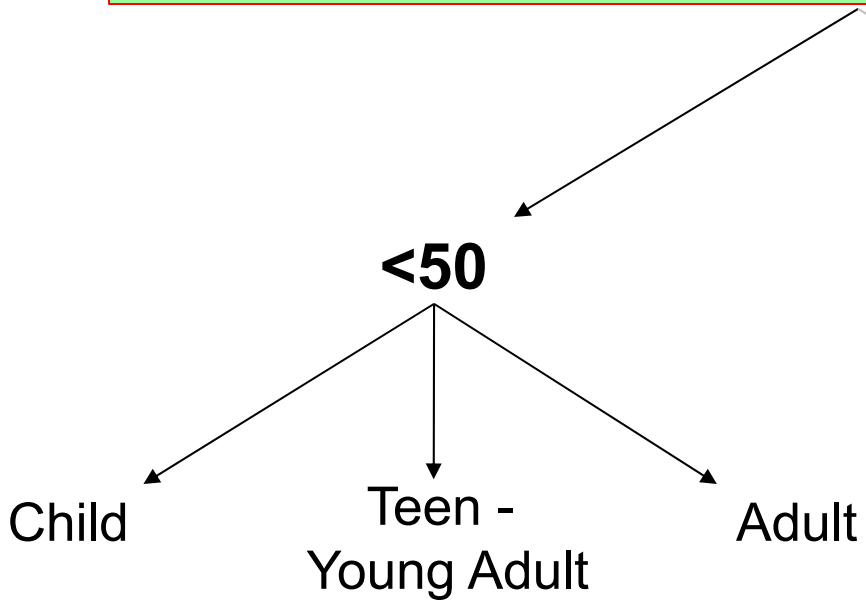
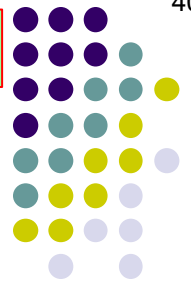
Infranuclear

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Thyroid eye dz? Doesn't that tend to affect the medial rectus, not the lateral?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



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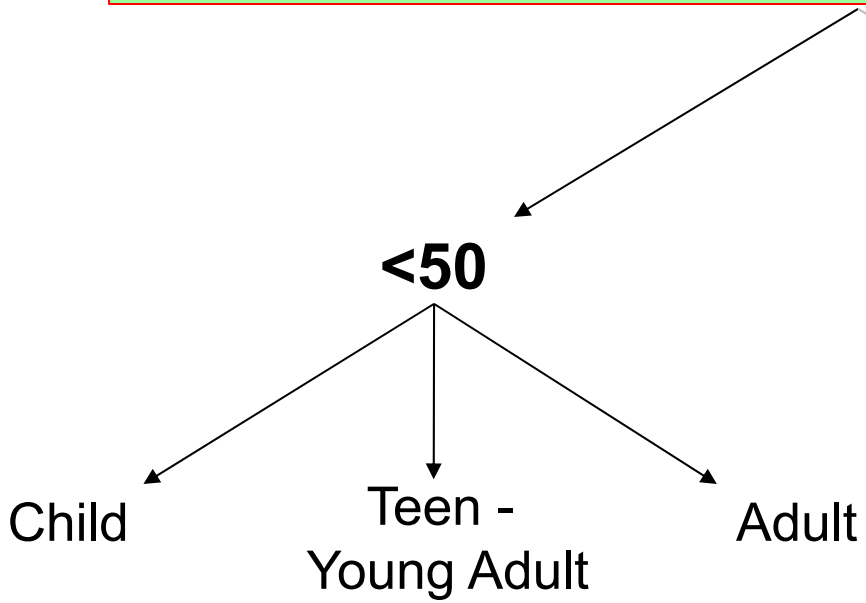
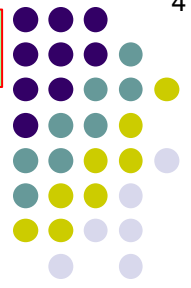
Infranuclear

- Fascicular
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What sort of orbital process might be implicated?
 A restrictive one, eg, thyroid eye dz

Thyroid eye dz? Doesn't that tend to affect the medial rectus, not the lateral?
 It does indeed tend to affect the MR, which is the point--the MR becomes restricted, giving the (false) impression of a LR palsy

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



What else should you consider about a 'CN6 palsy' (note the scare quotes) in individuals under 50?
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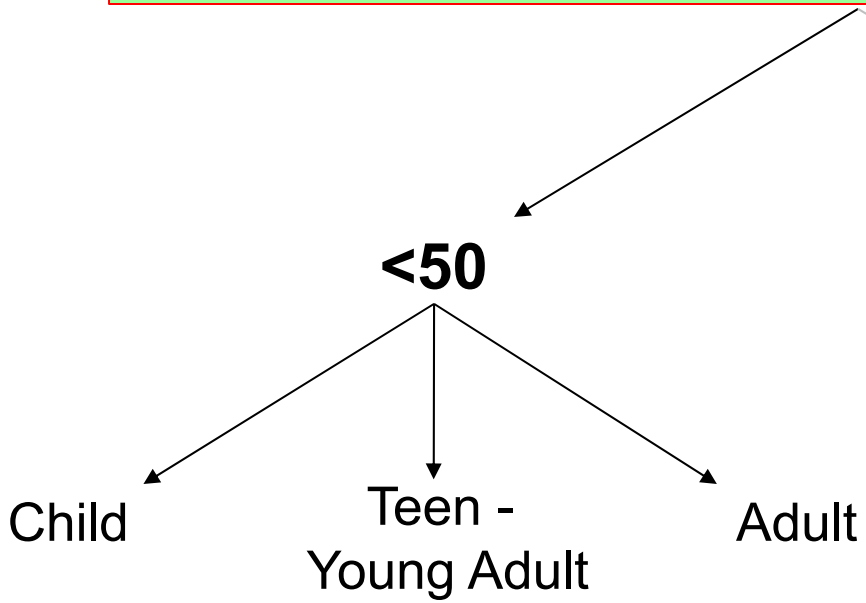
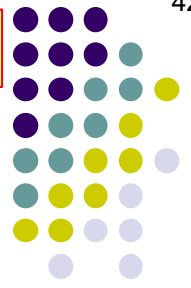
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Infranuclear

- Fascicular
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- Extraocular muscle

What pathology of the neuromuscular junction is most likely to mimic a CN6 palsy?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



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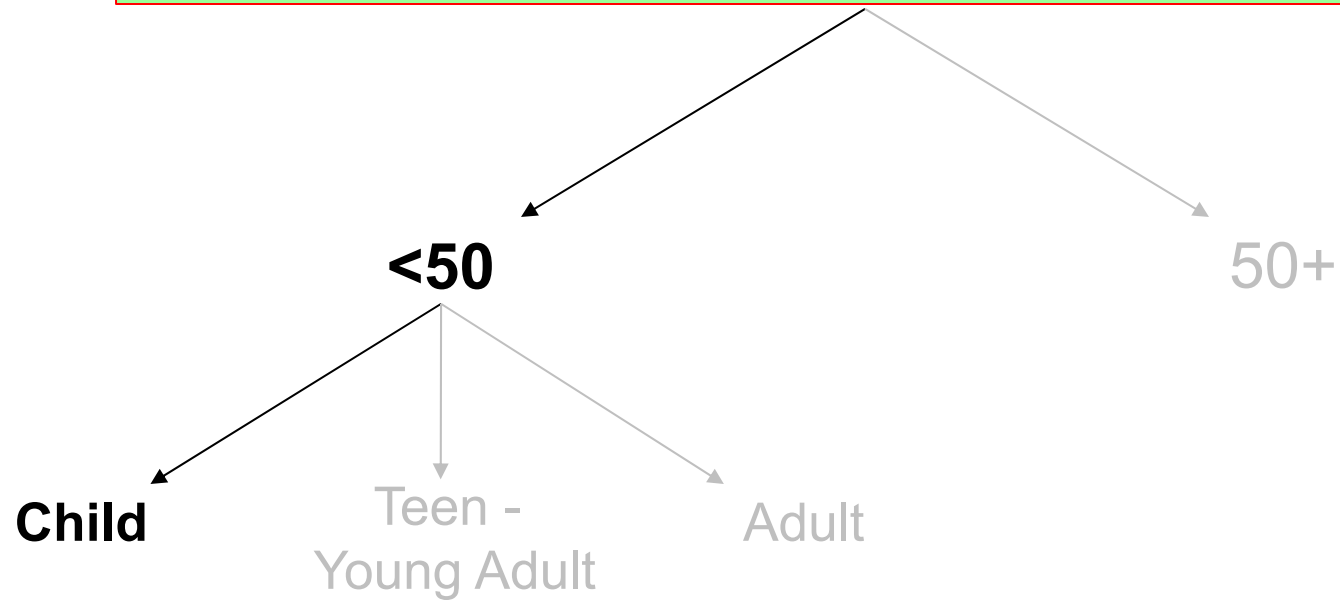
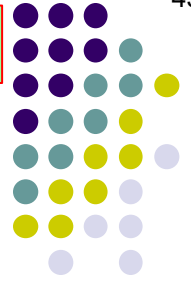
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Infranuclear

- Fascicular
- Subarachnoid
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- Extraocular muscle

What pathology of the neuromuscular junction is most likely to mimic a CN6 palsy?
 Myasthenia gravis

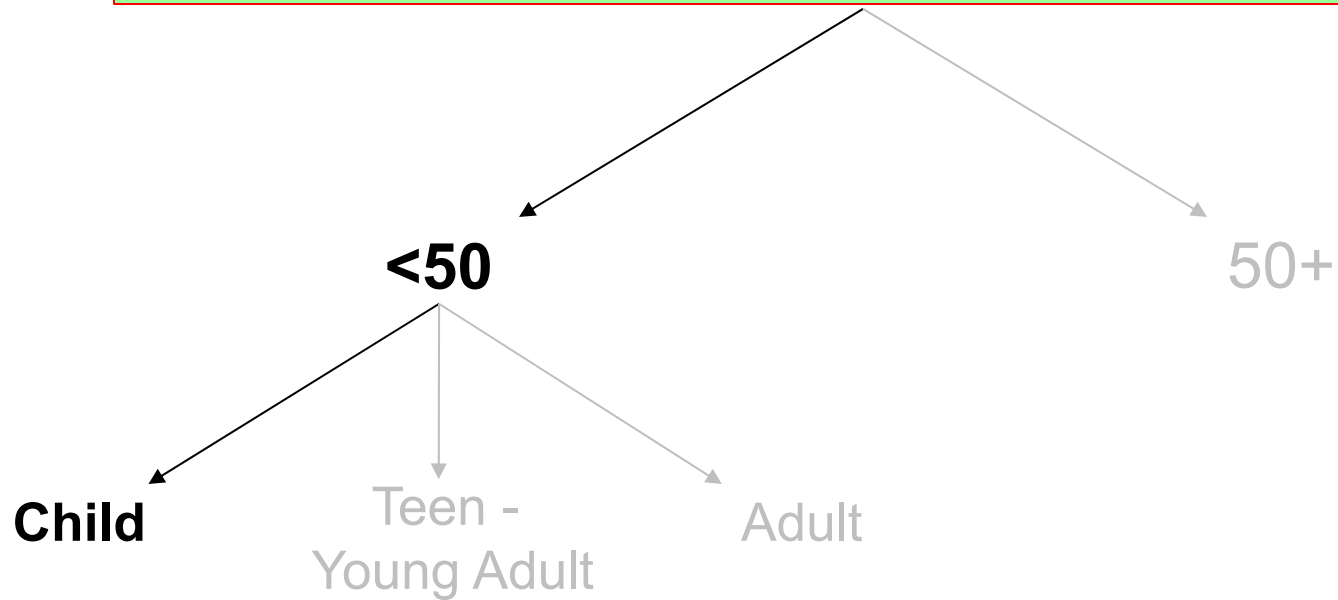
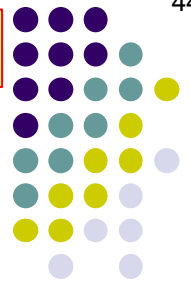
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

Is congenital CN6 palsy common?

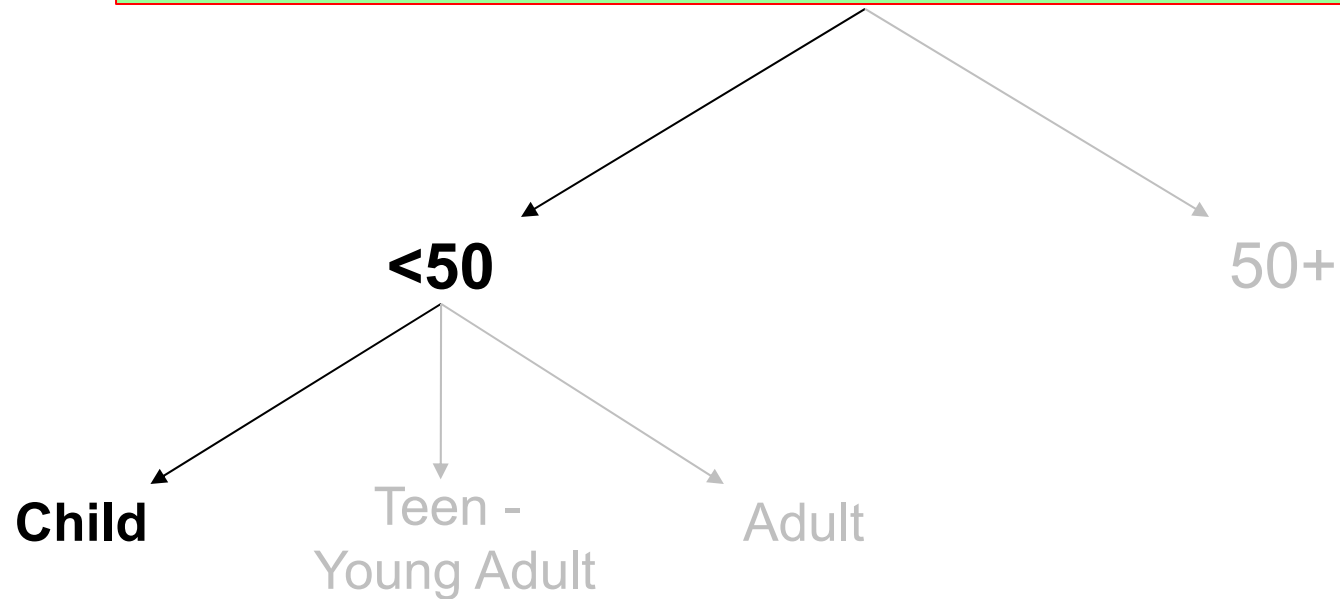
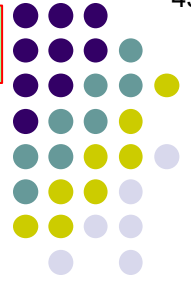
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

Is congenital CN6 palsy common?
No, it is very rare

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

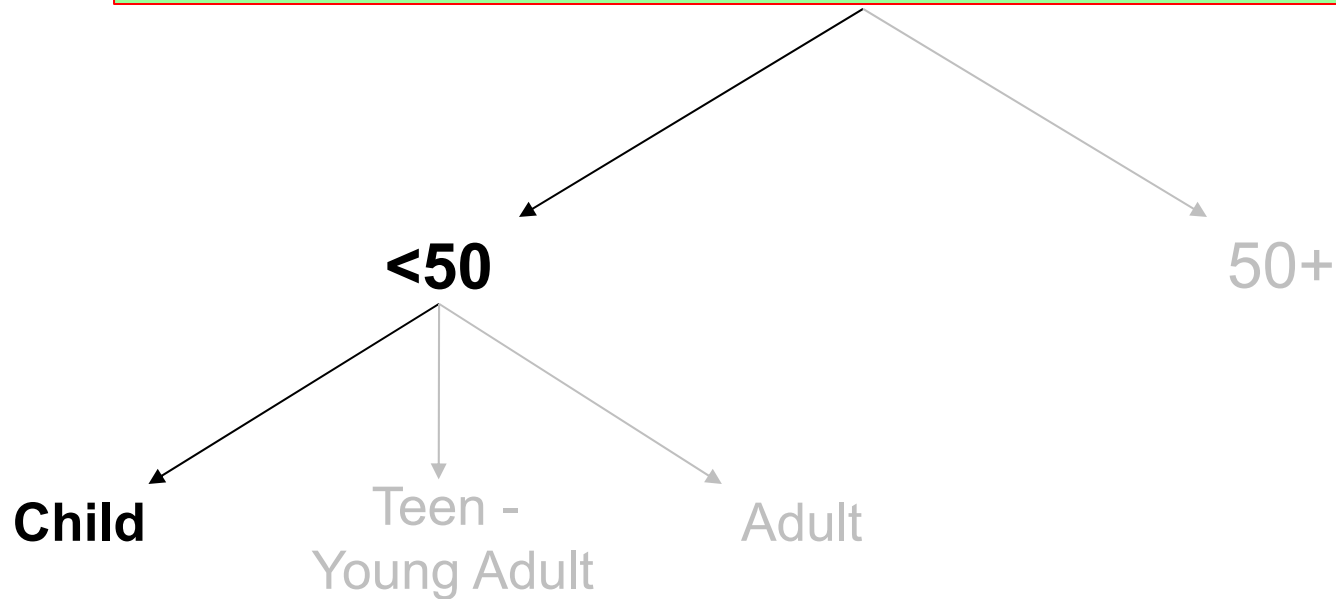
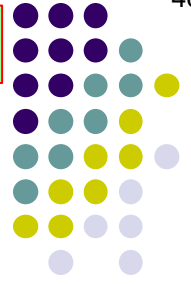
Is congenital CN6 palsy common?

No, it is very rare

You see an infant purported to have a congenital 6th. More than likely, it is actually one of three other conditions. What are they?

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Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

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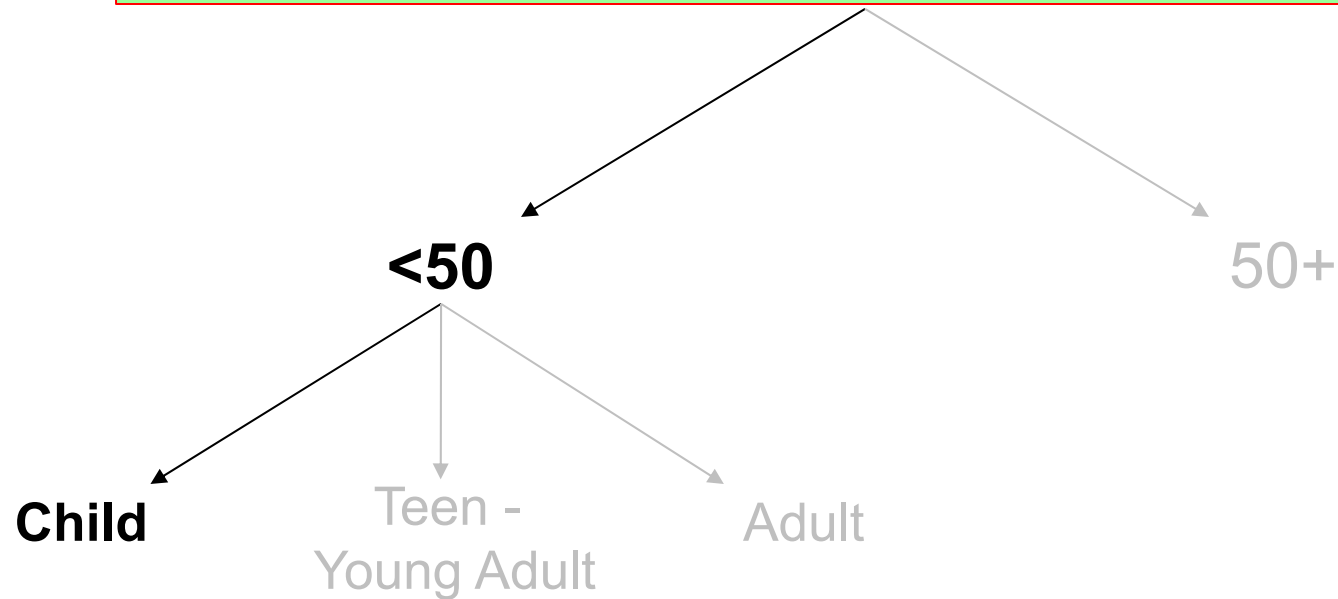
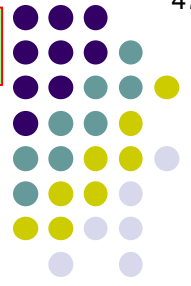
You see an infant purported to have a congenital 6th. More than likely, it is actually one of three other conditions. What are they?

--Transient CN6 palsy due to word + abb. 2ndry to the birth process

--Congenital word

-- eponym syndrome

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

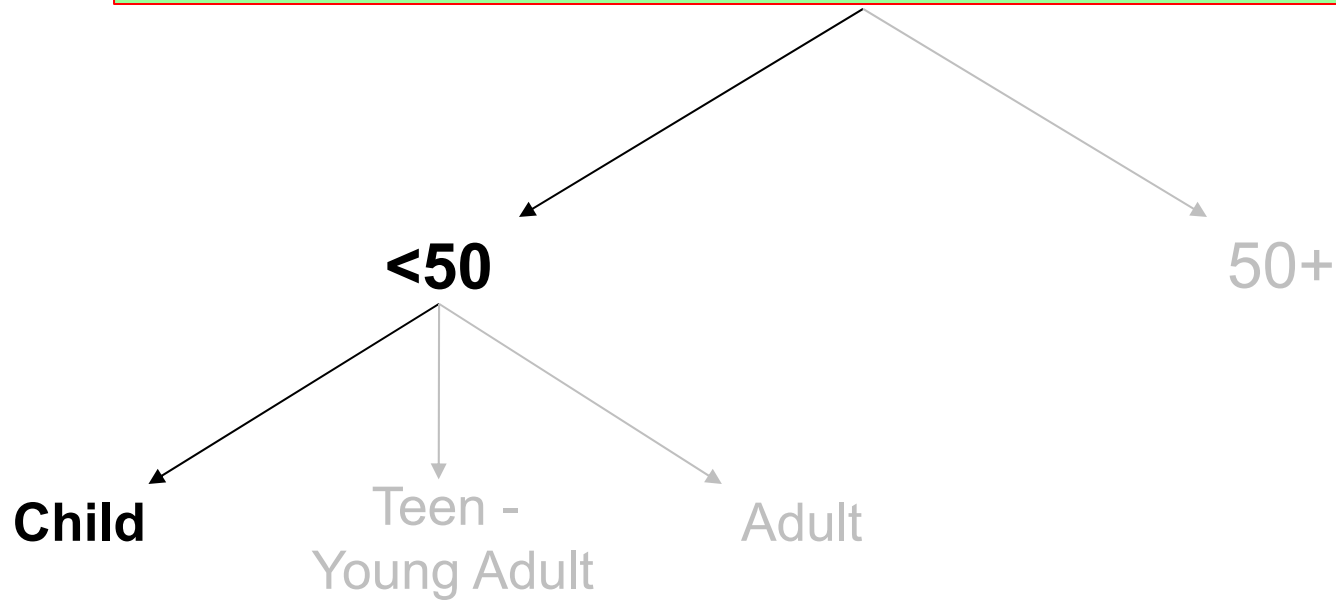
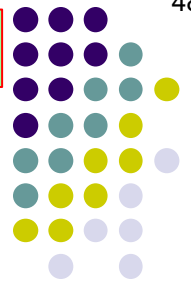
Is congenital CN6 palsy common?

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You see an infant purported to have a congenital 6th. More than likely, it is actually one of three other conditions. What are they?

- Transient CN6 palsy due to increased ICP 2ndry to the birth process
- Congenital esotropia
- Duane syndrome

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

Is congenital CN6 palsy common?
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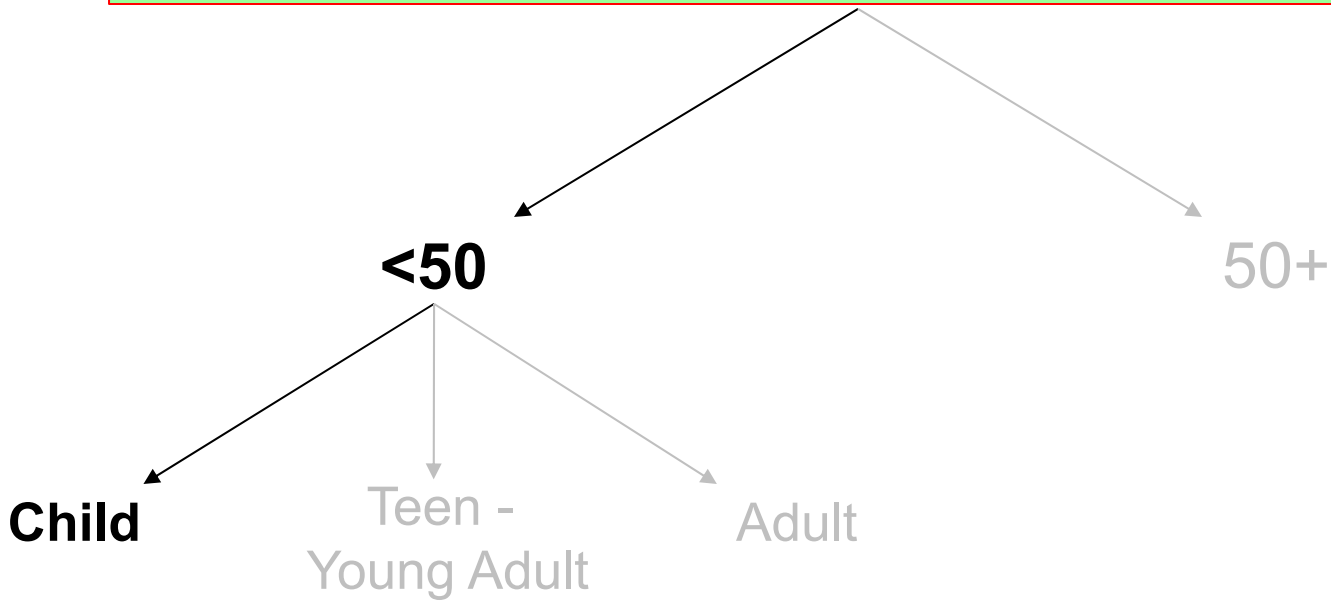
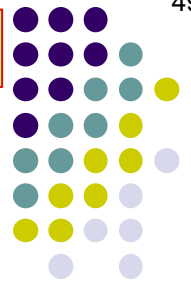
What are the three primary features of Duane syndrome?

-
-
-

*6th. More than likely, it is
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Congenital esotropia
Duane syndrome

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



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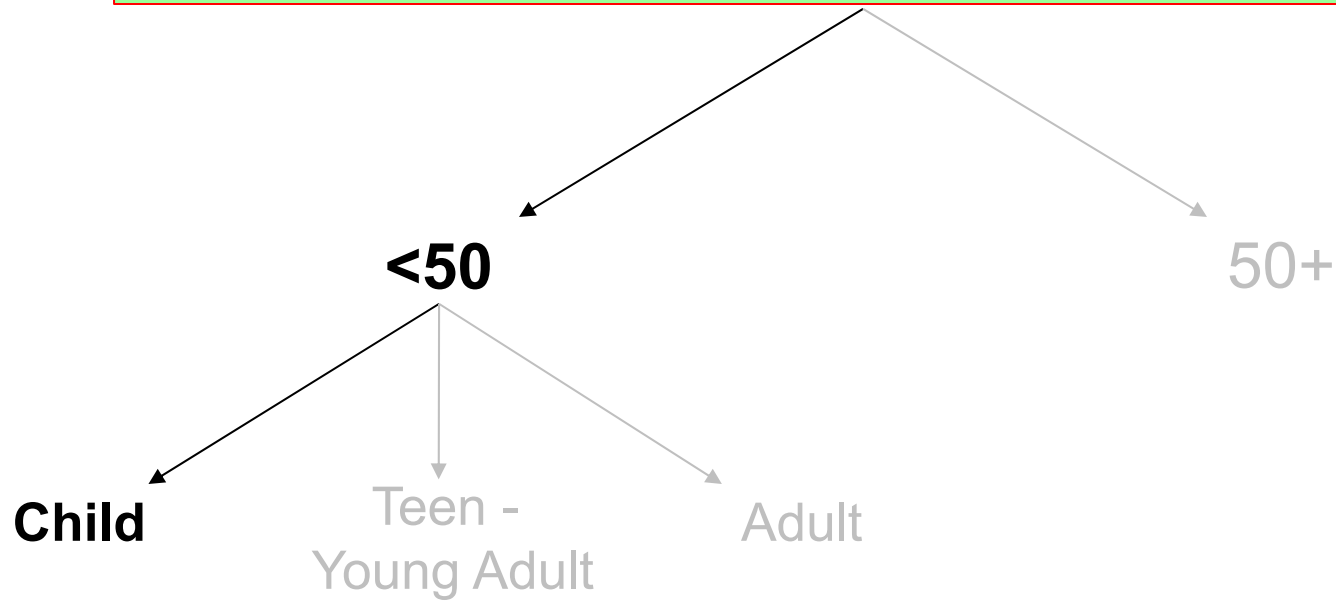
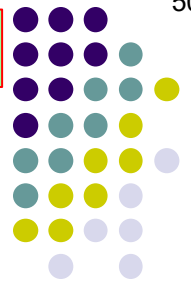
What are the three primary features of Duane syndrome?

- [redacted] of globe on attempted [redacted]
- At least some limitation of [redacted] two words
- Up- or downshoot in [redacted]

*6th. More than likely, it is
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--Congenital esotropia
- **Duane syndrome**

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

Is congenital CN6 palsy common?
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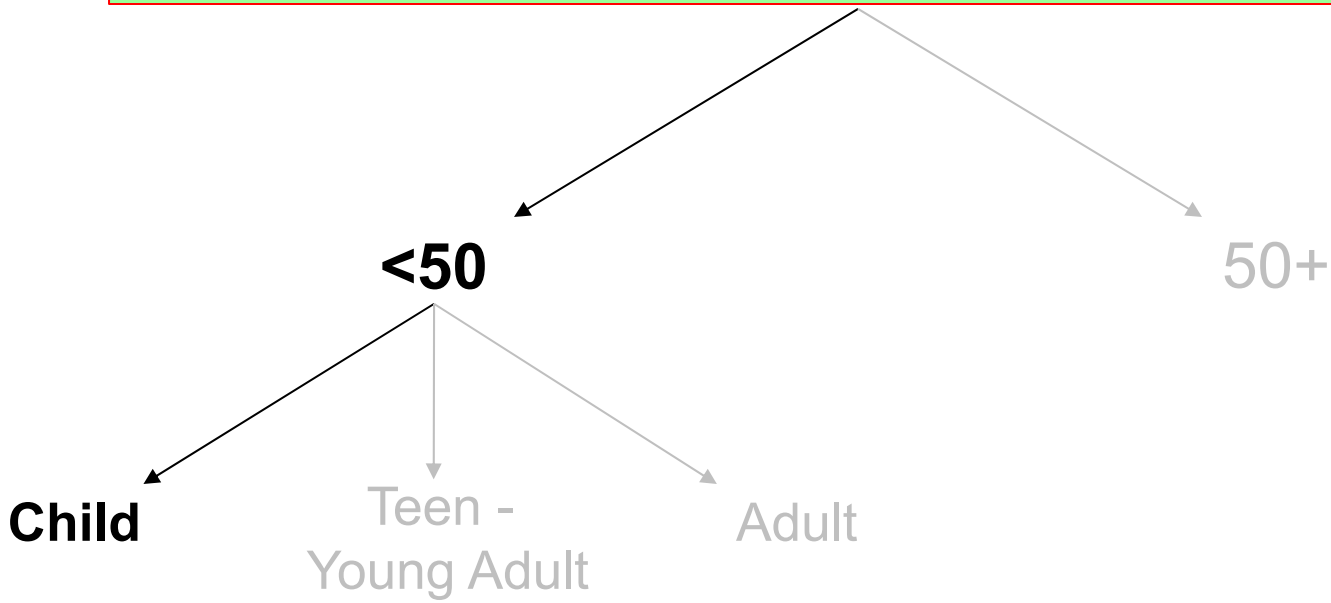
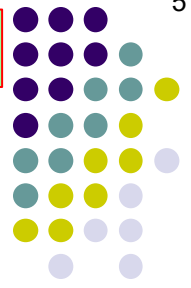
What are the three primary features of Duane syndrome?

- Retraction of globe on attempted adduction
- At least some limitation of horizontal movement
- Up- or downshoot in adduction

*6th. More than likely, it is
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-- Congenital esotropia
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Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

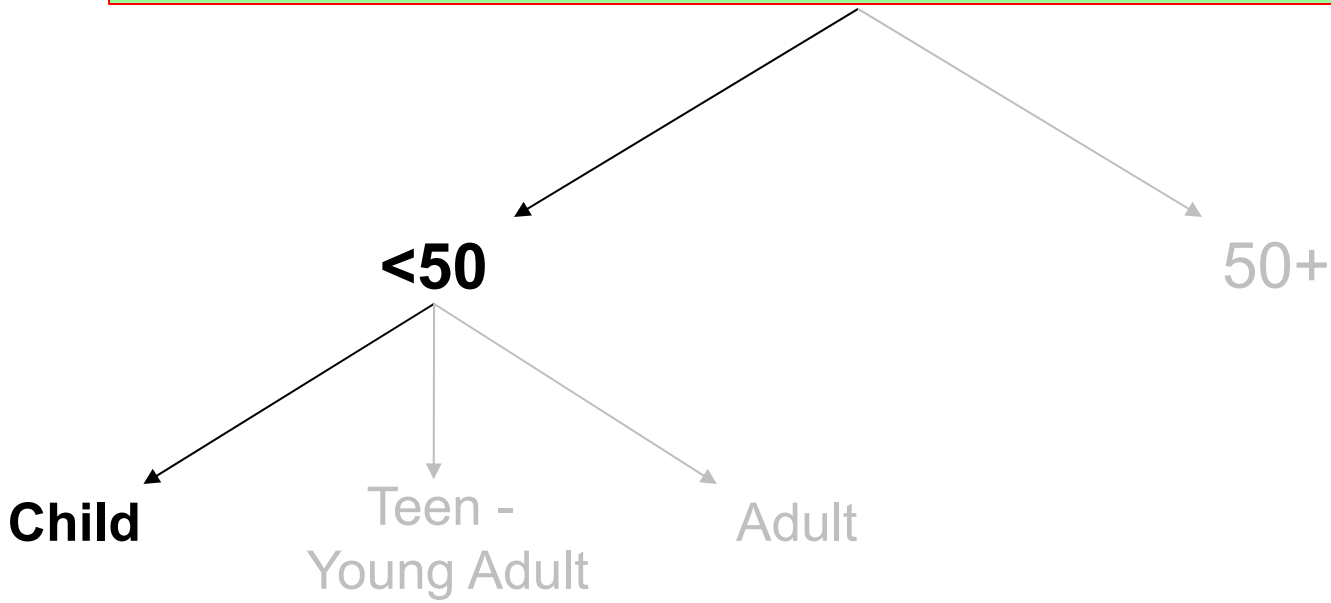
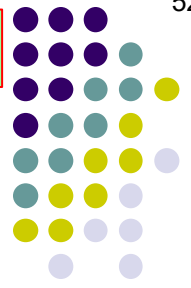
Is congenital CN6 palsy common?
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What are the three primary features of Duane syndrome?
-- Retraction of globe on attempted adduction
-- At least some limitation of horizontal movement
-- Up- or downshoot in adduction

6th. More than likely, it is they?
Surely globe retraction is a dead giveaway that the infant has Duane's and not a congenital CN6 palsy?

Duane syndrome

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Let's start young...

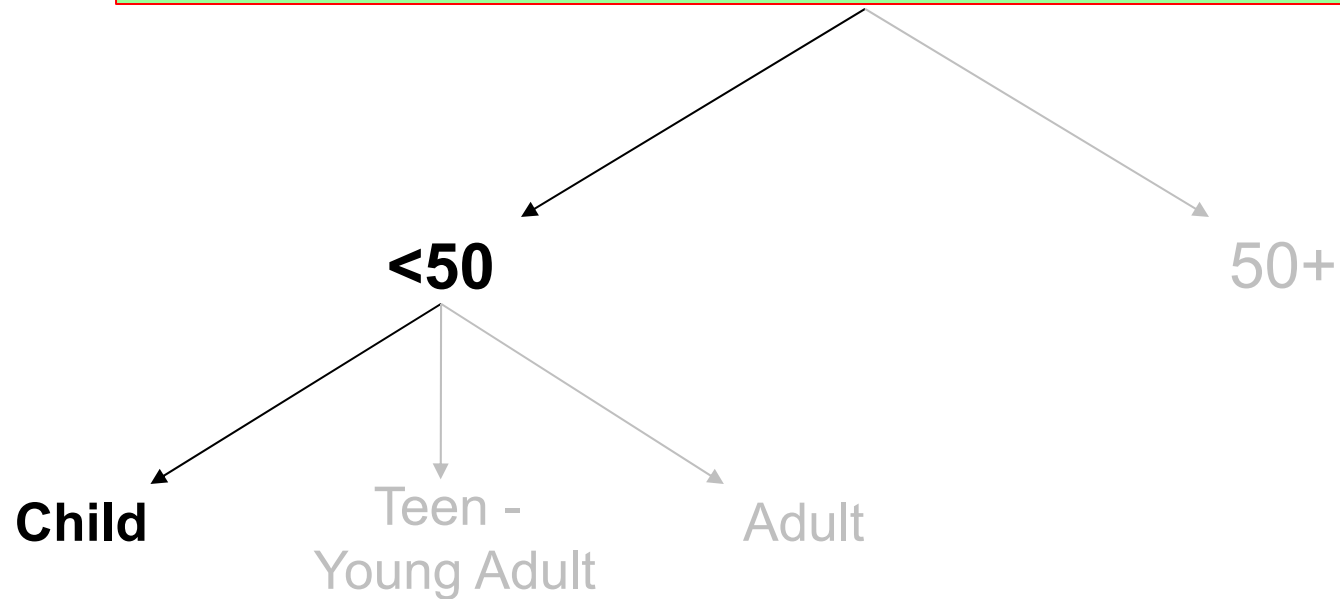
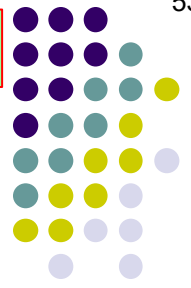
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What are the three primary features of Duane syndrome?
-- **Retraction of globe on attempted adduction**
--At least some limitation of horizontal movement
--Up- or downshoot in adduction

Duane syndrome

Surely globe retraction is a dead giveaway that the infant has Duane's and not a congenital CN6 palsy? It would be if it were present, but typically retraction is only minimally present in Duane infants

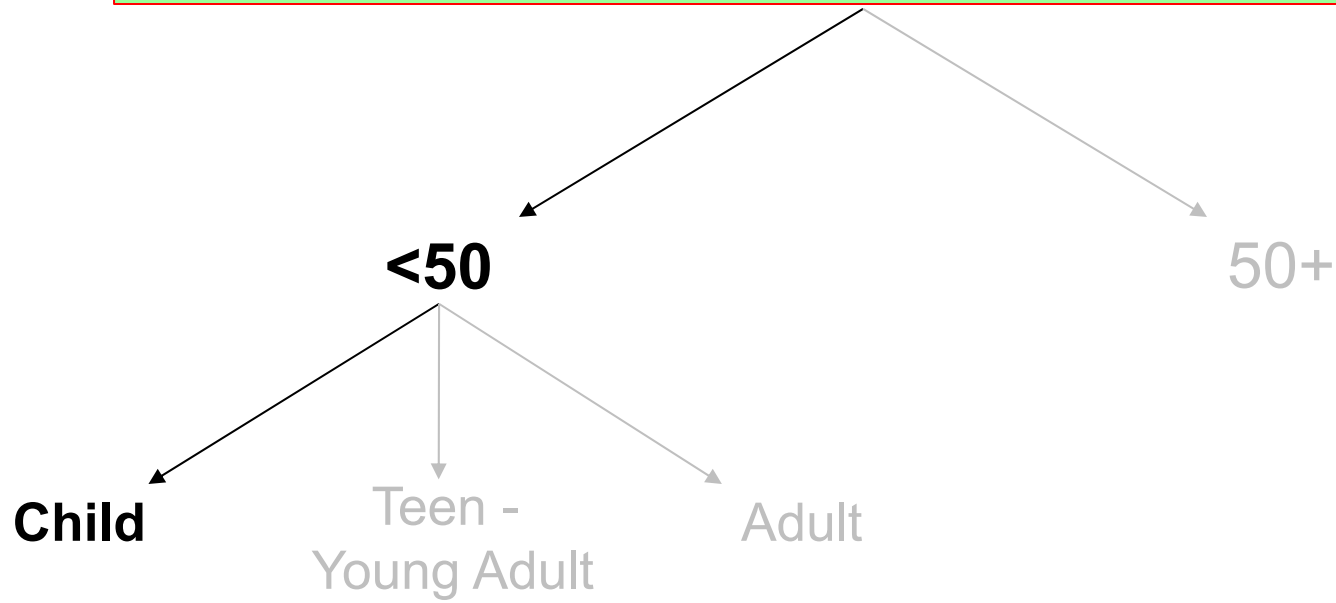
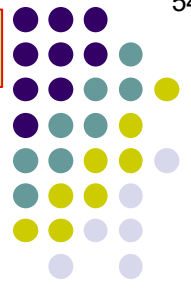
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Now, childhood...

What is the most common cause of isolated nontraumatic CN6 palsy in kids?

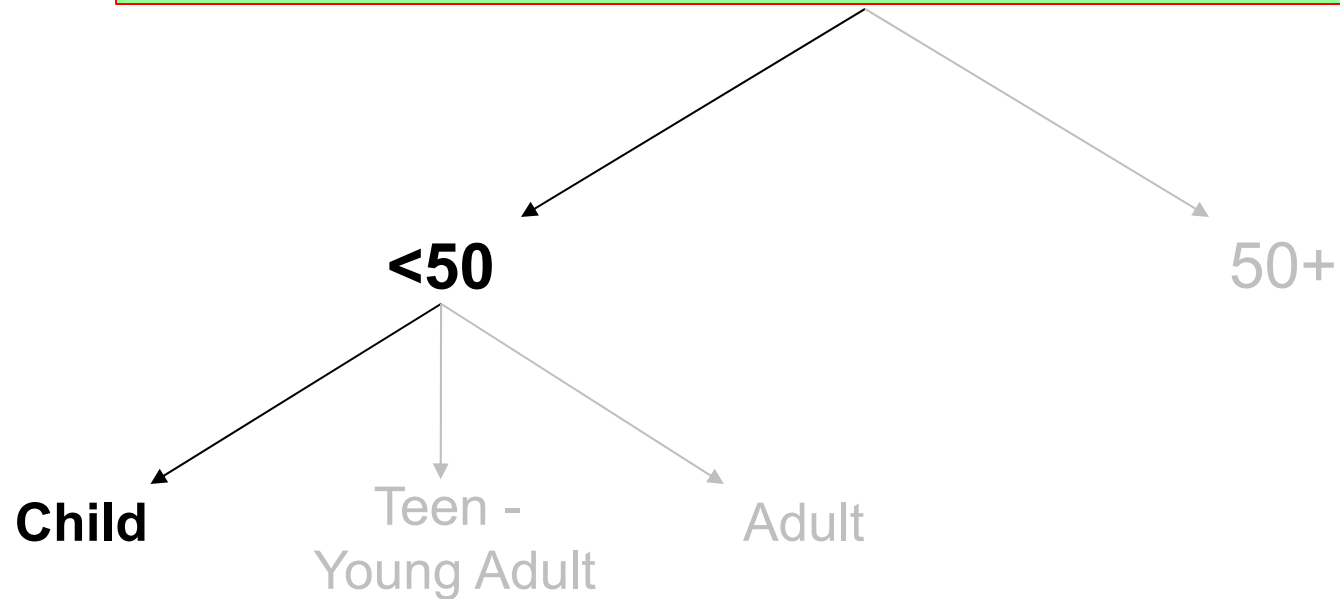
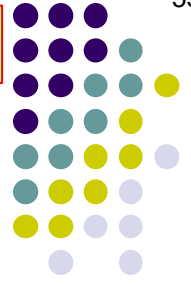
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Now, childhood...

What is the most common cause of isolated nontraumatic CN6 palsy in kids?
An immunologic response to exposure to antigens

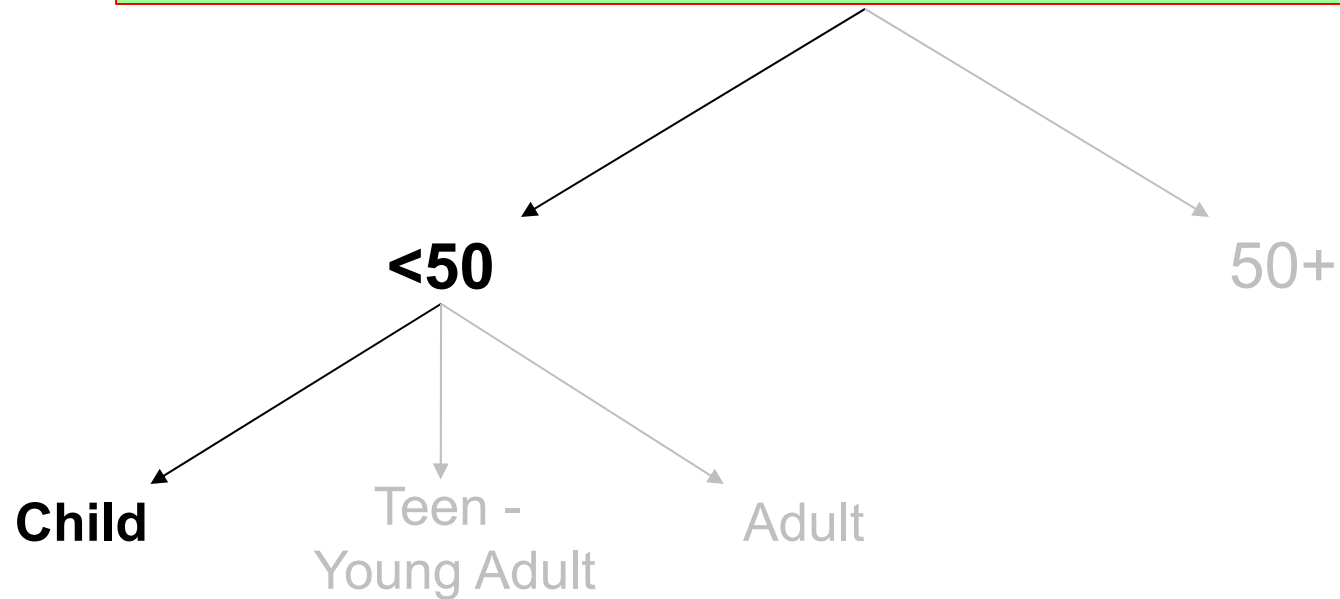
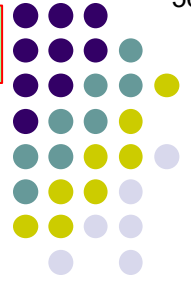
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



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Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



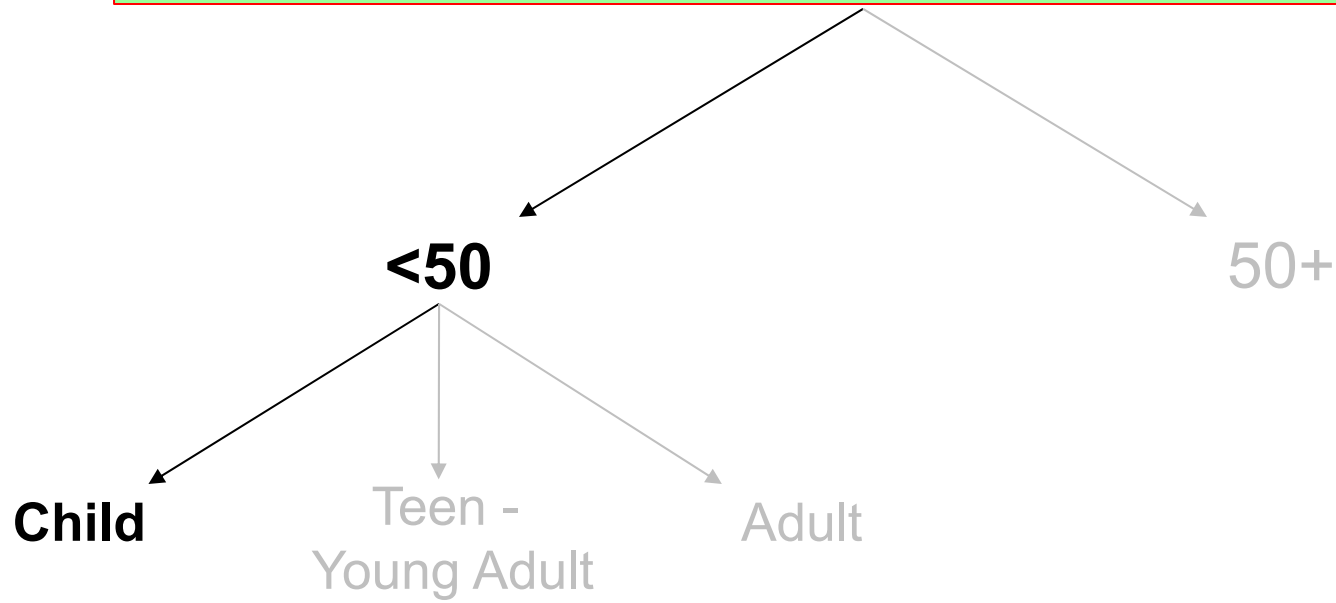
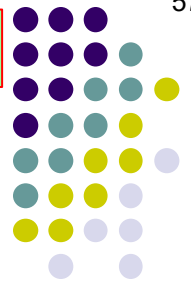
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Exposure takes one of two forms. What are they?

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Motility Disorders: Nontraumatic, Isolated, Unilateral CN6 Palsy



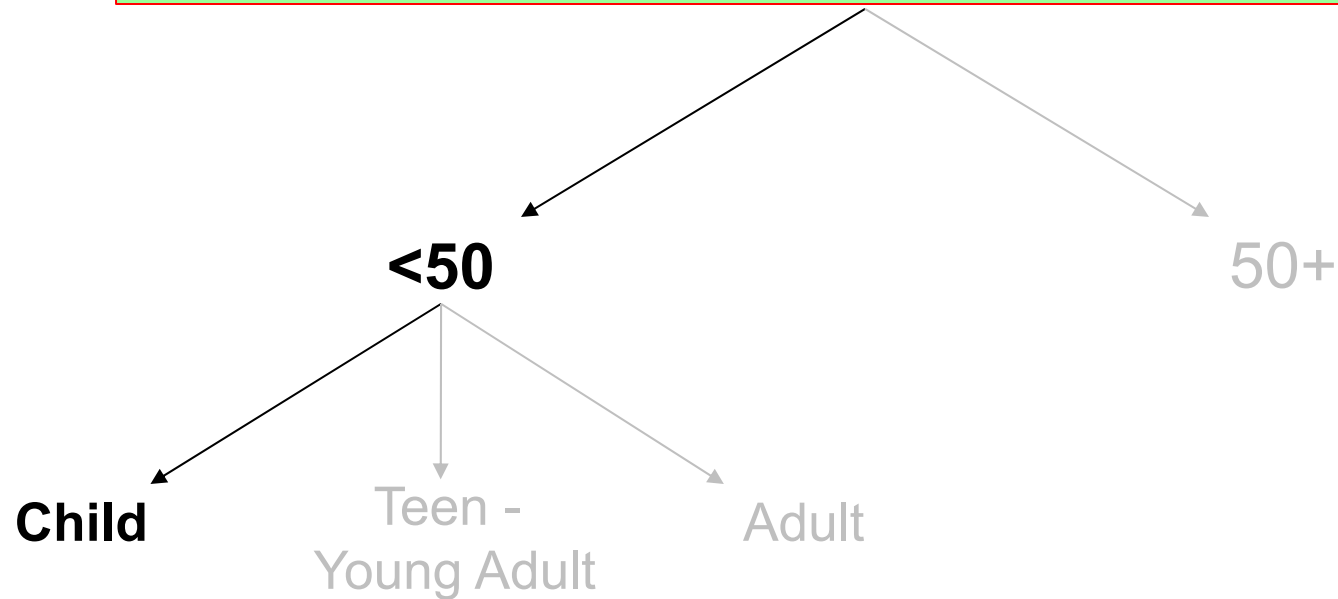
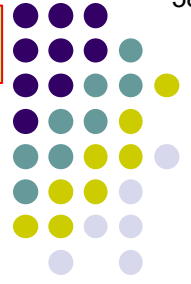
Now, childhood...

What is the most common cause of isolated nontraumatic CN6 palsy in kids?
An immunologic response to exposure to viral antigens

Exposure takes one of two forms. What are they?

- Post...
- Post...

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



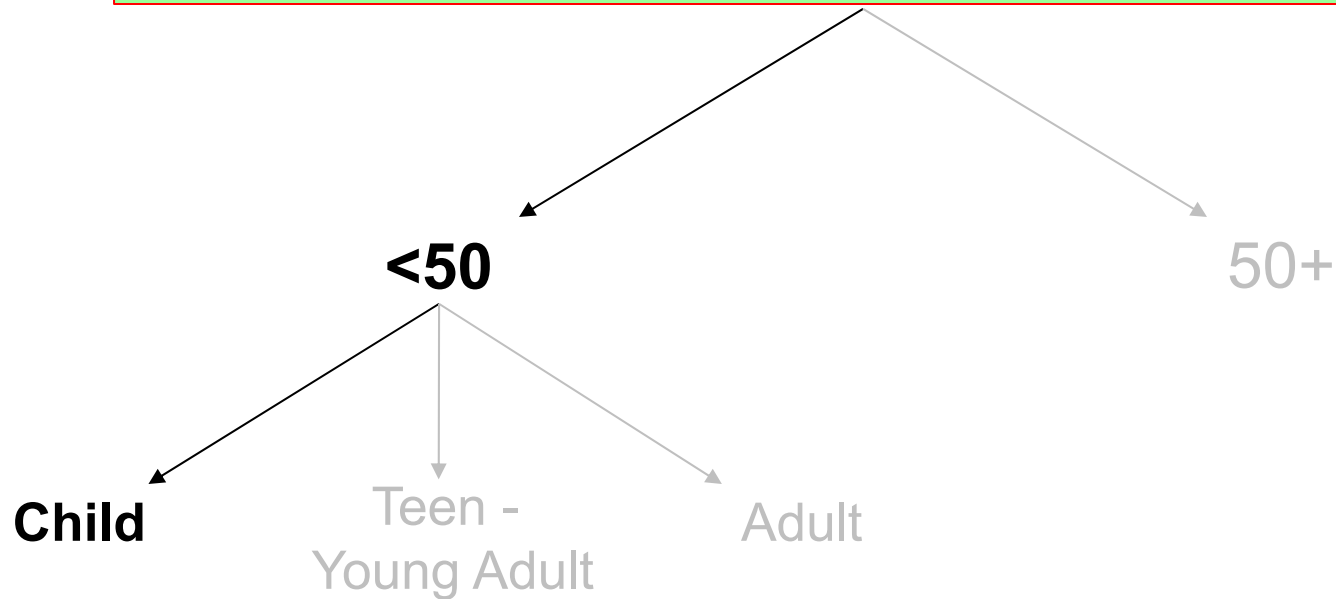
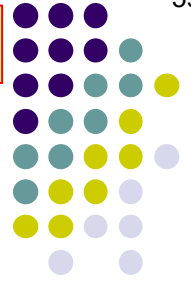
Now, childhood...

What is the most common cause of isolated nontraumatic CN6 palsy in kids?
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Exposure takes one of two forms. What are they?

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- Post...vaccinal

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Now, childhood...

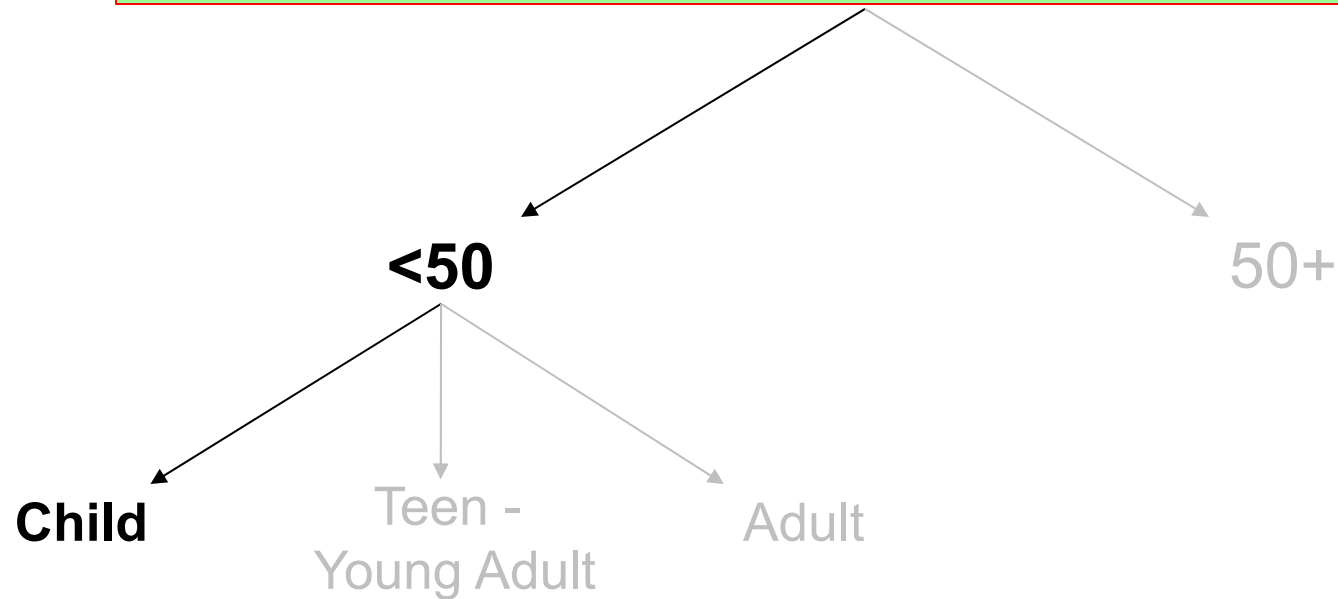
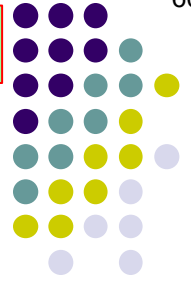
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- Post...vaccinal

What is the clinical course of post-viral CN6 palsy?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Now, childhood...

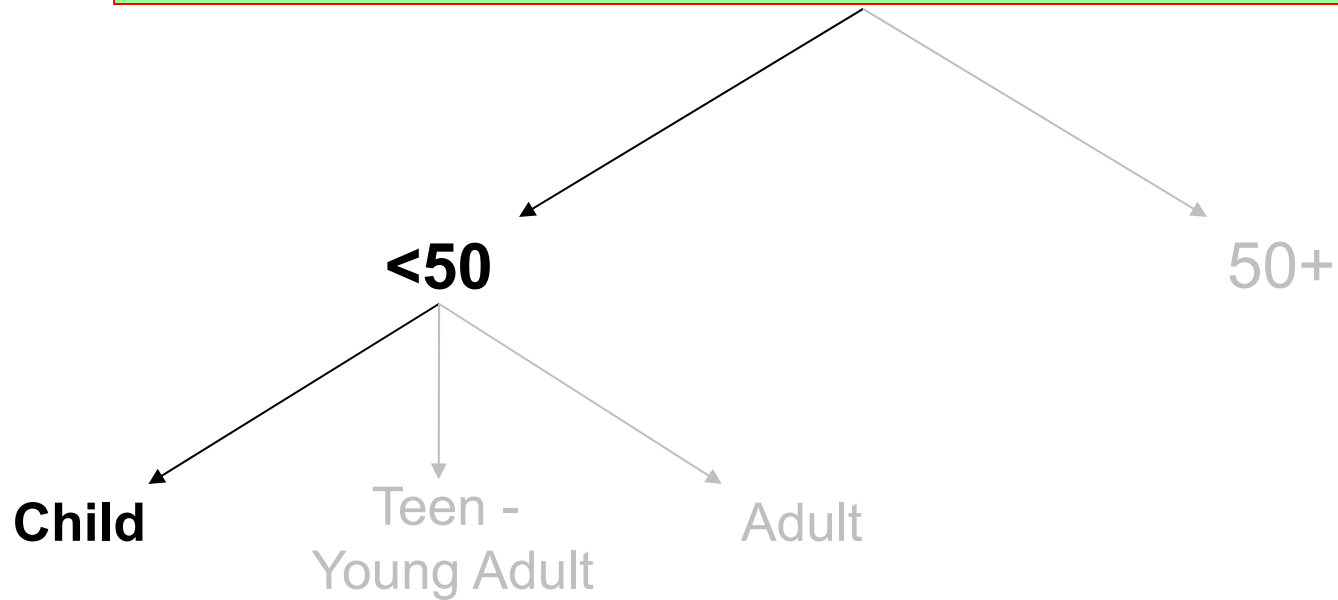
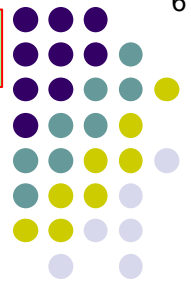
What is the most common cause of isolated nontraumatic CN6 palsy in kids?
 An immunologic response to exposure to viral antigens

Exposure takes one of two forms. What are they?

- Post...infectious
- Post...vaccinal

What is the clinical course of post-viral CN6 palsy?
 It resolves in weeks to months

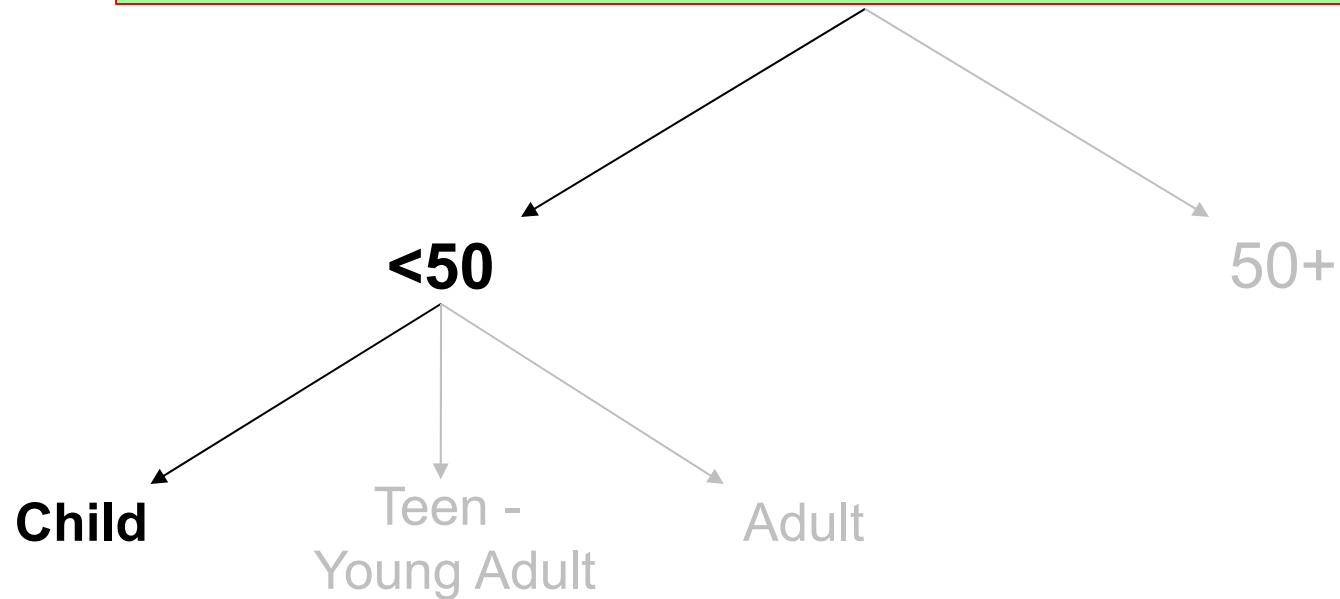
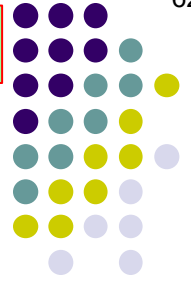
Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Still childhood...

After post-viral, what is the next most common cause of isolated nontraumatic CN6 palsy in kids?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*

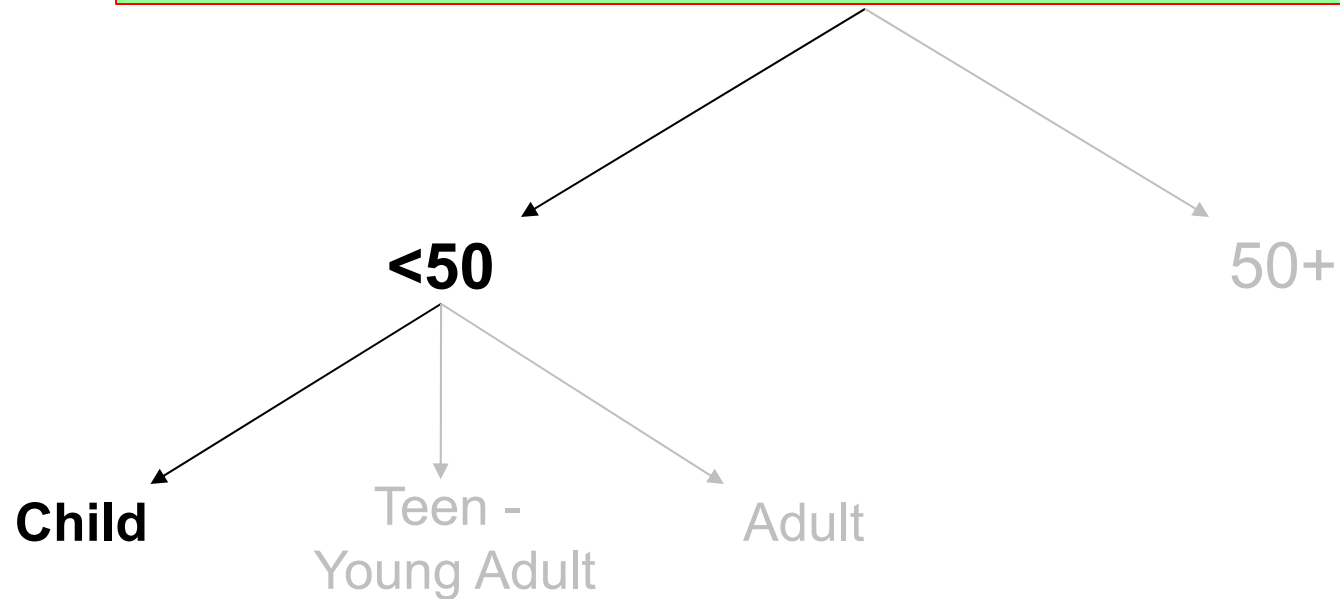
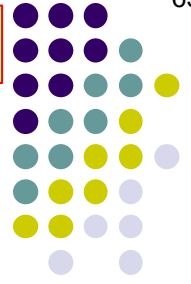


Still childhood...

After post-viral, what is the next most common cause of isolated nontraumatic CN6 palsy in kids?

Neoplasm

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



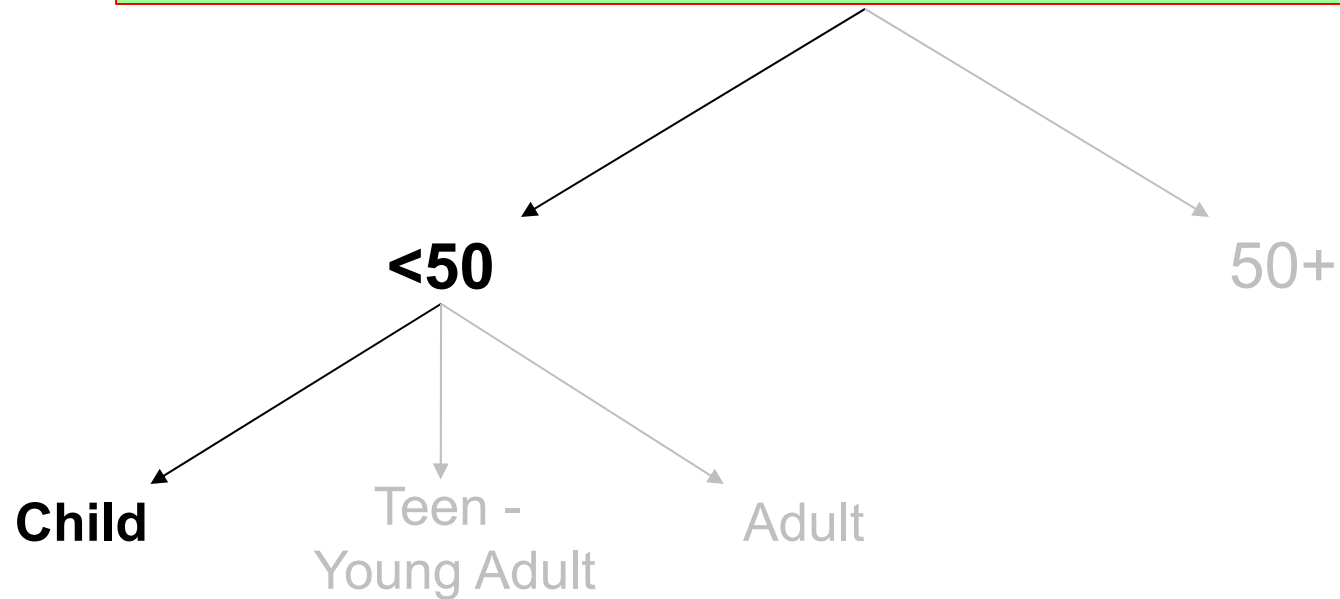
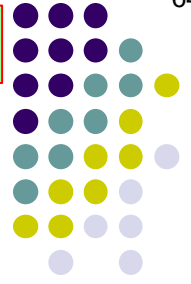
Still childhood...

After post-viral, what is the next most common cause of isolated nontraumatic CN6 palsy in kids?

Neoplasm

What sort of neoplasm is the classic cause?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Still childhood...

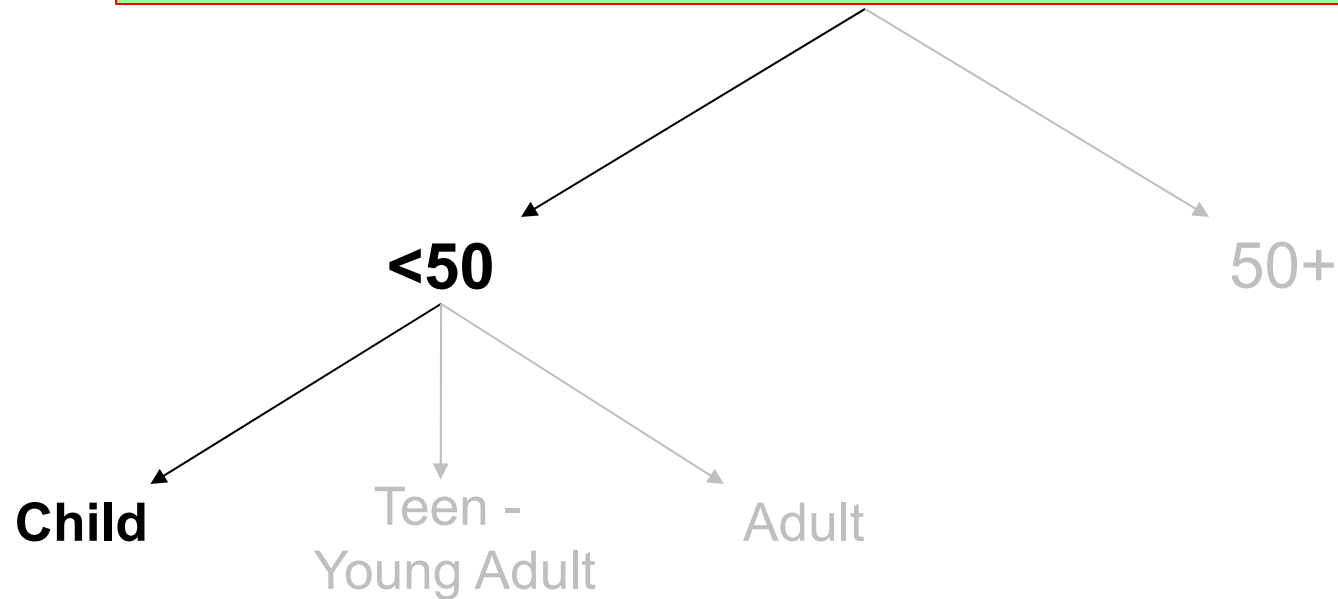
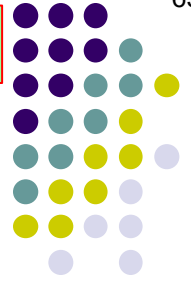
After post-viral, what is the next most common cause of isolated nontraumatic CN6 palsy in kids?

Neoplasm

What sort of neoplasm is the classic cause?

A brainstem glioma

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Still childhood...

After post-viral, what is the next most common cause of isolated nontraumatic CN6 palsy in kids?

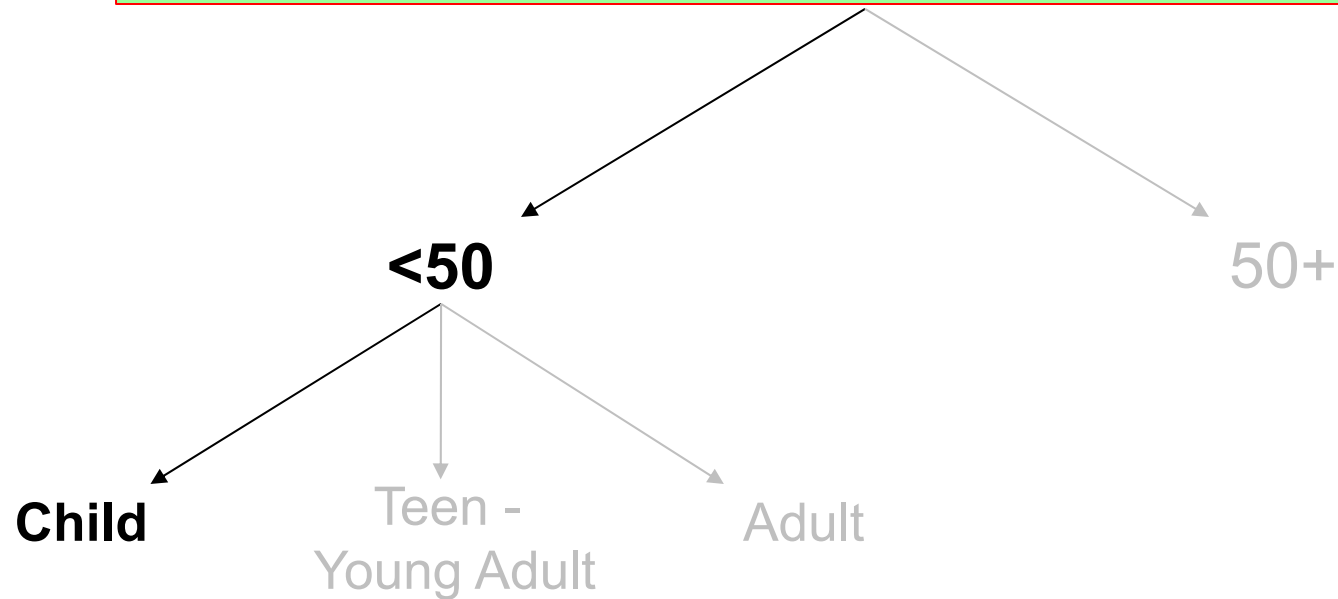
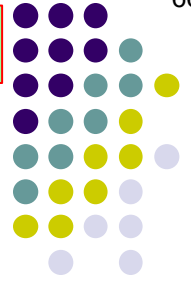
Neoplasm

What sort of neoplasm is

A **brainstem glioma**

Note: Some experts contend that, absent a history of recent vaccination or viral illness, a nontraumatic CN6 palsy in a child is a tumor until proven otherwise

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Still childhood...

After post-viral, what is the next most common cause of isolated nontraumatic CN6 palsy in kids?

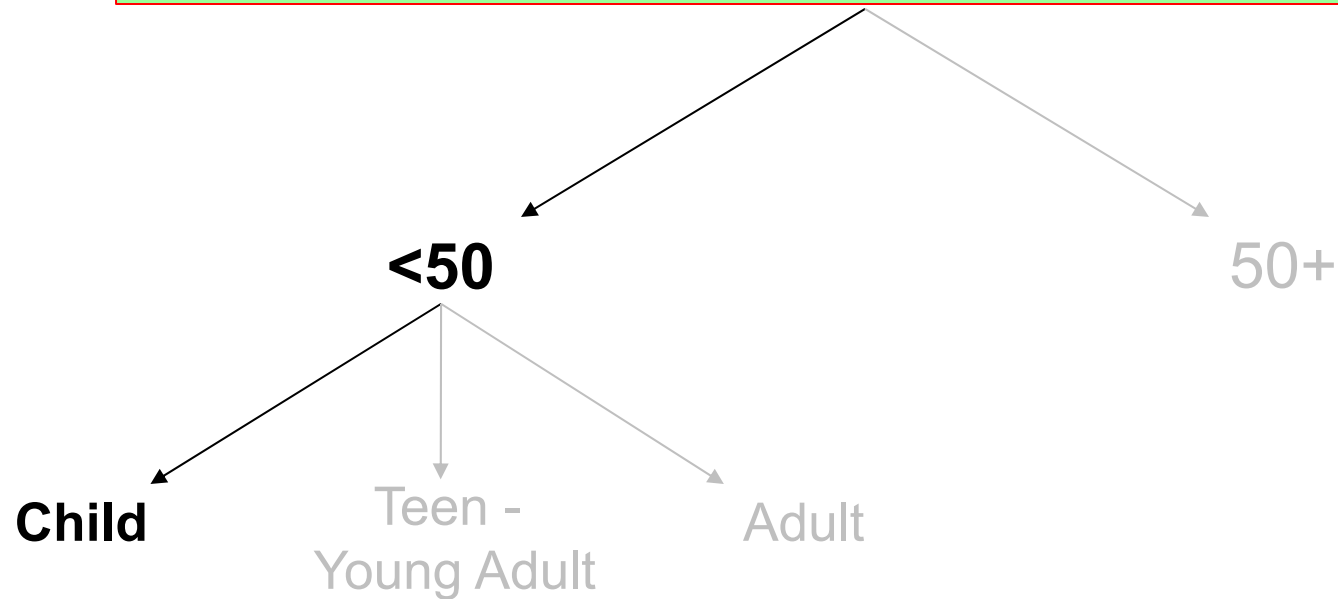
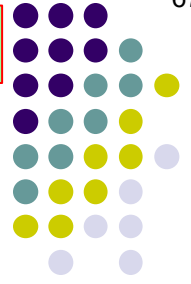
Neoplasm

What sort of neoplasm is the classic cause?

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Another sort of neoplasm must be considered. What is it?

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



Still childhood...

After post-viral, what is the next most common cause of isolated nontraumatic CN6 palsy in kids?

Neoplasm

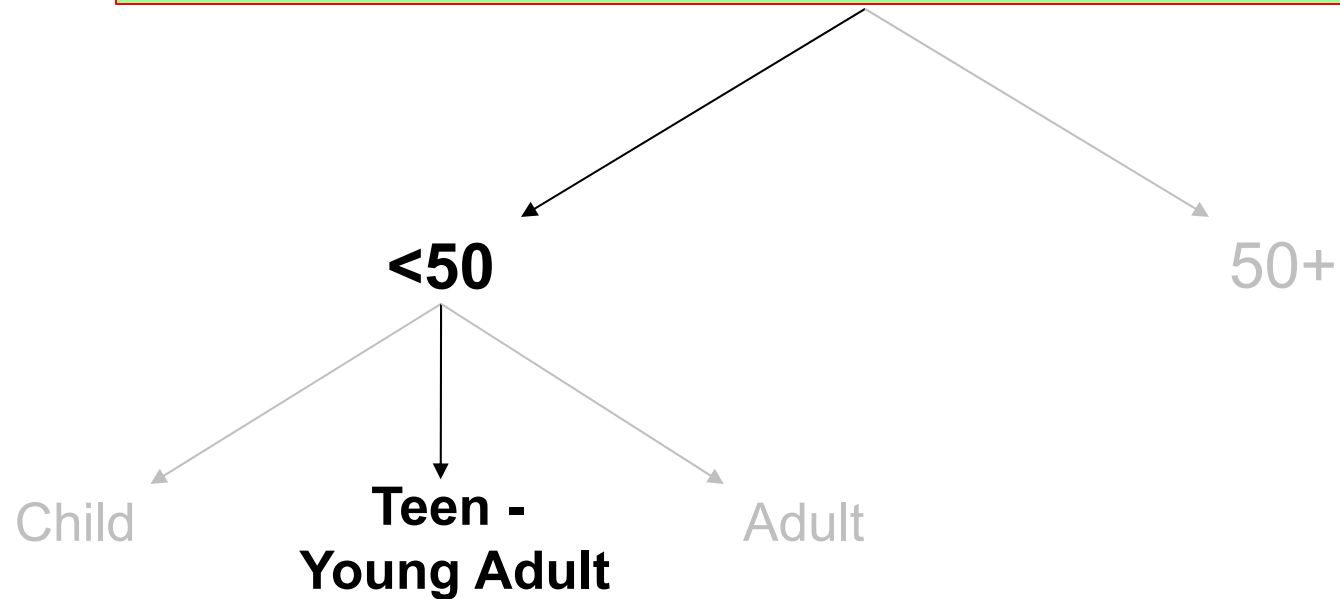
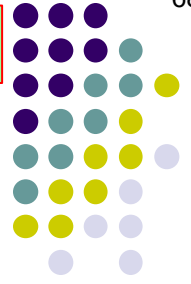
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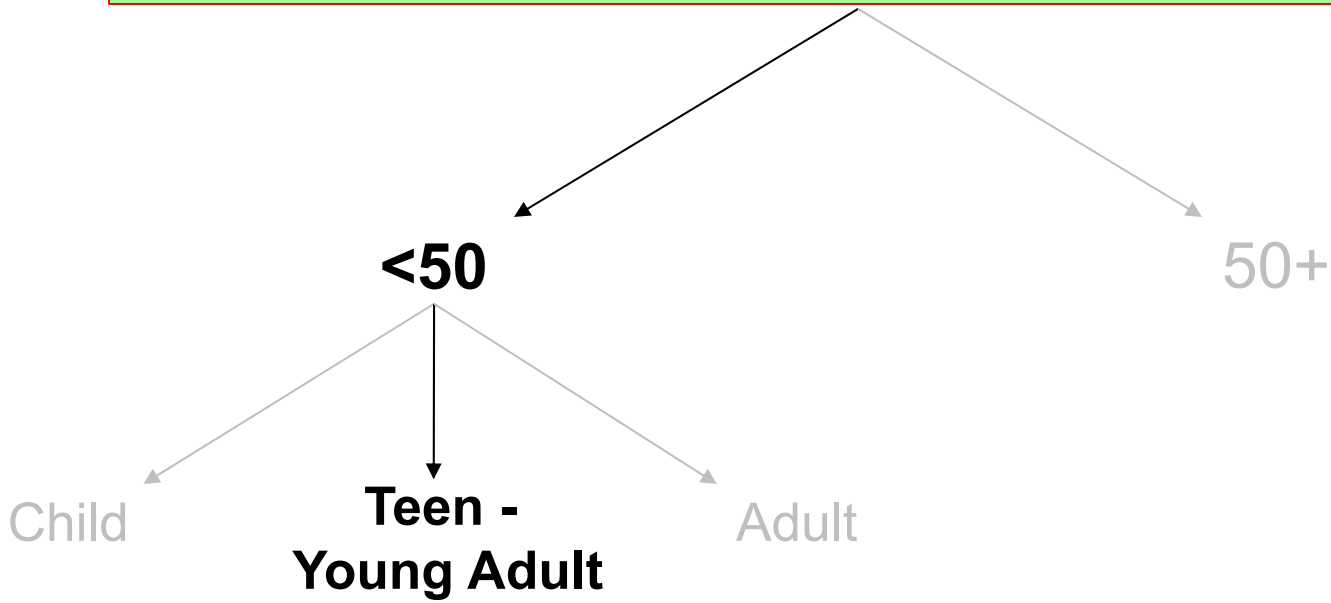
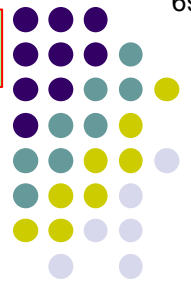
Leukemia

Motility Disorders: *Nontraumatic, Isolated, Unilateral CN6 Palsy*



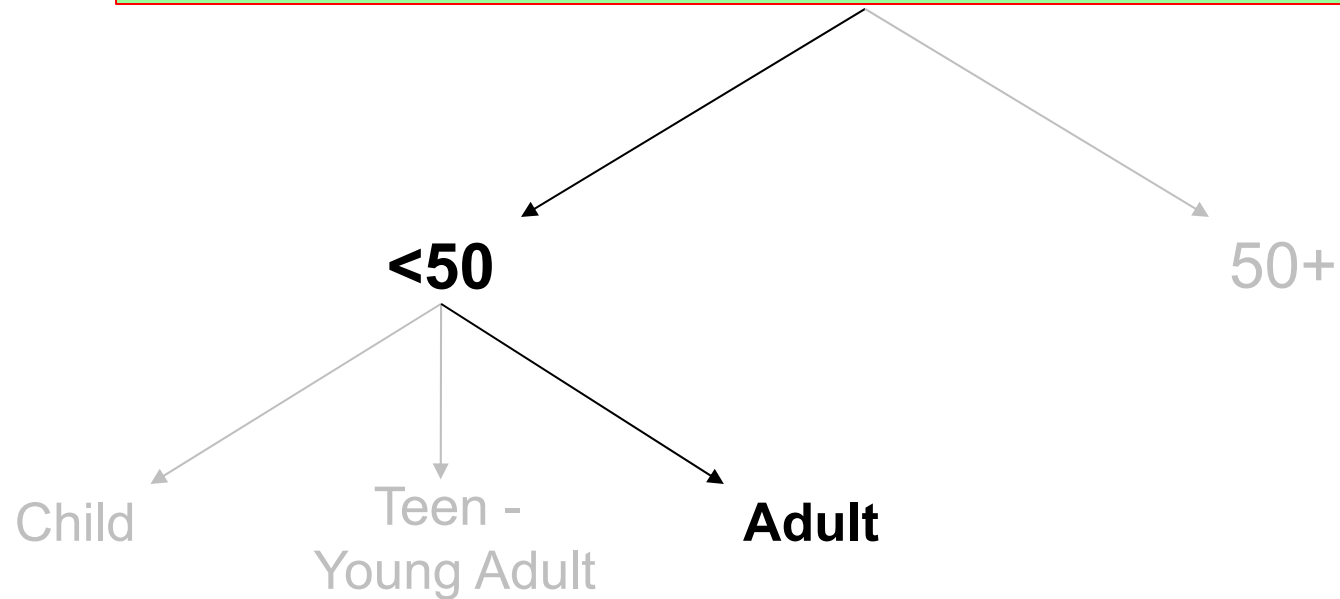
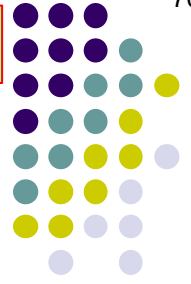
What condition should come to mind when a teen/young adult presents with an isolated unilateral CN6 palsy?

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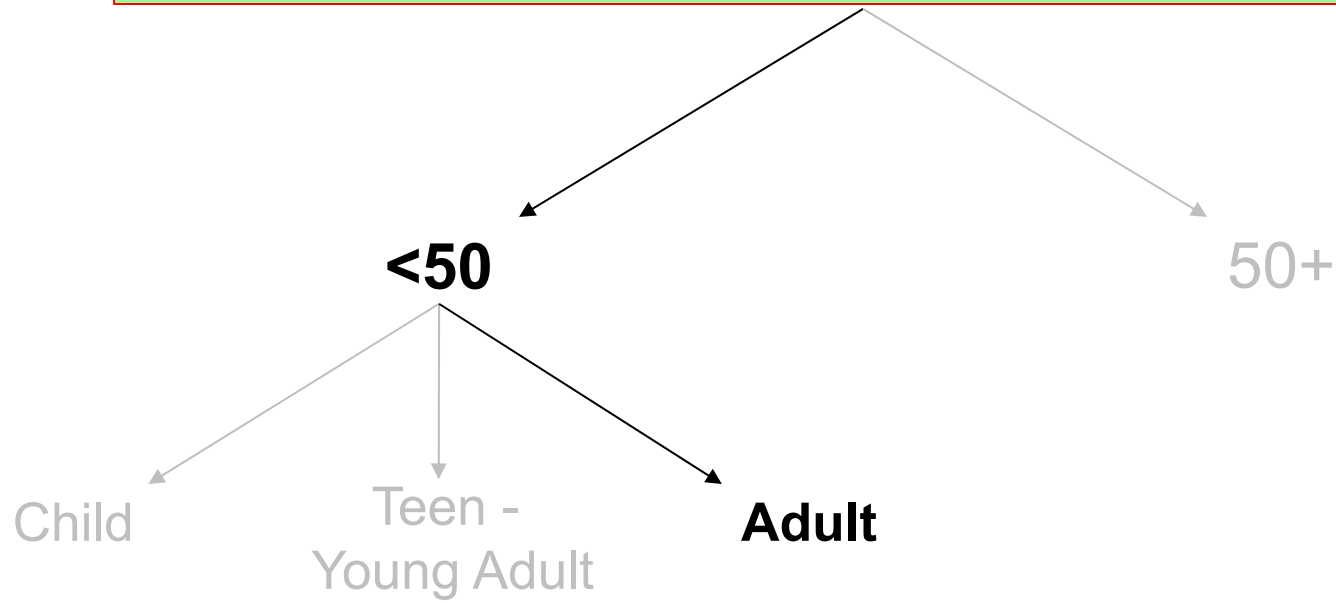
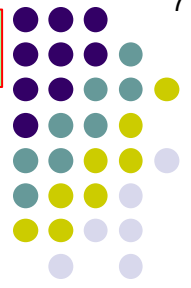
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Multiple sclerosis (MS)

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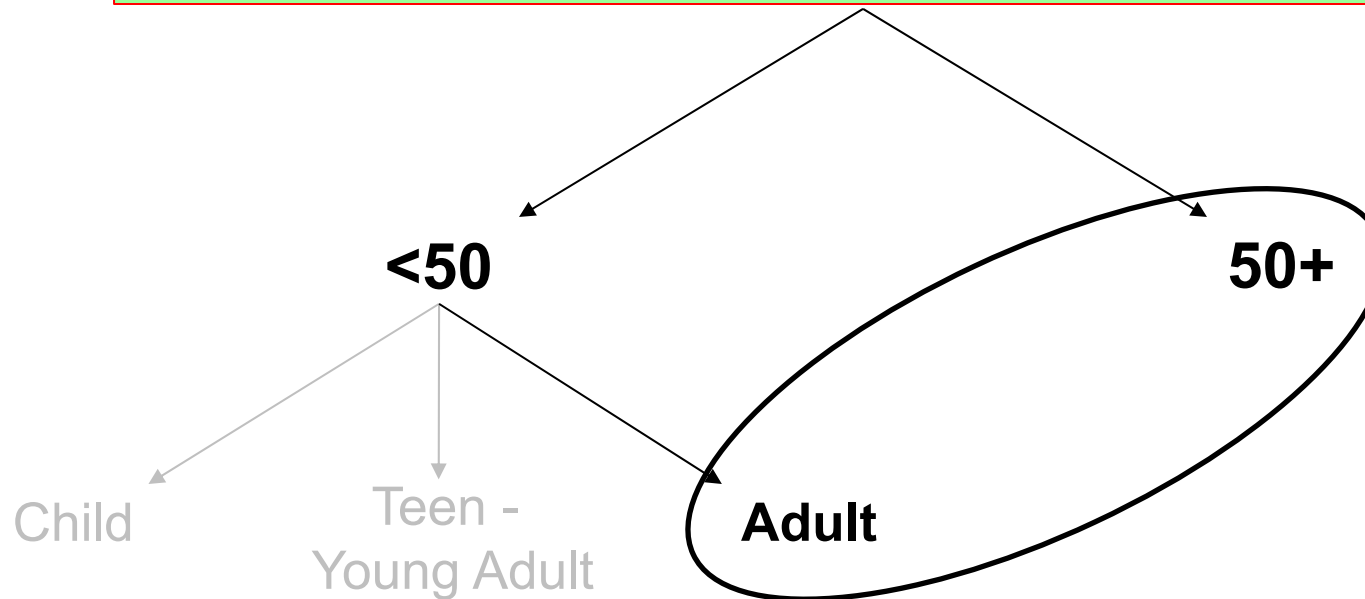
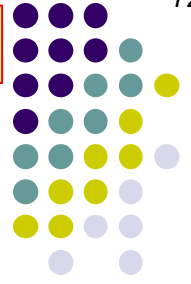
In adults too old for MS but too young for ischemic dz, what condition is most likely to present in a manner consistent with an isolated unilateral CN6 palsy?

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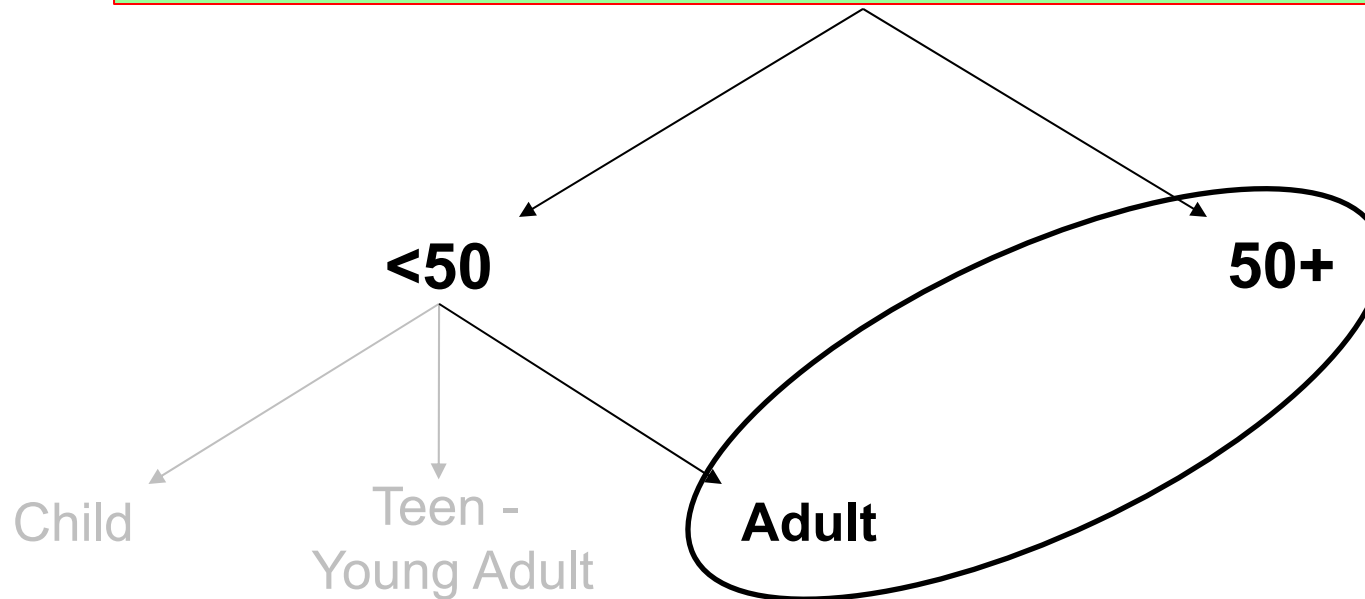
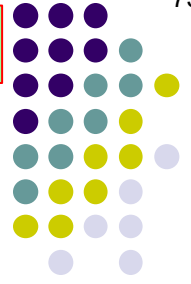
*In adults too old for MS but too young for ischemic dz, what condition is most likely to present in a manner consistent with an isolated unilateral CN6 palsy?
Myasthenia gravis (MG)*

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An uncommon cause of isolated CN6 palsy that occurs in adults has yet to be mentioned. What is it?

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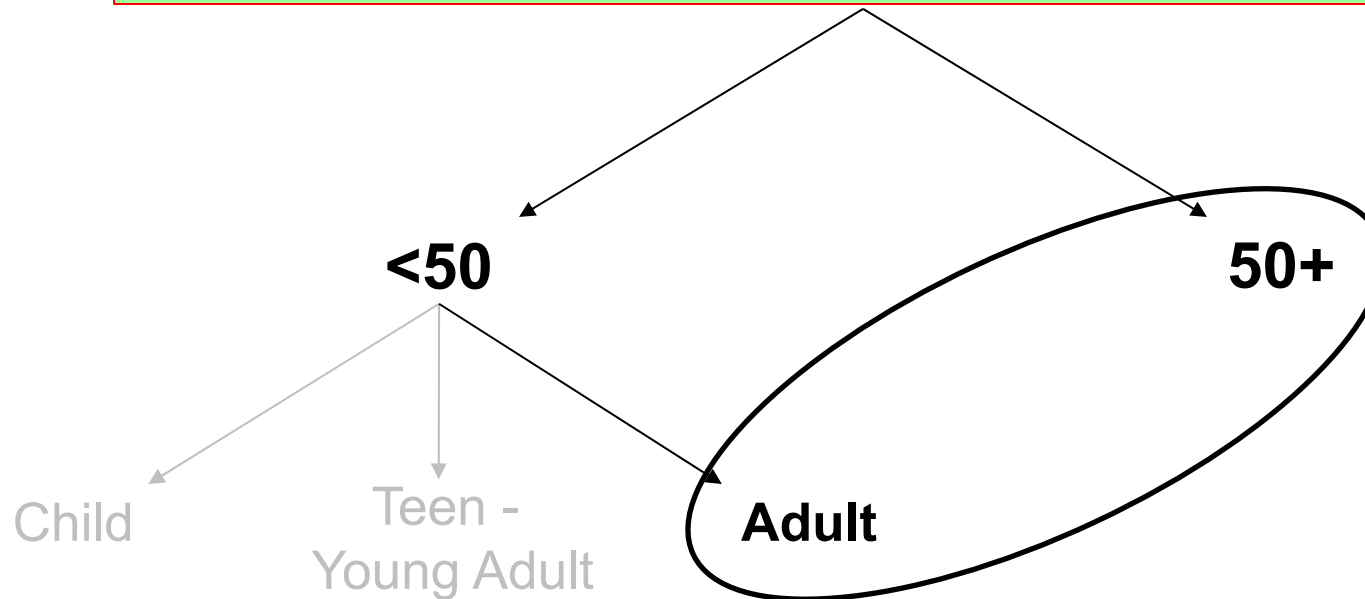
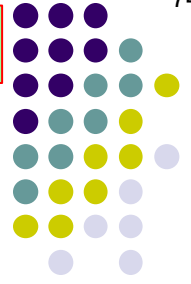


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What is it?

Carotid-cavernous sinus fistula (CCF)

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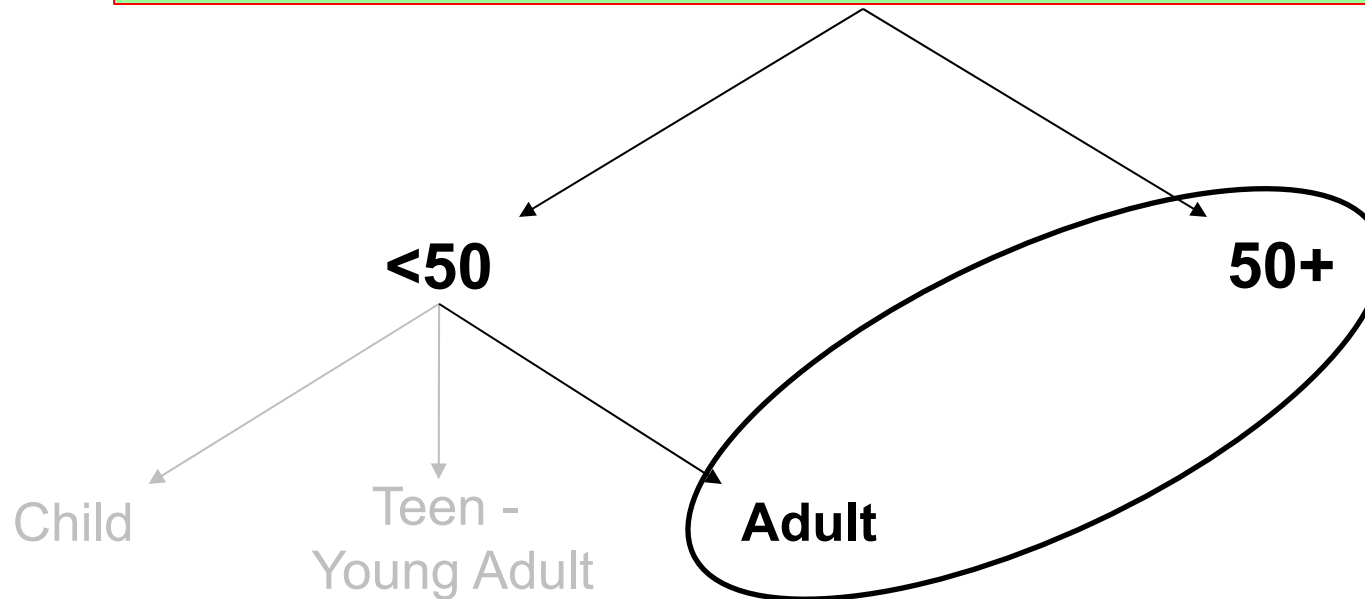
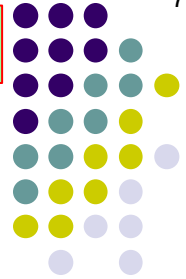


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Huh? Everyone knows CCFs cause multiple simultaneous cranial nerve problems, possibly accompanied by a Horner syndrome. How could it cause an isolated CN6?

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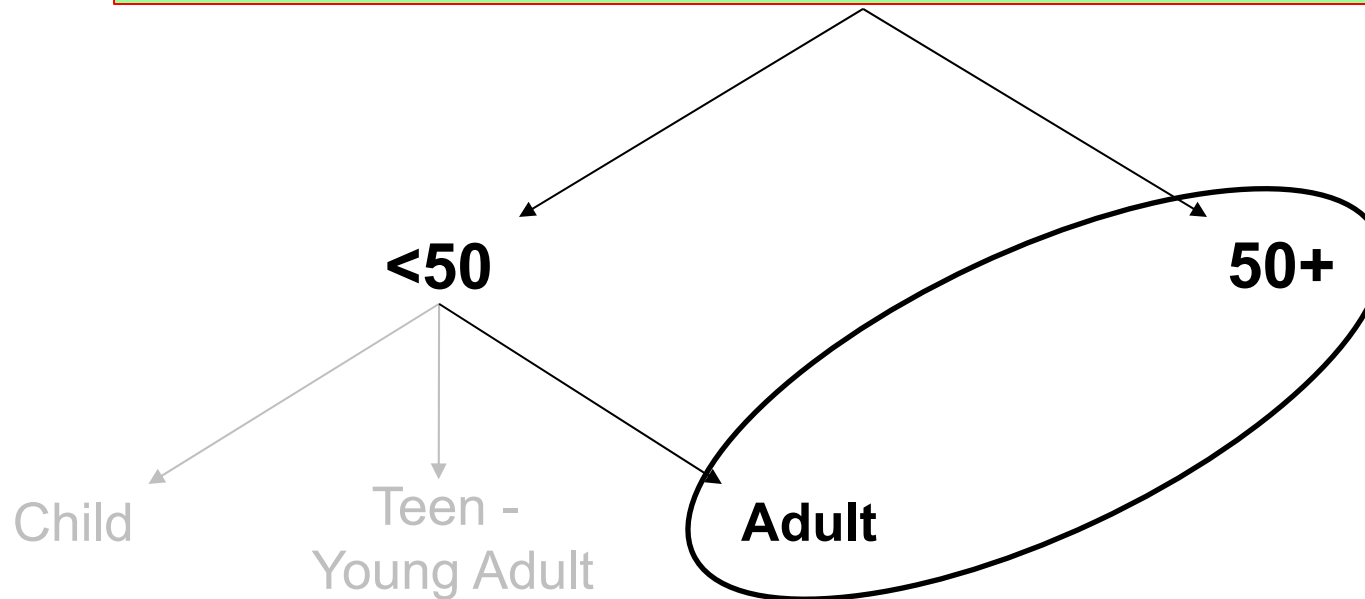
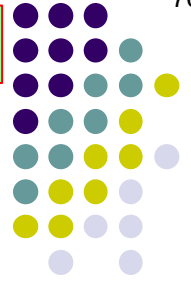
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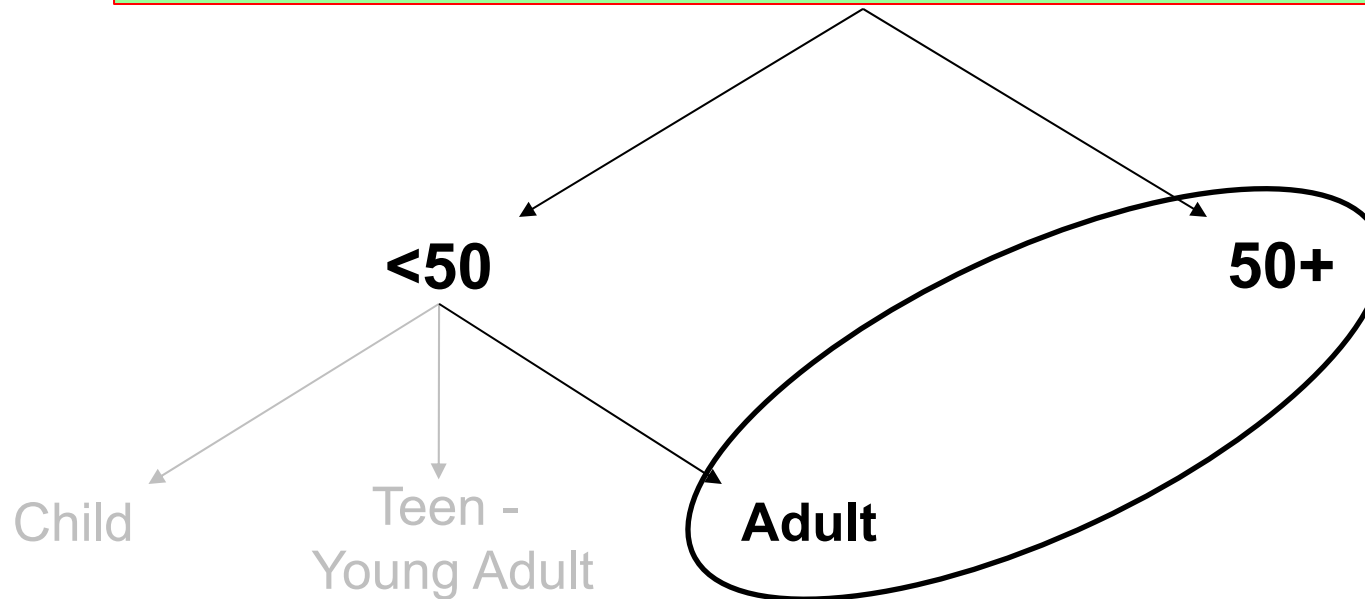
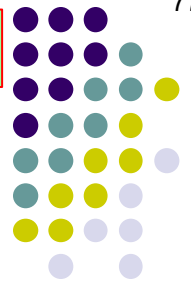


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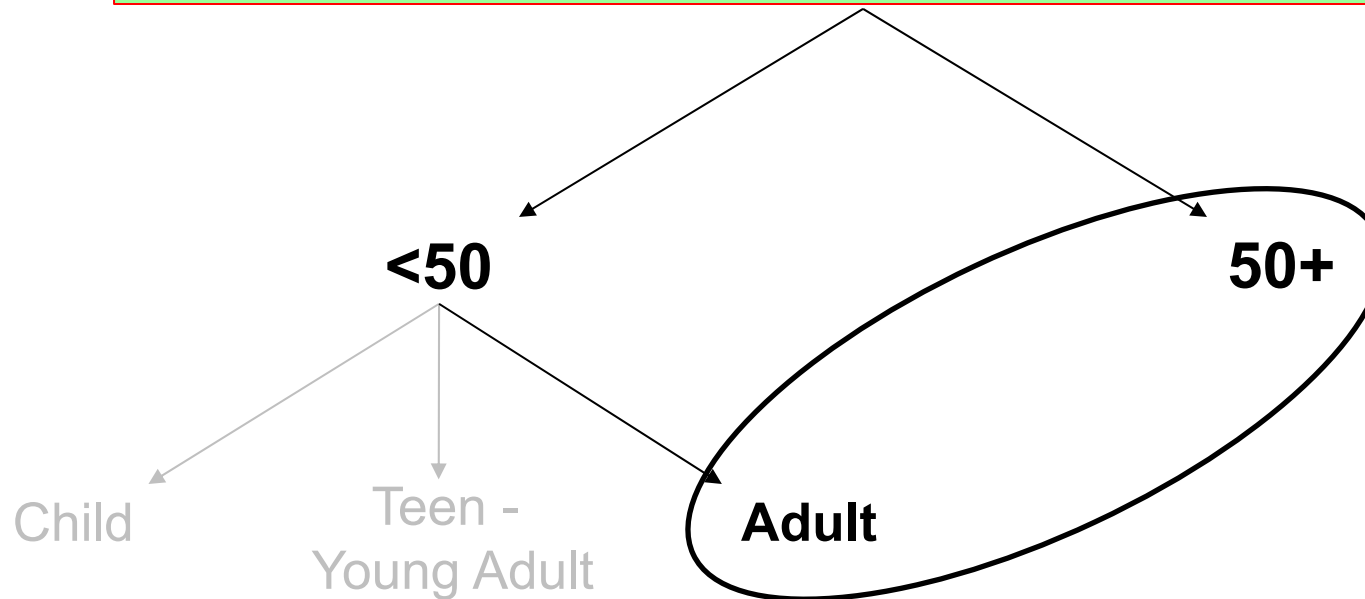
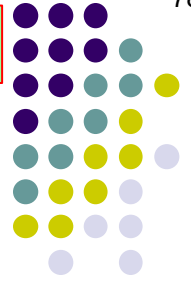


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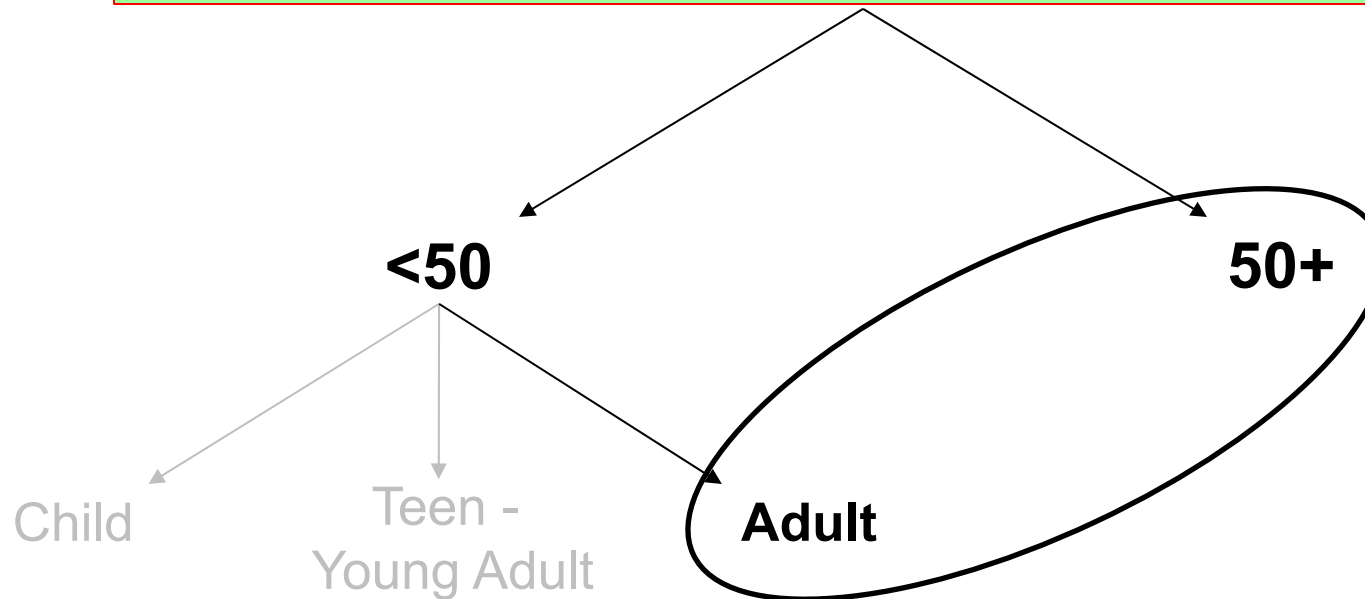
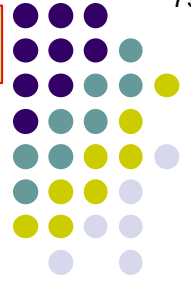


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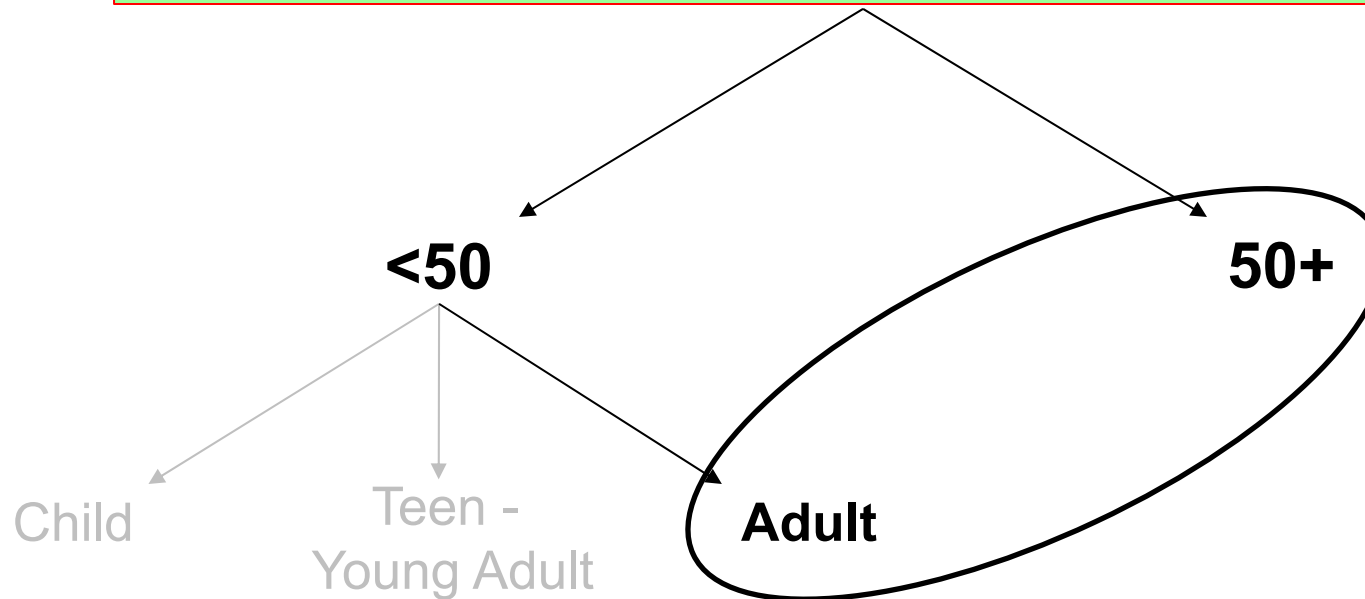


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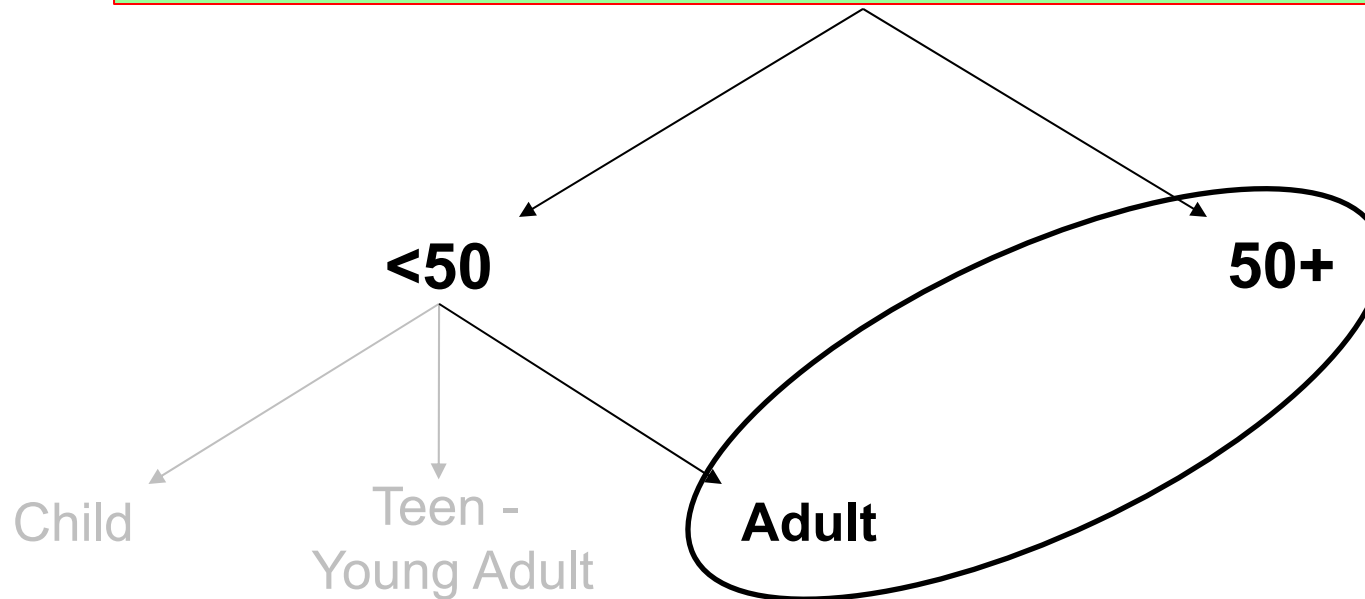
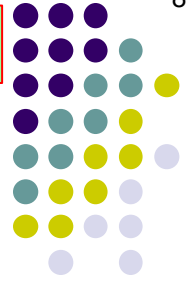


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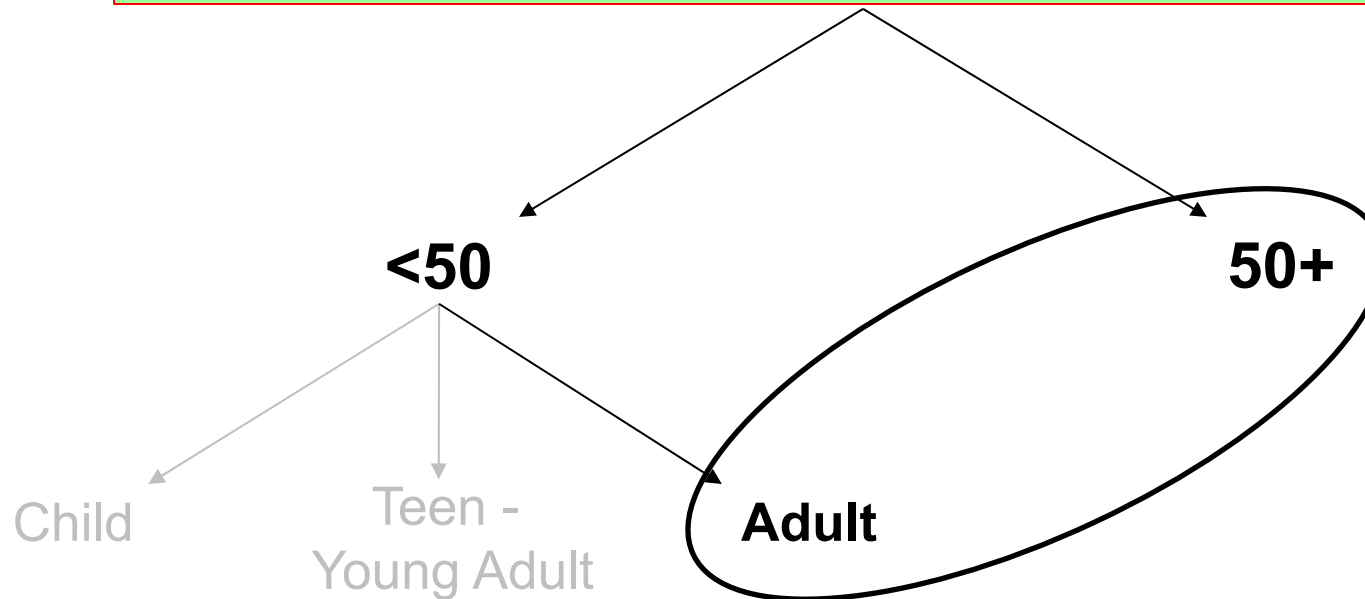
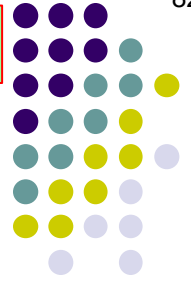
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What symptom might the pt report that should cause you to push CCF to the top of the DDX for a CN6 palsy?

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What symptom might the pt report that should cause you to push CCF to the top of the DDX for a CN6 palsy? How could it cause an isolated CN6?

Pulsatile tinnitus

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