In this context, what does the word **comitant** mean?
In this context, what does the word *comitant* mean?
It means the ET is the same in all fields of gaze
Comitant Esotropia

~50PD of comitant esotropia
In this context, what does the word **comitant** mean?
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What common cause of ET is effectively ruled out by comitancy?
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*What common cause of ET is effectively ruled out by comitancy?*
A recent-onset CN6 palsy
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What common cause of ET is effectively ruled out by comitancy?  
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Why can’t comitancy rule out an ‘old’ CN6 palsy as well?
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Because of the possibility of ‘spread of comitance’
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*What is spread of comitance?*
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What is spread of comitance?
The phenomena in which a longstanding palsy gradually transforms from incomitant to comitant
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Is there a gender predilection for comitant ET?
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There is a predilection pattern among US whites, blacks and Asians—what is it?
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Is there a gender predilection for comitant ET? No.

There is a predilection pattern among US whites, blacks and Asians—what is it? White = black > Asian.
In this context, what does the word **comitant** mean?
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What common cause of ET is effectively ruled out by comitancy?
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What is spread of comitance?
The phenomena in which a longstanding palsy gradually transforms from incomitant to comitant

Is there a gender predilection for comitant ET?
No

There **is** a predilection pattern among US whites, blacks and Asians—what is it?
White = black > Asian

Which is more common: comitant ET, or comitant XT?
In this context, what does the word **comitant** mean?
It means the ET is the same in all fields of gaze

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Is there a gender predilection for comitant ET?
No

There is a predilection pattern among US whites, blacks and Asians—what is it?
White = black > Asian

Which is more common: comitant ET, or comitant XT?
ET is significantly more common
Comitant Esotropia

Comitant esotropia

? ?

*Comitant ETs are divvied into two groups—what are they?*
Comitant Esotropia

Comitant Esotropia

Congenital

Acquired

Comitant ETs are divvied into two groups—what are they?
With regards to comitant ETs, ‘congenital’ doesn’t mean congenital, rather, it means ‘before a certain age.’ What age is used as the cutoff between congenital and acquired ETs?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With regards to comitant ETs, ‘congenital’ doesn’t mean congenital, rather, it means ‘before a certain age.’ What age is used as the cutoff between congenital and acquired ETs?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

*Why is the term congenital a misnomer here?*
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Technically, a congenital disorder must be present at birth—it can’t show up 6 months later.
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For this reason, some clinicians refer to these ETs not as ‘congenital,’ but as what?
Why is the term congenital a misnomer here? Technically, a congenital disorder must be present at birth—it can’t show up 6 months later.

For this reason, some clinicians refer to these ETs not as ‘congenital,’ but as what? Infantile esotropia.
Worried parents call your office to say they observed their two-month-old child’s eyes cross briefly. Should you be concerned?
Worried parents call your office to say they observed their two-month-old child’s eyes cross briefly. Should you be concerned?
Not necessarily. Brief strabismic episodes are commonly seen in the first few months of life. Tell them it’s probably nothing, but to keep an eye on it (so to speak).
Comitant Esotropia

Comitant esotropia

- Congenital (onset < age 6 m)
- Acquired (onset > age 6 m)

Worried parents call your office to say they observed their two-month-old child’s eyes cross briefly. Should you be concerned?
Not necessarily. Brief strabismic episodes are commonly seen in the first few months of life. Tell them it’s probably nothing, but to keep an eye on it (so to speak).

They call back a week later to report they observed his eyes “turning out [going XT] for a second.” As this represented a change from the transient ET they saw previously, they were concerned. Should you be?
Worried parents call your office to say they observed their two-month-old child’s eyes cross briefly. Should you be concerned?
Not necessarily. Brief strabismic episodes are commonly seen in the first few months of life. Tell them it’s probably nothing, but to keep an eye on it (so to speak).

They call back a week later to report they observed his eyes “turning out [going XT] for a second.” As this represented a change from the transient ET they saw previously, they were concerned. Should you be?
Probably not. It’s not uncommon for the same infant to display brief episodes of both ET and XT (it’s referred to as ocular instability of infancy).
Given that episodic strabismus is common in infancy, at what should make you worry that the infant has a congenital ET?
If the ET is…
--
--
--
…it probably represents a congenital ET needing treatment
Given that episodic strabismus is common in infancy, at what **should** make you worry that the infant has a congenital ET?

If the ET is…

--present after age # months;
--constant; and
--large (defined as greater than #Δ),

…it probably represents a congenital ET needing treatment
Given that episodic strabismus is common in infancy, at what **should** make you worry that the infant has a congenital ET?

If the ET is…
--present after age  2 months;
--constant; and
--large (defined as greater than  30Δ ),

...it probably represents a congenital ET needing treatment
Congenital ET puts the infant at significant risk of suffering what (very broad) category of non-ophthalmic disease as an adult?
Congenital ET puts the infant at significant risk of suffering what (very broad) category of non-ophthalmic disease as an adult?
Mental illness. Congenital ET confers a risk ratio of 2.6! (How or why, I have no idea).
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Two basic forms of congenital ET

?  ?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Two basic forms of congenital ET

With Nystagmus  Without Nystagmus
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

With Nystagmus

Nystagmus blockage syndrome
--Arises in pts with...[a nystagmus syndrome]

Latent nystagmus
Ciancia syndrome
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Nystagmus blockage syndrome
--Arises in pts with…congenital motor nystagmus (CMN)

Nystagmus blockage syndrome

- Latent nystagmus
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Nystagmus blockage syndrome
Briefly, what is congenital motor nystagmus?

Concomitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Nystagmus blockage syndrome
--Arises in pts with congenital motor nystagmus (CMN)

Comitant Esotropia

Ciancia syndrome
Latent nystagmus
Nystagmus blockage syndrome

Congenital motor nystagmus (CMN)

A nystagmus arising in the first few months of life that is not secondary to either sensory or CNS pathology

Is the nystagmus vertical, horizontal or both/either?

It is virtually always horizontal

Do CMN pts usually have good vision, or poor?

Good (rule of thumb: If a pt has nystagmus + good VA, it's CMN)

CMN has a unique finding related to an exam maneuver you’re familiar with but don’t perform very often. What is this finding?

A paradoxical OKN response
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Nystagmus blockage syndrome
--Arises in pts with congenital motor nystagmus (CMN)

Briefly, what is congenital motor nystagmus?
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- **Nystagmus blockage syndrome**
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**Acquired (onset > age 6 m)**

**Briefly, what is congenital motor nystagmus?**
A nystagmus arising in the first few months of life that is not secondary to either sensory or CNS pathology

*Is the nystagmus vertical, horizontal or both/either?*
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Comitant Esotropia
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Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

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Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

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What does ‘OKN’ stand for in this context?

A paradoxical OKN response
Comitant Esotropia

**Comitant esotropia**

*What does ‘OKN’ stand for in this context?*

Optokinetic nystagmus

*What does ‘OKN’ stand for in this context?*

Optokinetic nystagmus

*Don’t perform very often. What is this finding?*

A paradoxical **OKN** response
Nonrefractive  Without Nystagmus
With Nystagmus  Accommodative Refractive

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Comitant
esotropia

Ciancia syndrome
Latent nystagmus
Nystagmus blockage syndrome

Nystagmus blockage syndrome
--Arises in pts with…
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--Key exam finding: Pt  'eats up'  prism when deviation is being measured

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CMN has a unique finding related to an exam maneuver you're familiar with but don't perform very often. What is this finding?
A paradoxical OKN response
What does 'OKN' stand for in this context?
Optokinetic nystagmus
To what does 'optokinetic nystagmus response' refer?
To the phenomenon in which the presentation of a series of visual stimuli moving rapidly through the visual field induces the eyes to pursue (ie, follow) a stimulus, then engage in a rapid return saccade to pick up the next stimulus
How is OKN testing performed?
Usually with an OKN drum that is spun about its axis
What is a paradoxical OKN response?
A phenomenon that occurs when a CMN pt is presented with an OKN drum spinning in the direction congruent with the pt's nystagmus. Spinning in this direction would be expected to amplify (ie, worsen) the pt's nystagmus. However, in a CMN pt the presentation of congruent OKN movement produces a dampening or even reversal of the nystagmus—hence the term paradoxical OKN response.
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Comitant esotropia

A paradoxical OKN response
Comitant Esotropia

#OldSchoolCool: OKN drum
Nonrefractive
Without Nystagmus
With Nystagmus Accommodative
Refractive
Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Comitant Esotropia

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**Nonrefractive**

**Without Nystagmus**

**With Nystagmus Accommodative Refractive**

**Congenital (onset < age 6 m) Acquired (onset > age 6 m)**

**Comitant Esotropia**

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**Ciancia syndrome**

**Latent nystagmus**

**Nystagmus blockage syndrome**

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### Nystagmus blockage syndrome

- Arises in pts with congenital motor nystagmus (CMN)
- Pt 'learns' that their nystagmus is decreased (and thus acuity is increased) when their eyes are converged
- Key exam finding: Pt 'eats up' prism when deviation is being measured

**Briefly, what is congenital motor nystagmus?**

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Optokinetic nystagmus

**To what does ‘optokinetic nystagmus response’ refer?**

To the phenomenon in which the presentation of a series of visual stimuli moving rapidly through the visual field induces the eyes to pursue (ie, follow) a stimulus, then engage in a rapid return saccade to pick up the next stimulus.

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**Nystagmus blockage syndrome**

- Arises in pts with...congenital motor nystagmus (CMN)
- Pt ‘learns’ that their nystagmus is decreased (and thus acuity is increased) when their eyes are...['direction of gaze']
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

- Nystagmus blockage syndrome
  -- Arises in pts with congenital motor nystagmus (CMN)
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- Latent nystagmus
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Latent nystagmus
Ciancia syndrome
Comitant Esotropia

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- Latent nystagmus
- Ciancia syndrome
Without Nystagmus

With Nystagmus

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Comitant esotropia

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Nystagmus blockage syndrome

Nystagmus blockage syndrome

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What does it mean to say the pt ‘eats up’ prism?
It means that, when attempting to quantify the size of the esotropia with prisms, the clinician finds the pt needs progressively more prism to neutralize the ET.

Nystagmus blockage syndrome
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What does it mean to say the pt ‘eats up’ prism?

It means that, when attempting to quantify the size of the esotropia with prisms, the clinician finds the pt needs progressively more prism to neutralize the ET. So, eg, a child who initially requires 20PD might shortly thereafter be found to need 35, and after receiving 35 is found to need 50. (You can see how such a child is being said to ‘eat up’ prism.)

Why do NBS pts eat up prism?

Recall we said these pts often see better in the converged state, and that this improvement in VA is why their visual system adopts an esotropic orientation in the first place. Apparently, if their ET is neutralized with prism, this short-circuits the VA benefit they gained from converging. Thus, if their ET is neutralized with prism, re-acquiring improved VA requires the system to crank in even more convergence, and thus the child becomes clinically more esotropic. And if/when that ET is neutralized, the child will crank in even more convergence. In this manner the prism gets ‘eaten up.’
**Comitant Esotropia**

*What does it mean to say the pt ‘eats up’ prism?*
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*Why do NBS pts eat up prism?*

---

**With Nystagmus**

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**Nystagmus blockage syndrome**

- Latent nystagmus
- Ciancia syndrome
**Comitant Esotropia**

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--Key exam finding: **Pt ‘eats up’ prism** when deviation is being measured

**Nystagmus blockage syndrome**

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Comitant Esotropia

What does it mean to say the pt ‘eats up’ prism?
It means that, when attempting to quantify the size of the esotropia with prisms, the clinician finds the pt needs progressively more prism to neutralize the ET. So, eg, a child who initially requires 20PD might shortly thereafter be found to need 35, and after receiving 35 is found to need 50. (You can see how such a child is being said to ‘eat up’ prism.)

Why do NBS pts eat up prism?
Recall we said these pts often see better in the converged state, and that this improvement in VA is why their visual system adopts an esotropic orientation in the first place. Apparently, if their ET is neutralized with prism, this short-circuits the VA benefit they gained from converging. Thus, if their ET is neutralized with prism, re-acquiring improved VA requires the system to crank in even more convergence, and thus the child becomes clinically more esotropic. And if/when that ET is neutralized, the child will crank in even more convergence. In this manner the prism gets ‘et up.’

Nystagmus blockage syndrome
--Pt ‘learns’ that their nystagmus is decreased (and thus acuity is increased) when their eyes are…converged
--Key exam finding: Pt ‘eats up’ prism when deviation is being measured

With Nystagmus

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Ciancia syndrome
Latent nystagmus
Nystagmus blockage syndrome
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

Latent nystagmus

--Nystagmus blockage syndrome

--Latent nystagmus

--Ciancia syndrome

Without Nystagmus

Acquired (onset > age 6 m)

Latent nystagmus

--No nystagmus when vision is… [status]
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Latent nystagmus
-- No nystagmus when vision is...binocular
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

With

Without

Nystagmus

Nystagmus

Latent nystagmus

Ciancia syndrome

Latent nystagmus

--No nystagmus when vision is...binocular

--When one eye occluded, jerk nystagmus occurs with the fast phase toward the fixating eye vs occluded eye
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Latent nystagmus
- Nystagmus blockage syndrome
- Ciancia syndrome

Latent nystagmus
-- No nystagmus when vision is...binocular
-- When one eye occluded, jerk nystagmus occurs with the fast phase toward the fixating eye
Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

Acquired (onset > age 6 m)

Latent nystagmus
-- No nystagmus when vision is… binocular
-- When one eye occluded, jerk nystagmus occurs with the fast phase toward the fixating eye

Manifest latent nystagmus
-- Sounds like an oxymoron…
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

With
Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Latent nystagmus
-- No nystagmus when vision is...binocular
-- When one eye occluded, jerk nystagmus occurs with the fast phase toward the fixating eye

Manifest latent nystagmus
-- Sounds like an oxymoron...
-- Nystagmus present when both eyes are open but one is...[temporary vision status]
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Latent nystagmus
--No nystagmus when vision is...binocular
--When one eye occluded, jerk nystagmus occurs with the fast phase toward the fixating eye

Manifest latent nystagmus
--Sounds like an oxymoron...
--Nystagmus present when both eyes are open but one is...suppressed
Comitant Esotropia

Congenital (onset < age 6 m)  
\- With Nystagmus  
\- Without Nystagmus  
\- Latent nystagmus

Acquired (onset > age 6 m)  
\- Nystagmus blockage syndrome

\- Latent nystagmus

\- Ciancia syndrome

\- Manifest latent nystagmus

\- Nystagmus present when both eyes are open but one is suppressed

\- No nystagmus when vision is binocular

\- When one eye occluded, jerk nystagmus occurs with the fast phase toward the fixating eye

Latent nystagmus and manifest latent nystagmus are sometimes referred to by what single name?
Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Latent nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Latent nystagmus and manifest latent nystagmus are sometimes referred to by what single name?
Fusion maldevelopment nystagmus syndrome (FMNS)

Latent nystagmus

- No nystagmus when vision is binocular
- When one eye is occluded, nystagmus occurs with the fast phase toward the fixating eye

Manifest latent nystagmus

- Sounds like an oxymoron...
- Nystagmus present when both eyes are open but one is... suppressed
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus

- Ciancia syndrome

Ciancia syndrome
-- Deviation tends to be… [magnitude]

Without Nystagmus

Acquired (onset > age 6 m)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Without Nystagmus

With Nystagmus

Ciancia syndrome

--Deviation tends to be…very large

Acquired (onset > age 6 m)

Without Nystagmus

With Nystagmus

Ciancia syndrome

--Nystagmus blockage syndrome

--Latent nystagmus
Comitant Esotropia

Ciancia syndrome
Without Nystagmus

With Nystagmus

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Ciancia syndrome
-- Deviation tends to be... very large

How large is 'very large'?
Comitant Esotropia

Congenital (onset < age 6 m)

- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome

- Without Nystagmus

Acquired (onset > age 6 m)

- Ciancia syndrome
  - Deviation tends to be... very large
  - How large is 'very large'?
  - Greater than 50Δ
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus

Ciancia syndrome

-- Deviation tends to be very large
-- Nystagmus increases when the fixating eye... \([abducts vs adducts]\)
-- Nystagmus decreases when it... \([abducts vs adducts]\)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Nystagmus blockage syndrome
Latent nystagmus

Ciancia syndrome
--Deviation tends to be...very large
--Nystagmus increases when the fixating eye...abducts;
decreases when it...adducts
Comitant Esotropia

Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Nystagmus blockage syndrome
--Damped when the eyes are...converged
--Nystagmus appears upon attempted...abduction

Ciancia syndrome
--Deviation tends to be...very large
--Nystagmus increases when the fixating eye...abducts;
decreases when it...adducts
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Think of these disorders this way:
--The NBS is a type of [two words] for which the null point is located in convergence (ie, the ET is in a sense caused by the nystagmus)

---**Nystagmus blockage syndrome**
--Damped when the eyes are...converged
--Nystagmus appears upon attempted...abduction

---**Ciancia syndrome**
--Deviation tends to be...very large
--Nystagmus increases when the fixating eye...abducts; decreases when it...adducts
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these? Think of these disorders this way:
--The NBS is a type of congenital nystagmus for which the null point is located in convergence (ie, the ET is in a sense caused by the nystagmus)

Ciancia syndrome
--Deviation tends to be…very large
--Nystagmus increases when the fixating eye…abducts; decreases when it…adducts

Nystagmus blockage syndrome
--Damped when the eyes are…converged
--Nystagmus appears upon attempted…abduction
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these? Think of these disorders this way:

-- The NBS is a type of congenital nystagmus for which the null point is located in convergence (i.e., the ET is in a sense caused by the nystagmus). In contrast,

-- The Ciancia syndrome is a type of two words in which the ET just happens to be associated with a nystagmus that manifests in attempted abduction.

--- **Nystagmus blockage syndrome**
  -- Damped when the eyes are...converged
  -- **Nystagmus appears upon attempted**...abduction

--- **Ciancia syndrome**
  -- Deviation tends to be...very large
  -- **Nystagmus increases when the fixating eye**...abducts;
  decreases when it...adducts

--- **Comitant Esotropia**
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these? Think of these disorders this way:
--The NBS is a type of congenital nystagmus for which the null point is located in convergence (ie, the ET is in a sense caused by the nystagmus). In contrast,
--The Ciancia syndrome is a type of congenital esotropia in which the ET just happens to be associated with a nystagmus that manifests in attempted abduction.
Nystagmus blockage syndrome
--Damped when the eyes are...converged
--Nystagmus appears upon attempted...abduction

Ciancia syndrome
--Deviation tends to be...very large
--Nystagmus increases when the fixating eye...abducts;
decreases when it...adducts

Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?
Think of these disorders this way:
--The NBS is a type of congenital nystagmus for which the null point is located in convergence (i.e., the ET is in a sense caused by the nystagmus). In contrast,
--The Ciancia syndrome is a type of congenital esotropia in which the ET just happens to be associated with a nystagmus that manifests in attempted abduction.

So, NBS is a congenital nystagmus pretending to be a congenital esotropia, whereas Ciancia syndrome is a congenital esotropia with an overlay of congenital nystagmus.
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Think of these disorders this way:

--The NBS is a type of congenital nystagmus for which the null point is located in convergence (i.e., the ET is in a sense caused by the nystagmus). In contrast,

--The Ciancia syndrome happens to be associated with ET.

What is a null point?

Nystagmus blockage syndrome

--Damped when the eyes are...converged

--Nystagmus appears upon attempted...abduction

Ciancia syndrome

--Deviation tends to be...very large

--Nystagmus increases when the fixating eye...abducts; decreases when it...adducts
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Think of these disorders this way:

--The NBS is a type of congenital nystagmus for which the null point is located in convergence (i.e., the ET is in a sense caused by the nystagmus). In contrast,
--The Ciancia syndrome happens to be associated with a nystagmus that manifests in attempted abduction.

What is a null point?
A direction of gaze in which the intensity of the nystagmus is minimized.

Nystagmus blockage syndrome
--Damped when the eyes are...converged
--Nystagmus appears upon attempted...abduction

Ciancia syndrome
--Deviation tends to be...very large
--Nystagmus increases when the fixating eye...abducts; decreases when it...adducts

Comitant Esotropia
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these? Think of these disorders this way:

--The NBS is a type of congenital nystagmus for which the null point is located in convergence (ie, the ET is in a sense caused by the nystagmus). In contrast,

Given that the ET in NBS stems from convergence, what other signs **may** be present to clue you in that you’re dealing with NBS and not Ciancia syndrome?

- Nystagmus blockage syndrome
  --Damped when the eyes are...converged
  --Nystagmus appears upon attempted...abduction

- Latent nystagmus

- Ciancia syndrome
  --Deviation tends to be...very large
  --Nystagmus increases when the fixating eye...abducts; decreases when it...adducts
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Think of these disorders this way:

--The NBS is a type of congenital nystagmus for which the null point is located in convergence (ie, the ET is in a sense caused by the nystagmus). In contrast,

Given that the ET in NBS stems from convergence, what other signs **may** be present to clue you in that you’re dealing with NBS and not Ciancia syndrome?

- Pupillary constriction **may** accompany the convergence

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

**Ciancia syndrome**

--Deviation tends to be...very large

--Nystagmus increases when the fixating eye...abducts; decreases when it...adducts
**Comitant Esotropia**

Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Think of these disorders this way:

--The NBS is a type of congenital nystagmus for which the null point is located in convergence (ie, the ET is in a sense *caused* by the nystagmus). In contrast,

*Given that the ET in NBS stems from convergence, what other signs **may** be present to clue you in that you’re dealing with NBS and not Ciancia syndrome?*

- Pupillary constriction **may** accompany the convergence

**May**? Why the hedging?

--Damped when the eyes are...converged

---**Nystagmus appears upon attempted...abduction**

---Nystagmus blockage syndrome

---Latent nystagmus

---Ciancia syndrome

---Ciancia syndrome

--Deviations tend to be...very large

---**Nystagmus increases when the fixating eye...abducts**;

---decreases when it...adducts
Comitant Esotropia

Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Think of these disorders this way:

--The NBS is a type of congenital nystagmus for which the null point is located in convergence (i.e., the ET is in a sense caused by the nystagmus). In contrast,

**Given that the ET in NBS stems from convergence, what other signs **may** be present to clue you in that you’re dealing with NBS and not Ciancia syndrome?**

- Pupillary constriction **may** accompany the convergence

**May**? Why the hedging?
Some infants with NBS ‘learn’ to decouple their near-response triad, so miosis (as well as accommodation) are not a universal finding in NBS

With Nystagmus

--Damped when the eyes are...converged

**Nystagmus appears upon attempted...abduction**

-Nystagmus blockage syndrome

Latent nystagmus

-Ciancia syndrome

--Deviation tends to be...very large

**Nystagmus increases when the fixating eye...abducts;**

decreases when it...adducts
Note that both NBS and Ciancia syndrome present with ET and nystagmus on attempted abduction. Given this, how can you differentiate between these?

Think of these disorders this way:

--The NBS is a type of congenital nystagmus for which the null point is located in convergence (i.e., the ET is in a sense caused by the nystagmus). In contrast,

--The Ciancia syndrome is a type of congenital esotropia in which the ET just happens to be associated with a nystagmus that manifests in attempted abduction.

Finally, note also that the magnitude of the ET tends to be much larger in Ciancia syndrome than the NBS. So for purposes of the Boards and/or OKAP, an infant with nystagmus and ≤35PD* of congenital ET probably has NBS, whereas an infant with nystagmus and ≥55PD of congenital ET likely has Ciancia syndrome.

*Ciancia syndrome
--Deviation tends to be...**very** large
--Nystagmus increases when the fixating eye...abducts; decreases when it...adducts

*Prior to ‘eating up prism’
Without Nystagmus

With Nystagmus

Congenital (onset < **age 6 m**)  

--- Family history usually... **[present vs absent]**

--- Nystagmus blockage syndrome

--- Latent nystagmus

--- Ciancia syndrome

Acquired (onset > **age 6 m**)  

--- Family history usually... **[present vs absent]**

--- Deviation tends to be... large

--- Cross fixation... common

--- 2/3 with concomitant... DVD and IO overaction

Management:

--- Prescribe full... cycloplegic refraction

--- Perform bilateral... MR recession

--- Best if by age... 24 months

--- If IO overaction present, consider... weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome
- Without Nystagmus

Acquired (onset > age 6 m)

**Congenital ET without nystagmus**
-- Family history usually...present

Management:
-- Prescribe full...cycloplegic refraction
-- Perform bilateral...MR recession
-- Best if by age...24 months
-- If IO overaction present, consider...weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually…present
--Deviation tends to be…[magnitude]

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Management:
--Prescribe full…cycloplegic refraction--Perform bilateral…MR recession
--Best if by age…24 months
--If IO overaction present, consider…weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large

With Nystagmus

Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Management:
--Prescribe full...cycloplegic refraction
--Perform bilateral...MR recession
--Best if by age...24 months
--If IO overaction present, consider...weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually present
--Deviation tends to be large

How large is ‘large’?

Greater than 30°
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Congenital ET without nystagmus
-- Family history usually present
-- Deviation tends to be...large

How large is ‘large’?
Greater than 30Δ
Comitant Esotropia

Congenital (onset < age 6 m)  

- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome
- Without Nystagmus

Acquired (onset > age 6 m)

Congenital ET without nystagmus

- Family history usually present
- Deviation tends to be large

If a congenital ET is subtle, what should you infer?

Management:

- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
- Best if by age 24 months
- If IO overaction present, consider weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

**Congenital ET without nystagmus**

--Family history usually...present

--Deviation tends to be...large

*If a congenital ET is subtle, what should you infer? It’s not a congenital ET* (ie, they’re not subtle)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)   Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large

If a congenital ET is subtle, what should you infer? It’s not a congenital ET (ie, they’re not subtle)

What is the exception to this?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus

--Family history usually present
--Deviation tends to be large

If a congenital ET is subtle, what should you infer?
It's not a congenital ET (ie, they're not subtle)

What is the exception to this?
ET in preemies—their congenital ET can be small-angle

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Management:
-- Prescribe full cycloplegic refraction
-- Perform bilateral MR recession
-- Best if by age 24 months
-- If IO overaction present, consider weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome
- Without Nystagmus
  - Congenital ET without nystagmus
    -- Family history usually... present
    -- Deviation tends to be... large
    -- Cross fixation... [may be present?]

Acquired (onset > age 6 m)

Management:
- Prescribe full... cycloplegic refraction
- Perform bilateral... MR recession
- Best if by age... 24 months
- If IO overaction present, consider... weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present

With Nystagmus

-Nystagmus blockage syndrome
-Latent nystagmus
-Ciancia syndrome

Management:
--Prescribe full...cycloplegic refraction
--Perform bilateral...MR recession
--Best if by age...24 months
--If IO overaction present, consider...weakening
Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus
- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

Acquired (onset > age 6 m)

Congenital ET without nystagmus
- Family history usually present
- Deviation tends to be large
- Cross fixation may be present

What does this imply about VA?

It tends to be equal OU

Is amblyopia common?
No
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present

What does this imply about VA?
It will be equal OU

With Nystagmus
--Nystagmus blockage syndrome
--Latent nystagmus
--Ciancia syndrome
Comitant esotropia

Congenital (onset < \text{age 6 m})
   - With Nystagmus
     - Nystagmus blockage syndrome
     - Latent nystagmus
     - Ciancia syndrome
   - Without Nystagmus
     - Congenital ET without nystagmus
       -- Family history usually...present
       -- Deviation tends to be...large
       -- Cross fixation...may be present

Acquired (onset > \text{age 6 m})

Management:
-- Prescribe full...cycloplegic refraction
-- Perform bilateral...MR recession
-- Best if by age...24 months
-- If IO overaction present, consider...weakening

What does this imply about VA?
It will be \textbf{equal OU}

What exam finding is key to determining whether the infant's vision is equal bilaterally?
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Congenital ET without nystagmus
-- Family history usually… present
-- Deviation tends to be… large
-- Cross fixation… may be present

What does this imply about VA?
It will be equal OU

What exam finding is key to determining whether the infant’s vision is equal bilaterally?
If it isn’t, the infant will display a [  ] for the better-seeing eye
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus

--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present

What does this imply about VA?
It will be equal OU

What exam finding is key to determining whether the infant’s vision is equal bilaterally?
If it isn’t, the infant will display a gaze preference for the better-seeing eye.
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually…present
--Deviation tends to be…large
--Cross fixation…may be present

What does this imply about VA?
It will be equal OU

Is amblyopia common?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually…present
--Deviation tends to be…large
--Cross fixation…may be present

What does this imply about VA?
It will be equal OU

Is amblyopia common?
Yes
Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
    - Nystagmus
    - Latent nystagmus
    - Ciancia syndrome
  - Without Nystagmus
    - Congenital ET without nystagmus
      -- Family history usually present
      -- Deviation tends to be large
      -- Cross fixation may be present
    - Comitant esotropia

- Acquired (onset > age 6 m)
  - Latent nystagmus
  - Nystagmus blockage syndrome

If amblyopia is present,
--- will vision be equal OU?
---...

What does this imply about VA?
--- is amblyopia common?
---...

If amblyopia is present:
--- will vision be equal OU?
---...

--- Is amblyopia common?
Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

Without Nystagmus

---Nystagmus
---Latent nystagmus
---Ciancia syndrome

Acquired (onset > age 6 m)

Congenital ET without nystagmus
---Family history usually…present
---Deviation tends to be…large
---Cross fixation…may be present

If amblyopia is present:
---will vision be equal OU? No

Yes

Is amblyopia common?

No

If amblyopia is present:
---will vision be equal OU? No

What does this imply about VA?
It tends to be equal OU?

Yes

No

Is amblyopia common?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present

If amblyopia is present:
--will vision be equal OU? No
--Will a gaze preference be present?

Is amblyopia common?

Yes

Best if by age...24 months

If IO overaction present, consider...weakening
Comitant esotropia

Congenital (onset < age 6 m)

- With Nystagmus
  - Nystagmus
  - Latent nystagmus
  - Ciancia syndrome

Without Nystagmus

- Congenital ET without nystagmus
  - Family history usually present
  - Deviation tends to be large
  - Cross fixation may be present

Acquired (onset > age 6 m)

Management:
- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
- Best if by age 24 months
- If IO overaction present, consider weakening

If amblyopia is present:
- Will vision be equal OU? No
- Will a gaze preference be present? Yes

- Is amblyopia common?
  - Yes

What does this imply about VA?
- It tends to be equal OU?
- No

Is amblyopia common?
- Yes
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

**Congenital ET without nystagmus**
-- Family history usually... present
-- Deviation tends to be... large
-- Cross fixation... may be present
-- 2/3 with concomitant... [strabismic conditions]
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Without Nystagmus

With Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present
--2/3 with concomitant...DVD and IO overaction

Acquired (onset > age 6 m)

Ciancia syndrome
Latent nystagmus
Nystagmus blockage syndrome

Management:
--Prescribe full...cycloplegic refraction
--Perform bilateral...MR recession
--Best if by age...24 months
--If IO overaction present, consider...weakening
Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus
- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

Acquired (onset > age 6 m)

Congenital ET without nystagmus
- Family history usually present
- Deviation tends to be large
- Cross fixation may be present
- 2/3 with concomitant DVD and IO overaction

In this context, what do DVD and IO stand for?

**DVD:**

**IO:**
Comitant esotropia

Congenital (onset < age 6 m)

- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome

- Without Nystagmus

Acquired (onset > age 6 m)

Congenital ET without nystagmus
-- Family history usually present
-- Deviation tends to be large
-- Cross fixation may be present
-- 2/3 with concomitant DVD and IO overaction

In this context, what do DVD and IO stand for?

**DVD**: Dissociated vertical deviation

**IO**: Inferior oblique (muscle)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Congenital ET without nystagmus

What is the classic clinical finding in DVD?

In this context, what do DVD and IO stand for?

**DVD**: Dissociated vertical deviation

**IO**: Inferior oblique (muscle)
Comitant esotropia

- Congenital (onset < 6 months)
- Acquired (onset > 6 months)

**With Nystagmus**
- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

**Congenital ET without nystagmus**

*What is the classic clinical finding in DVD?*
An eye will slowly elevate and extort, either spontaneously (manifest DVD) or when occluded (latent DVD).

*In this context, what do DVD and IO stand for?*
- **DVD**: Dissociated vertical deviation
- **IO**: Inferior oblique (muscle)
Comitant esotropia

Congenital (onset < age 6 m)
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome
  - Congenital ET without nystagmus

Acquired (onset > age 6 m)

What is the classic clinical finding in DVD? An eye will slowly elevate and extort, either spontaneously (manifest DVD) or when occluded (latent DVD). A crucial finding occurs when the drifting eye reorients downward, and it is this—the fellow eye does not move downward simultaneously (as would normally be the case).

In this context, what do DVD and IO stand for?
- **DVD**: Dissociated vertical deviation
- **IO**: Inferior oblique (muscle)
Comitant Esotropia

**Comitant esotropia**

- **Congenital (onset < age 6 m)**
  - With Nystagmus
  - Without Nystagmus
    - Nystagmus blockage syndrome
    - Latent nystagmus
    - Ciancia syndrome
  - **Congenital ET without nystagmus**
    -- Family history usually present
    -- Deviation tends to be large
    -- Cross fixation may be present
    -- 2/3 with concomitant DVD and IO overaction

- **Acquired (onset > age 6 m)**

Management:
-- Prescribe full cycloplegic refraction
-- Perform bilateral MR recession
-- Best if by age 24 months
-- If IO overaction present, consider weakening

Both DVD and IO overaction involve elevation and extorsion. How can they be differentiated?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually…present
--Deviation tends to be…large
--Cross fixation…may be present
--2/3 with concomitant…DVD and IO overaction

Both DVD and IO overaction involve elevation and extorsion. How can they be differentiated? DVD violates Hering’s law; IO overaction doesn’t
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Congenital ET without nystagmus
--Family history usually…present
--Deviation tends to be…large
--Cross fixation…may be present
--2/3 with concomitant…DVD and IO overaction

What does this mean, exactly?

Both DVD and IO overaction involve elevation and extorsion. How can they be differentiated?

**DVD violates Hering’s law; IO overaction doesn’t**
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present
--2/3 with concomitant...DVD and IO overaction

What does this mean, exactly?
When an eye that is elevated by IO overaction depresses, the fellow eye obeys Hering’s law and depresses as well. This doesn’t happen in DVD.
Comitant esotropia

- Congenital (onset < age 6 m)
- Acquired (onset > age 6 m)

**Congenital ET without nystagmus**

---

1. Nystagmus blockage syndrome
2. Latent nystagmus
3. Ciancia syndrome

**Management:**
- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
- Best if by age 24 months
- If IO overaction present, consider weakening

Both DVD and IO overaction involve elevation and extorsion. How can they be differentiated?

- DVD violates Hering’s law; IO overaction doesn’t
- If IO overaction present, consider weakening

---

What does this mean, exactly?

When an eye that is elevated by IO overaction depresses, the fellow eye obeys Hering’s law and depresses as well. This doesn’t happen in DVD.

For more on DVD and IO overaction, see slide-set P7; for Hering’s law, see FELT3.
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present
--2/3 with concomitant...DVD and IO overaction

Management:
--Prescribe full...

With Nystagmus

Without Nystagmus

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome
<table>
<thead>
<tr>
<th>Comitant Esotropia</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>With Nystagmus</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Without Nystagmus</strong></td>
<td></td>
</tr>
<tr>
<td>Congenital (onset &lt; <strong>age 6 m</strong>)</td>
<td>Acquired (onset &gt; <strong>age 6 m</strong>)</td>
</tr>
</tbody>
</table>

### Congenital ET without Nystagmus
- Family history usually present
- Deviation tends to be...large
- Cross fixation...may be present
- 2/3 with concomitant...DVD and IO overaction

**Management:**
- Prescribe full...cycloplegic refraction

### Management:
- Prescribe full...cycloplegic refraction
- Perform bilateral...MR recession
- Best if by age...24 months
- If IO overaction present, consider...weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present
--2/3 with concomitant...DVD and IO overaction

Management:
--Prescribe full...cycloplegic refraction

Why prescribe the full CR?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Congenital ET without nystagmus
-- Family history usually...present
-- Deviation tends to be...large
-- Cross fixation...may be present
-- 2/3 with concomitant...DVD and IO overaction

Management:
-- Prescribe full...cycloplegic refraction

Why prescribe the full CR?
In case the ET has an accommodative component
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Without Nystagmus

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

Acquired (onset > age 6 m)

Congenital ET without nystagmus

- Family history usually present
- Deviation tends to be large
- Cross fixation may be present
- 2/3 with concomitant DVD and IO overaction

Management:
- Prescribe full cycloplegic refraction
- Perform bilateral [surgery]
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

**Congenital ET without nystagmus**
-- Family history usually…present
-- Deviation tends to be…large
-- Cross fixation…may be present
-- 2/3 with concomitant…DVD and IO overaction

Management:
-- Prescribe full…cycloplegic refraction
-- Perform bilateral…MR recession
Comitant esotropia

Congenital (onset < age 6 m)

Without Nystagmus
- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

With Nystagmus
- Ciancia syndrome
- Latent nystagmus
- Nystagmus blockage syndrome

Acquired (onset > age 6 m)

Congenital ET without nystagmus
-- Family history usually present
-- Deviation tends to be large
-- Cross fixation may be present
-- 2/3 with concomitant DVD and IO overaction

Management:
-- Prescribe full cycloplegic refraction
-- Perform bilateral MR recession
-- Best if by age...
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

With Nystagmus
- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

Congenital ET without nystagmus
- Family history usually present
- Deviation tends to be large
- Cross fixation may be present
- 2/3 with concomitant DVD and IO overaction

Management:
- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
- Best if by age 24 months
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Congenital ET without nystagmus
--Family history usually...present
--Deviation tends to be...large
--Cross fixation...may be present
--2/3 with concomitant...DVD and IO overaction

Management:
--Prescribe full...cycloplegic refraction
--Perform bilateral...MR recession
  --Best if by age...24 months
--If IO overaction present, consider...[surgery]
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With

Without

Nystagmus

Nystagmus

Congenital ET without nystagmus
--Family history usually…present
--Deviation tends to be…large
--Cross fixation…may be present
--2/3 with concomitant…DVD and IO overaction

Management:
--Prescribe full…cycloplegic refraction
--Perform bilateral…MR recession
  --Best if by age…24 months
--If IO overaction present, consider…weakening
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

What is the realistic goal of treatment?

Management:
- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
  - Best if by age 24 months
- If IO overaction present, consider weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus
- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Without Nystagmus

Acquired (onset > age 6 m)

What is the realistic goal of treatment?
Monofixation syndrome, or a small-angle esophoria

Management:
-- Prescribe full... cycloplegic refraction
-- Perform bilateral... MR recession
-- Best if by age... 24 months
-- If IO overaction present, consider... weakening
Comitant esotropia

Congenital (onset < age 6 m)

- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome

- Without Nystagmus

Acquired (onset > age 6 m)

What is the realistic goal of treatment?
Monofixation syndrome, or a small-angle esophoria

What about high-grade stereopsis?

Management:
- Prescribe full... cycloplegic refraction
- Perform bilateral... MR recession
  - Best if by age... 24 months
- If IO overaction present, consider... weakening
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus

Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

What is the realistic goal of treatment?
Monofixation syndrome, or a small-angle esophoria

What about high-grade stereopsis?
It’s not gonna happen

Management:
-- Prescribe full... cycloplegic refraction
-- Perform bilateral... MR recession
-- Best if by age... 24 months
-- If IO overaction present, consider... weakening
Monofixation syndrome is one of the three adaptations the immature visual system makes in response to misalignment. What are the other two?

---

- Anomalous retinal correspondence
- Monofixation syndrome

Mnemonic is…

Management:
- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
  -- Best if by age…24 months
  -- If IO overaction present, consider…weakening
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus
- Nystagmus block
- Latent nystagmus
- Ciancia syndrome

Monofixation syndrome

Management:
- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
- Best if by age...24 months
- If IO overaction present, consider...weakening

What is the realistic goal of treatment?
- Monofixation syndrome

Monofixation syndrome is one of the three adaptations the immature visual system makes in response to misalignment. What are the other two?
- SAM
- Monofixation syndrome

Mnemonic is...SAM

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Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  
- Nystagmus block
- Latent nystagmus
- Ciancia syndrome

Acquired (onset > age 6 m)

With Nystagmus

- Nystagmus block
- Latent nystagmus
- Ciancia syndrome

What is the realistic goal of treatment? Monofixation syndrome

Monofixation syndrome is one of the three adaptations the immature visual system makes in response to misalignment. What are the other two?

- Suppression
- Anomalous retinal correspondence

Mnemonic is…SAM

Management:
- Prescribe full cycloplegic refraction
- Perform bilateral MR recession
  - Best if by age…24 months
  - If IO overaction present, consider…weakening

Monofixation syndrome, or a small-angle esophoria

What about high-grade stereopsis?
It’s not gonna happen
For more on sensory responses in strabismus, see slide-set P14
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Two basic forms of acquired ET
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Two basic forms of acquired ET

Accommodative  Nonaccommodative
**Comitant Esotropia**

Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
  - Without Nystagmus

- Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative

**Accommodative**
--Onset between ages [age 6 months] and [age 7 years]; average age [age 2.5 years]
Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
  - Without Nystagmus

- Acquired (onset > age 6 m)
  - Accommodative
    -- Onset between ages 6 months and 7 years; average age 2.5 years
  - Nonaccommodative

Accommodative

Nystagmus blockage syndrome

Ciancia syndrome

Latent nystagmus

Accommodative -- Initially intermittent, eventually becoming constant -- Amblyopia is common -- c/o diplopia early, but stops after developing a facultative suppression scotoma
## Comitant Esotropia

### Comitant esotropia

- **Congenital (onset < age 6 m)**
  - With Nystagmus
  - Without Nystagmus
  - **Accommodative**
    - Onset between ages 6 months and 7 years; average age 2.5 years
    - Initially intermittent, eventually becoming constant
    - Amblyopia is common; c/o diplopia early, but stop after developing a facultative suppression scotoma

- **Acquired (onset > age 6 m)**
  - Nonaccommodative
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

Without Nystagmus

Acquired (onset > age 6 m)

Accommodative

--Onset between ages 6 months and 7 years; average age 2.5 years
--Initially intermittent, eventually becoming constant

Nonaccommodative

Accommodative syndrome

Ciancia syndrome

Latent nystagmus

Nystagmus blockage syndrome

Accommodative -- Onset between ages 6 months and 7 years; average age 2.5 years -- Initially intermittent, eventually becoming constant
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

Without Nystagmus

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Accommodative

--Onset between ages 6 months and 7 years; average age 2.5 years
--Initially intermittent, eventually becoming constant
--Amblyopia is [common vs uncommon]
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
With Nystagmus
Without Nystagmus

Acquired (onset > age 6 m)

Accommodative
Nonaccommodative

Accommodative
--Onset between ages 6 months and 7 years; average age 2.5 years
--Initially...intermittent, eventually becoming...constant
--Amblyopia is...common
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Accommodative  Nonaccommodative

Accommodative
--Onset between ages 6 months and 7 years; average age 2.5 years
--Initially...intermittent, eventually becoming...constant
--Amblyopia is...common
--c/o diplopia early, but stop after developing a...
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

Without Nystagmus

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Accommodative

--Onset between ages 6 months and 7 years; average age 2.5 years
--Initially...intermittent, eventually becoming...constant
--Amblyopia is...common
--c/o diplopia early, but stop after developing a...facultative suppression scotoma
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Accommodative
--Onset between ages 6 months
--Initially...intermittent, eventually
--Amblyopia is...common
--c/o diplopia early, but stop after developing a...facultative suppression scotoma

What is ‘suppression’ in this context?

What is ‘suppression’ in this context?

It is the prevention of an image in one eye from reaching conscious awareness.

How does the phenomenon of suppression come about?

It is one of three sensory adaptations the visual system employs to avoid the occurrence of visual confusion and/or diplopia.
Comitant Esotropia

Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
  - Without Nystagmus
- Acquired (onset > age 6 m)

What is ‘suppression’ in this context?

It is the prevention of an image in one eye from reaching conscious awareness.

Accommodative

-- Onset between ages 6 months
-- Initially...intermittent, eventually
-- Amblyopia is...common
-- c/o diplopia early, but stop after developing a...facultative suppression scotoma
Comitant esotropia

(Comitant Esotropia)

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Accommodative
--Onset between ages 6 months
--Initially...intermittent, eventually
--Amblyopia is...common
--c/o diplopia early, but stop after developing a...facultative suppression

What is ‘suppression’ in this context?
It is the prevention of an image in one eye from reaching conscious awareness

How does the phenomenon of suppression come about?

What is ‘suppression’ in this context?
It is the prevention of an image in one eye from reaching conscious awareness
Comitant Esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Accommodative
--Onset between ages 6 months
--Initially...intermittent, eventually
--Amblyopia is...common
--c/o diplopia early, but stop after developing a...facultative scotoma

**What is ‘suppression’ in this context?**
It is the prevention of an image in one eye from reaching conscious awareness

**How does the phenomenon of suppression come about?**
It is one of the three sensory adaptations to strabismus that was mentioned previously
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Accommodative
--Onset between ages 6 months and 7 years; average age 2.5 years
--Initially...intermittent, eventually...constant--Amblyopia is...common--c/o diplopia early, but stop after developing a...

What is ‘suppression’ in this context?
It is the prevention of an image in one eye from reaching conscious awareness.

What does it mean to say a suppression scotoma is ‘facultative’?
facultative suppression

Ciancia syndrome
Latent nystagmus
Nystagmus blockage syndrome
Without Nystagmus

With Nystagmus

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Refractive

Nonrefractive

What is ‘suppression’ in this context?

It is the prevention of an image in one eye from reaching conscious awareness.

What does it mean to say a suppression scotoma is ‘facultative’?

It means suppression occurs only while the eye is deviated.

Facultative suppression

Accommodative

--Onset between ages 6 months and 7 years; average age 2.5 years

--Initially...intermittent, eventually becoming constant

--Amblyopia is...common

--c/o diplopia early, but stop after developing...
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
  - With Nystagmus
    - Nystagmus blockage syndrome
    - Latent nystagmus
    - Ciancia syndrome
  - Without Nystagmus

Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative

Two basic forms
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Two basic forms
    - Refractive
    - Nonrefractive
Comitant Esotropia

Comitant esotropia

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Accommodative: **Refractive**
-- Combo of uncorrected and inadequate

Latent nystagmus
Ciancia syndrome

Refractive

Nonrefractive
Comitant Esotropia

Comitant esotropia

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Accommodative: **Refractive**
-- Combo of uncorrected hyperopia and inadequate divergence

Latent nystagmus
Ciancia syndrome

Refractive

Nonrefractive
Comitant esotropia

Acquired (onset > age 6 m)

Accommodative: Refractive
- Combo of uncorrected hyperopia and inadequate divergence

What does the term divergence refer to in this context?

Ciancia syndrome

Refractive Nonrefractive
Comitant esotropia

Accommodative (onset < age 6 m)

- Combo of uncorrected hyperopia and inadequate divergence

Refractive

- Accommodative: Refractive
- Ciancia syndrome

Nonaccommodative

Refractive

- Average refractive error: +4
- Strabismus usually measures ET ≈ ET'

Management

- Prescribe full CR
- If residual ET' with full CR: Rx bifocal
- Try to wean off plus over time

What does the term divergence refer to in this context?

To motor inputs intended to prevent overconvergence, with subsequent loss of bifixation of the object of regard
Comitant Esotropia

Comitant esotropia

Accommodative (onset < age 6 m)

- Accommodative: Refractive
  - Combo of uncorrected hyperopia and inadequate divergence

What does the term divergence refer to in this context?
To motor inputs intended to prevent overconvergence, with subsequent loss of bifixation of the object of regard

What is the general term for the set of efferent pathways responsible for establishing and maintaining bifixation on objects of regard?

Ciancia syndrome

Refractive

Acquired (onset > age 6 m)

Nonrefractive

Nonaccommodative
Comitant Esotropia

- Congenital (onset < age 6 m)
  - Accommodative: Refractive
    - Combo of uncorrected hyperopia and inadequate divergence
  - Ciancia syndrome
- Acquired (onset > age 6 m)
  - Refractive
  - Nonrefractive

**What does the term divergence refer to in this context?**
To motor inputs intended to prevent overconvergence, with subsequent loss of bifixation of the object of regard.

**What is the general term for the set of efferent pathways responsible for establishing and maintaining bifixation on objects of regard?**
The supranuclear pathways.
Comitant Esotropia

Comitant esotropia

Accommodative: Refractive
- Combo of uncorrected hyperopia and inadequate divergence

For more on the supranuclear pathways, see slide-set N21

What is the general term for the set of efferent pathways responsible for establishing and maintaining bifixation on objects of regard?
The supranuclear pathways

Ciancia syndrome

Latent nystagmus

Nystagmus blockage syndrome

Accommodative:

Refractive
- Average refractive error: +4
- Strabismus usually measures ET ≈ ET'

Management
- Prescribe full CR
- If residual ET' with full CR: Rx bifocal
- Try to wean off plus over time

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Comitant Esotropia

Comitant esotropia

Accommodative: **Refractive**
--Combo of uncorrected hyperopia and inadequate divergence
--Average refractive error:

- Latent nystagmus
- Ciancia syndrome

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Refractive

Nonrefractive
Comitant Esotropia

Comitant esotropia

Acquired (onset > age 6 m)

Accommodative

--Combo of uncorrected hyperopia and inadequate divergence
--Average refractive error: +4

Nonaccommodative

Refractive

Nonrefractive

Latent nystagmus
Ciancia syndrome
Comitant Esotropia

Comitant esotropia

Accommodative: **Refractive**
-- Combo of uncorrected *hyperopia* and inadequate *divergence*
-- Average refractive error: +4
-- Strabismus usually measures ET $\geq$ ET'

Latent nystagmus
Ciancia syndrome

Acquired (onset $>$ age 6 m)

Accommodative
Nonaccommodative

Refractive
Nonrefractive
Comitant Esotropia

**Comitant esotropia**

**Accommodative: Refractive**
-- Combo of uncorrected hyperopia and inadequate divergence
-- Average refractive error: +4
-- Strabismus usually measures ET ≈ ET'

**Acquired (onset > age 6 m)**

- Accommodative
- Nonaccommodative
  - Refractive
  - Nonrefractive

- Latent nystagmus
- Ciancia syndrome
Comitant Esotropia

Comitant esotropia

Accommodative: **Refractive**
--Combo of uncorrected hyperopia and inadequate divergence
--Average refractive error: +4
--Strabismus usually measures ET ≈ ET’

Management
--Prescribe…[refraction]

- Latent nystagmus
- Ciancia syndrome

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Refractive

Nonrefractive
Comitant esotropia

**Accommodative:** Refractive
--Combo of uncorrected hyperopia and inadequate divergence
--Average refractive error: +4
--Strabismus usually measures ET ≈ ET'

**Management**
--Prescribe...full CR

**Acquired (onset > age 6 m)**

**Accommodative**

**Nonaccommodative**

**Refractive**

**Nonrefractive**

Latent nystagmus
Ciancia syndrome
Comitant Esotropia

Comitant esotropia

Acquired (onset > age 6 m)

Accommodative
- Combo of uncorrected hyperopia and inadequate divergence
- Average refractive error: +4
- Strabismus usually measures ET ≈ ET'

Management
- Prescribe...full CR
  - If residual ET’ with full CR: Rx...

Nonaccommodative

Refractive

Latent nystagmus
Ciancia syndrome

Nonrefractive
Comitant Esotropia

Comitant esotropia

Accommodative: *Refractive*
- Combo of uncorrected hyperopia and inadequate divergence
- Average refractive error: +4
- Strabismus usually measures ET ≈ ET'

**Management**
- Prescribe...full CR
  - If residual ET' with full CR: Rx...bifocal

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

Refractive

Nonrefractive

Latent nystagmus
Ciancia syndrome
Comitant Esotropia

Comitant esotropia

**Accommodative: Refractive**
-- Combo of uncorrected hyperopia and inadequate divergence
-- Average refractive error: +4
-- Strabismus usually measures ET ≈ ET’

**Management**
-- Prescribe… full CR
  -- If residual ET’ with full CR: Rx… bifocal
  -- Try to wean off plus over time

Latent nystagmus
Ciancia syndrome

Acquired (onset > age 6 m)

Accommodative
Nonaccommodative

Refractive
Nonrefractive
Comitont Esotropia

Management
--Prescribe...full CR
--If residual ET' with full CR: Rx...bifocal
--Try to wean off plus over time

Compliance is often an issue with spectacle wear in this population—why?

Patients who have become accustomed to maintaining a constant accommodative effort are often intolerant of full-CR spectacles (they can't relax accommodation enough to see clearly through them), and will refuse to wear them—hence the compliance issue. To improve compliance, some clinicians will 'cut sphere;' ie, prescribe less than the full CR. Alternatively and perhaps more frequently, the clinician will prescribe topical atropine to paralyze accommodation, thereby making the child more accepting of the full-CR spectacles.

Comitont Esotropia

Comitant esotropia

Comitant esotropia

Accommodative

Nonaccommodative

Refractive

Nonrefractive

Latent nystagmus
Ciancia syndrome

age 6 m)
Comitant Esotropia

Compliance is often an issue with spectacle wear in this population—why? Patients who have become accustomed to maintaining a constant accommodative effort are often intolerant of full-CR spectacles (they can’t relax accommodation enough to see clearly through them), and will refuse to wear them—hence the compliance issue. To improve compliance, some clinicians will ‘cut sphere,’ ie, prescribe less than the full CR.

Management
--Prescribe...full CR
--If residual ET’ with full CR: Rx...bifocal
--Try to wean off plus over time

Comitant Esotropia

- Congenital (onset < age 6 m)
- Acquired (onset > age 6 m)

Refractive
- Accommodative
- Nonaccommodative

Nonrefractive

Late myopia
Ciancia syndrome
Latent nystagmus
Nystagmus blockage syndrome

Acquired ET: Accommodative:
Refractive
-- Combo of uncorrected hyperopia and inadequate divergence--Average refractive error: +4--Strabismus usually measures ET ≈ ET'

Management
--Prescribe...full CR
--If residual ET’ with full CR: Rx...bifocal
--Try to wean off plus over time

Compliance is often an issue with spectacle wear in this population—why? Patients who have become accustomed to maintaining a constant accommodative effort are often intolerant of full-CR spectacles (they can’t relax accommodation enough to see clearly through them), and will refuse to wear them—hence the compliance issue. To improve compliance, some clinicians will ‘cut sphere,’ ie, prescribe less than the full CR.
Comitant Esotropia

Compliance is often an issue with spectacle wear in this population—why? Patients who have become accustomed to maintaining a constant accommodative effort are often intolerant of full-CR spectacles (they can’t relax accommodation enough to see clearly through them), and will refuse to wear them—hence the compliance issue. To improve compliance, some clinicians will ‘cut sphere;’ ie, prescribe less than the full CR. Alternatively and perhaps more frequently, the clinician will prescribe topical drug to paralyze accommodation, thereby making the child more accepting of the full-CR spectacles.

Management
--Prescribe...full CR
--If residual ET with full CR: Rx...bifocal
--Try to wean off plus over time
Comitant Esotropia

Compliance is often an issue with spectacle wear in this population—why? Patients who have become accustomed to maintaining a constant accommodative effort are often intolerant of full-CR spectacles (they can’t relax accommodation enough to see clearly through them), and will refuse to wear them—hence the compliance issue. To improve compliance, some clinicians will ‘cut sphere;’ ie, prescribe less than the full CR. Alternatively and perhaps more frequently, the clinician will prescribe topical atropine to paralyze accommodation, thereby making the child more accepting of the full-CR spectacles.

Management
--Prescribe…full CR
--If residual ET’ with full CR: Rx…bifocal
--Try to wean off plus over time

Latent nystagmus
Ciancia syndrome

Comitant esotropia

Accommodative

Nonaccommodative

Refractive

Nonrefractive

> age 6 m)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to...

Accommodative

Nonaccommodative

Nonrefractive

Accommodative

Nonrefractive
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to...high AC/A ratio

Accommodative

Nonaccommodative

Nonrefractive
Without Nystagmus

With Nystagmus

Accommodative: Nonrefractive

- ET secondary to high AC/A ratio

Nonaccommodative

Refractive: Nonrefractive

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Comitant esotropia

Ciancia syndrome

Latent nystagmus

Nystagmus blockage syndrome

Accommodative:

Nonrefractive -- ET secondary to high AC/A ratio
-- Average refractive error +2, but can be anything, even myopic

Management
-- No consensus on optimum treatment
-- Give bifocal of about +3
-- Reasonable treatment goals:
  -- Distance: Fusion
  -- Near: <10 \( \Delta \) ET

What is the AC/A ratio?

The near triad consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes); likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the AC/A ratio. For some individuals, the 'factory setting' of the AC/A ratio is too high--their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is usually greatest at near.)
**What is the AC/A ratio?**

The *near triad* consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes). Likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the **AC/A ratio**.
**What is the AC/A ratio?**

The *near triad* consists of convergence, accommodation, and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes). Likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the **AC/A ratio**. For some individuals, the ‘factory setting’ of the AC/A ratio is too high—their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is greatest at near.)

**Accommodative: Nonrefractive**

--- ET secondary to high AC/A ratio

**Accommodative**

--- ET < Average refractive error +2, but can be anything, even myopic

**Nonrefractive**

--- ET'

--- Average refractive error

--- Management

--- No consensus on optimum treatment

--- Give bifocal of about +3

--- Reasonable treatment goals:

--- Distance: Fusion

--- Near: <10

--- ET
What is the AC/A ratio?
The near triad consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes). Likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the AC/A ratio. For some individuals, the ‘factory setting’ of the AC/A ratio is too high—their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is greatest at near.)

What are the units for:
--AC?
--A?

high AC/A ratio

Accommodative: Nonrefractive
--ET secondary to high AC/A ratio

Comitant Esotropia

Accommodative

Nonaccommodative

Nonrefractive
**What is the AC/A ratio?**

The *near triad* consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes). Likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the **AC/A ratio**. For some individuals, the ‘factory setting’ of the AC/A ratio is too high—their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is greatest at near.)

**What are the units for:**
- **AC?** Prism diopters
- **A?** Diopters

**Accommodative**: Nonrefractive
- ET secondary to high AC/A ratio

**Nonaccommodative**

**Accommodative**
- **Nonrefractive**

**Nonrefractive**
What is the AC/A ratio?
The near triad consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes). Likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the AC/A ratio. For some individuals, the ‘factory setting’ of the AC/A ratio is too high—their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is greatest at near.)

What are the units for:
--AC? Prism diopters
--A? Diopters

What is a normal AC/A?
What is the AC/A ratio?
The near triad consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes). Likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the AC/A ratio. For some individuals, the ‘factory setting’ of the AC/A ratio is too high—their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is greatest at near.)

What are the units for:
--AC? Prism diopters
--A? Diopters

What is a normal AC/A?
Around 3:1 to 5:1

Accommodative: Nonrefractive
--ET secondary to high AC/A ratio
Without Nystagmus

With Nystagmus Accommodative Nonaccommodative

Refractive Nonrefractive

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Comitant

esotropia

Ciancia syndrome

Latent nystagmus

Nystagmus blockage syndrome

Accommodative: Nonrefractive

--ET secondary to high AC/A ratio

--ET’ > ET

--Average refractive error +2, but can be anything, even myopic

Management

--No consensus on optimum treatment--Give bifocal of about...+3--Reasonable treatment goals:

--Distance: Fusion

--Near: <10 Δ ET

What is the AC/A ratio?

The near triad consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes); likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the AC/A ratio. For some individuals, the ‘factory setting’ of the AC/A ratio is too high--their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is greatest at near.)

What are the units for:

--AC? Prism diopters

--A? Diopters

What is a normal AC/A?

Around 3:1 to 5:1

How is the AC/A ratio measured?

The gradient method is probably the most commonly-employed technique in clinical practice. The child’s deviation is measured while gazing at a near (33 cm) target. The child is then re-measured while wearing a +3D add, the addition of which should obviate any accommodative effort on the child’s part to see a target at 33 cm. The change in ET is divided by 3 (the power of the add); the result is the child’s AC/A ratio.

AC/A ratio = (ET’ without add - ET’ with add)/3

If the result is greater than 5, the child has a high AC/A ratio.
What is the AC/A ratio?

How is the AC/A ratio measured?
The gradient method is probably the most commonly-employed technique in clinical practice. The child’s deviation is measured while gazing at a near (33 cm) target. The child is then re-measured while wearing a +3D add, the addition of which should obviate any accommodative effort on the child’s part to see a target at 33 cm. The change in ET is divided by 3 (the power of the add); the result is the child’s AC/A ratio.

\[ \text{AC/A ratio} = \frac{(\text{ET’ without add} - \text{ET’ with add})}{3} \]

If the result is greater than 5, the child has a high AC/A ratio.

What are the units for:

--AC? Prism diopters
--A? Diopters

What is a normal AC/A?

Around 3:1 to 5:1
Comitant Esotropia

Congenital (onset < age 6 m)

- Accommodative: **Nonrefractive**
  - ET secondary to...high AC/A ratio
  - ET $\leq$ ET'

Acquired (onset > age 6 m)

- Accommodative
- Nonaccommodative

Accommodative: **Nonrefractive**

- ET > ET'

Management

- No consensus on optimum treatment
- Give bifocal of about...+3
- Reasonable treatment goals:
  - Distance: Fusion
  - Near: $<10$ \(\Delta ET\)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to...high AC/A ratio
--ET < ET'

Accommodative

Nonaccommodative

Nonrefractive
What is the AC/A ratio?
The near triad consists of convergence, accommodation and miosis. The act of convergence induces a certain amount of accommodation (this is why your vision gets blurry when you intentionally cross your eyes). Likewise, the act of accommodation induces a certain degree of convergence. The quantitative relationship between the amplitude of convergence (AC) and the amount of accommodation (A) is represented by the AC/A ratio. For some individuals, the ‘factory setting’ of the AC/A ratio is too high—their eyes converge so much when they accommodate that their fusional and divergence mechanisms are overwhelmed, and an ET results. (Because near vision elicits more accommodation than distance vision, the ET is greatest at near.)

Accommodative: Nonrefractive
--ET secondary to...high AC/A ratio
--ET < ET’
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

- Accommodative: Nonrefractive
  - ET secondary to high AC/A ratio
  - ET < ET′

- How much greater is the ET at near?

Acquired (onset > age 6 m)

- Accommodative
- Nonaccommodative

- Accommodative
  - Nonrefractive

- Nonaccommodative
Comitant Esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Accommodative: Nonrefractive
-- ET secondary to... high AC/A ratio
-- ET < ET’

How much greater is the ET at near? At least 10Δ
Without Nystagmus With Nystagmus

Accommodative Nonaccommodative

Refractive Nonrefractive

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Comitant Esotropia

Accommodative: Nonrefractive
--ET secondary to...high AC/A ratio
--ET < ET'
--Average refractive error # but can be anything, even myopic

Management
--No consensus on optimum treatment
--Give bifocal of about...+3
--Reasonable treatment goals:
  --Distance: Fusion
  --Near: <10 \( \Delta \) ET

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Comitant Esotropia

Comitant esotropia

- Congenital (onset < age 6 m)
- Acquired (onset > age 6 m)

**Accommodative:** Nonrefractive
- ET secondary to high AC/A ratio
- ET < ET’
- Average refractive error +2, but can be anything, even myopic

**Nonaccommodative**
- Accommodative
- Nonrefractive
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Accommodative: **Nonrefractive**
--ET secondary to...high AC/A ratio
--ET < ET'
--Average refractive error +2, but can be anything, even myopic

Management
--No consensus on optimum treatment
--Give bifocal of about...#
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

**Accommodative: Nonrefractive**
--ET secondary to...high AC/A ratio
--ET < ET'
--Average refractive error +2, but can be anything, even myopic

**Management**
--No consensus on optimum treatment
--Give bifocal of about...+3

Accommodative  Nonaccommodative

Accommodative  Nonrefractive
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to...high AC/A ratio
--ET < ET'
--Average refractive error +2, but can be anything, even myopic
Management
--No consensus on optimum treatment
--Give bifocal of about...+3
--Reasonable treatment goals:
  --Distance:
  --Near:

Nonaccommodative

Accommodative

Nonrefractive
Comitant Esotropia

**Comitant esotropia**

- **Congenital (onset < age 6 m)**
- **Acquired (onset > age 6 m)**

**Accommodative: Nonrefractive**
- ET secondary to...high AC/A ratio
- ET < ET'
- Average refractive error +2, but can be anything, even myopic

**Management**
- No consensus on optimum treatment
- Give bifocal of about...+3
- Reasonable treatment goals:
  - Distance: Fusion
  - Near: <10Δ ET

**Nonaccommodative**

- Accommodative
- Nonrefractive
Without Nystagmus
With Nystagmus
Accommodative
Nonaccommodative
Refractive
Nonrefractive

Congenital (onset < age 6 m)
Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to high AC/A ratio
--ET < ET’
--Average refractive error +2, but can be anything, even myopic

Management
--No consensus on optimum treatment
--Give bifocal of about...+3
--Reasonable treatment goals:
  --Distance: Fusion
  --Near: <10Δ ET

Can a high AC/A ratio be a component of an exotropia?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to high AC/A ratio
--ET < ET'
--Average refractive error +2, but can be anything, even myopic
Management
--No consensus on optimum treatment
--Give bifocal of about...+3
--Reasonable treatment goals:
  --Distance: Fusion
  --Near: <10Δ ET

Can a high AC/A ratio be a component of an exotropia? Yes
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Accommodative: Nonrefractive
-- ET secondary to high AC/A ratio
-- ET < ET'
-- Average refractive error +2, but can be anything, even myopic
Management
-- No consensus on optimum treatment
-- Give bifocal of about...+3
-- Reasonable treatment goals:
  -- Distance: Fusion
  -- Near: <10° ET

Can a high AC/A ratio be a component of an exotropia?
Yes

Is high AC/A ratio more likely to be associated with ET, or with XT?
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to high AC/A ratio
--ET < ET'
--Average refractive error +2, but can be anything, even myopic

Management
--No consensus on optimum treatment
--Give bifocal of about...+3
--Reasonable treatment goals:
  --Distance: Fusion
  --Near: <10△ ET

Can a high AC/A ratio be a component of an exotropia? Yes

Is high AC/A ratio more likely to be associated with ET, or with XT? ET (by a lot)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to low AC/A ratio
--ET < ET'
--Average refractive error +2, but can be anything, even myopic

Management
--No consensus on optimum treatment
--Give bifocal of about...+3
--Reasonable treatment goals:
  --Distance: Fusion
  --Near: <10Δ ET

Is low AC/A ratio a thing?
Without Nystagmus

With Nystagmus Accommodative Nonaccommodative

Refractive Nonrefractive

Congenital (onset < age 6 m) Acquired (onset > age 6 m)

Comitant Esotropia

Accommodative: Nonrefractive

Low AC/A ratio

---ET secondary to ...
---Average refractive error +2, but can be anything, even myopic

Management

---No consensus on optimum treatment
---Give bifocal of about...+3
---Reasonable treatment goals:
---Near: <10Δ ET
---Distance: Fusion

---ET < ET',
---Average ET secondary to ...
---Low AC/A ratio

Is low AC/A ratio a thing?

Yes

Acquired (onset > age 6 m)

Comitant Esotropia

Is low AC/A ratio more likely to be associated with ET, or XT?

XT (by a lot)
Comitant Esotropia

**Congenital (onset < age 6 m)**
- Accommodative: Nonrefractive
  - ET secondary to low AC/A ratio
  - ET < ET'
  - Average refractive error +2, but can be anything, even myopic

**Acquired (onset > age 6 m)**
- Nonrefractive
  - ET

**Management**
- No consensus on optimum treatment
- Give bifocal of about...+3
- Reasonable treatment goals:
  - Distance: Fusion
  - Near: <10Δ ET

**Is low AC/A ratio a thing?**
- Yes

**Is low AC/A ratio more likely to be associated with ET, or with XT?**
Comitant Esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Accommodative: Nonrefractive
--ET secondary to low AC/A ratio
--ET < ET'
--Average refractive error +2, but can be anything, even myopic

Management
--No consensus on optimum treatment
--Give bifocal of about...+3
--Reasonable treatment goals:
  --Distance: Fusion
  --Near: <10Δ ET

Is low AC/A ratio a thing?
Yes

Is low AC/A ratio more likely to be associated with ET, or with XT?
XT (by a lot)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus  Accommodative  Nonaccommodative

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Refractive  Nonrefractive
Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome
- Without Nystagmus

Acquired (onset > age 6 m)
- Accommodative
  - Refractive
  - Nonrefractive
- Nonaccommodative
  - Basic
  - Sensory
  - Divergence insufficiency
  - Spasm of the near
  - Consecutive
  - Cyclic
Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
  - Nystagmus blockage syndrome
  - Late Ciancia syndrome
- Without Nystagmus

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic
  - Sensory

Nonaccommodative: Basic
-- In essence, is the acquired version of...
Nonaccommodative: Basic

--In essence, is the acquired version of... ‘congenital ET w/o nystagmus’
Comitant esotropia

Congenital (onset < age 6 m)
  - With Nystagmus
  - Without Nystagmus

Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
    - Sensory

Nonaccommodative: Basic
-- In essence, is the acquired version of... 'congenital ET w/o nystagmus'
-- Consider workup for a...
Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic
  - Sensory

Nonaccommodative: Basic
-- In essence, is the acquired version of... 'congenital ET w/o nystagmus'
-- Consider workup for a... CNS lesion
Comitant esotropia

Congenital (onset < age 6 m)
  - With Nystagmus
  - Without Nystagmus

Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
    - Sensory

Nonaccommodative: Basic
  -- In essence, is the acquired version of... 'congenital ET w/o nystagmus'
  -- Consider workup for a CNS lesion

What would clue you in that a workup is warranted?

CNS lesion
Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
    - Nystagmus blockage syndrome
  - Without Nystagmus
    - Late onset Ciancia syndrome
- Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
      - In essence, is the acquired version of... 'congenital ET w/o nystagmus'
      - Consider workup for a CNS lesion
    - Sensory

What would clue you in that a workup is warranted?
If there is anything hinky about the presentation, eg, neuro signs/symptoms; face turn; c/o HA; etc.
Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic
  - Sensory

Nonaccommodative: Basic
- In essence, is the acquired version of... 'congenital ET w/o nystagmus'
- Consider workup for a... CNS lesion

Management
- CR for any accommodative component
Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Nonaccommodative

Comitant Esotropia

Nonaccommodative: Basic
--In essence, is the acquired version of…‘congenital ET w/o nystagmus’
--Consider workup for a…CNS lesion

Management
--CR for any accommodative component
--Consider two words (non-surg proc.) prior to four words (surgical procedure)
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Without Nystagmus

--Nystagmus blockage syndrome

--Ciancia syndrome

With Nystagmus

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

--Basic

Sensory

Nonaccommodative: Basic

--In essence, is the acquired version of...‘congenital ET w/o nystagmus’

--Consider workup for a...CNS lesion

Management

--CR for any accommodative component

--Consider prism adaptation prior to bilateral medial rectus recession
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic

What is prism adaptation?

- Nystagmus blockage syndrome

---

What is prism adaptation?

-- Consider prism adaptation prior to bilateral medial rectus recession
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

- With Nystagmus
- Without Nystagmus

Acquired (onset > age 6 m)

- Accommodative
- Nonaccommodative
  - Basic

What is prism adaptation?
It is a process in which the pt is prescribed the full prism needed to nullify their ET, then re-evaluated periodically to determine whether additional ET has been ‘uncovered.’ If it has, their prescription is updated to nullify the additional ET.

--Consider prism adaptation prior to bilateral medial rectus recession
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic

What is prism adaptation?
It is a process in which the pt is prescribed the full prism needed to nullify their ET, then re-evaluated periodically to determine whether additional ET has been ‘uncovered.’ If it has, their prescription is updated to nullify the additional ET. This is repeated until the prism prescription is stable, at which time surgery is performed to correct the full final prism prescription.

--Consider prism adaptation prior to bilateral medial rectus recession
Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
    - Nystagmus blockage syndrome
    - Latent nystagmus
  - Without Nystagmus

- Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
      - Sensory
      - Divergence insufficiency

**Sensory (aka deprivational) nonaccommodative esotropia** develops in response to monocular vision loss.
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic
    - Sensory
    - Divergence insufficiency

**Sensory (aka deprivational) nonaccommodative esotropia** develops in response to monocular vision loss.
Sensory (aka deprivalional) nonaccommodative esotropia develops in response to monocular vision loss. Common causes include cataracts, corneal clouding, and retinal or optic nerve disorders.
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus

Accommodative  Nonaccommodative

- Basic
- Sensory
- Divergence insufficiency

**Sensory** *(aka deprivational)* **nonaccommodative esotropia** develops in response to monocular vision loss. Common causes include cataracts, corneal clouding, and retinal or optic nerve disorders. The lack of symmetric visual stimulation leads to sensory blockage and latent nystagmus, followed by a breakdown in visual alignment.
Sensory (aka deprivalional) nonaccommodative esotropia develops in response to monocular vision loss. Common causes include cataracts, corneal clouding, and retinal or optic nerve disorders. The lack of symmetric visual stimulation leads to amblyopia, followed by a breakdown in fusion.
Comitant Esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With  Without

Earlier in this slide-set we mentioned supranuclear divergence inputs that prevent overconvergence. In divergence insufficiency, a lack of robustness on the part of these inputs allows the eyes to turn in a bit, resulting in a modest esotropia.

Nonaccommodative
- Basic
- Sensory
  - Divergence insufficiency
    - Spasm of the near
    - Consecutive
    - Cyclic
Earlier in this slide-set we mentioned supranuclear divergence inputs that prevent overconvergence. In divergence insufficiency, a lack of robustness on the part of these inputs allows the eyes to turn in a bit, resulting in a modest esotropia. The classic presentation is that of an esotropia that is present at dist vs near, but not at dist vs near.
Earlier in this slide-set we mentioned supranuclear divergence inputs that prevent overconvergence. In divergence insufficiency, a lack of robustness on the part of these inputs allows the eyes to turn in a bit, resulting in a modest esotropia. The classic presentation is that of an esotropia that is present at distance, but not at near.
Comitant Esotropia

Earlier in this slide-set we mentioned supranuclear divergence inputs that prevent overconvergence. In divergence insufficiency, a lack of robustness on the part of these inputs allows the eyes to turn in a bit, resulting in a modest esotropia. The classic presentation is that of an esotropia that is present at distance, but not at near. The most common form of this develops in older individuals—hence its alternative name, age-related distance esotropia. In some pts, orbital imaging reveals changes to the EOMs and ligamentous support structures.
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Comitant Esotropia

Note that these conditions can be differentiated on the basis of the relative magnitude of the esotropia as a function of whether it is measured at distance vs near:

**Refractive:** $ET \leq ET'$

**Nonrefractive (high AC/A ratio):** $ET \geq ET'$

**Divergence insufficiency:** $ET \geq ET'$

Sensory
- Spasm of the near
- Consecutive
- Cyclic

Comitant esotropia

- Congenital (onset < age 6 m)
- Acquired (onset > age 6 m)

Refractive
- Without Nystagmus
- With Nystagmus

Nonrefractive
- Accommodative
- Nonaccommodative

Congenital (onset < age 6 m)
- Acquired (onset > age 6 m)

Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Divergence insufficiency
Comitant esotropia

Note that these conditions can be differentiated on the basis of the relative magnitude of the esotropia as a function of whether it is measured at distance vs near:

Refractive: $ET \approx ET'$

Nonrefractive (high AC/A ratio): $ET < ET'$

Divergence insufficiency: $ET > ET'$

Comitant Esotropia

Refractive

Nonrefractive

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Sensory

Spasm of the near

Consecutive

Cyclic

Nystagmus blockage syndrome

Ciancia syndrome

Latent nystagmus
Spasm of the near (aka convergence spasm) is almost always a response to psychosocial stressors. All three components of the near triad (convergence, miosis, and accommodation) can usually be demonstrated. The esotropia may alternate with periods of orthotropia. Abduction will be poor or absent when the eyes are tested simultaneously, but full when tested monocularly. Treatment should address the inciting stressors. If further intervention is needed, cycloplegic agents and/or hyperopic correction can be tried. As a last resort, Botox or surgery can be considered, with caution.
Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
  - Without Nystagmus
- Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative

**Spasm of the near** (aka convergence spasm) is almost always a functional response to psychosocial stressors.
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Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus
  - Nystagmus blockage syndrome

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic
  - Sensory
  - Divergence insufficiency
  - Spasm of the near
  - Consecutive
  - Cyclic

Consecutive esotropia refers to esotropia that develops in someone with a history of...
Comitant esotropia

**Concomitant Esotropia**

- **Congenital (onset < age 6 m)**
  - With Nystagmus
    - Nystagmus blockage syndrome
  - Without Nystagmus

- **Acquired (onset > age 6 m)**
  - Accommodative
  - Nonaccommodative
    - Basic
    - Sensory
    - Divergence insufficiency
    - Spasm of the near
    - **Consecutive**
    - Cyclic

**Consecutive esotropia** refers to esotropia that develops in someone with a history of exotropia.
Concomitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
  - With Nystagmus
  - Without Nystagmus
    - Nystagmus blockage syndrome

Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
    - Sensory
    - Divergence insufficiency
    - Spasm of the near
    - Cyclic

Consecutive esotropia refers to esotropia that develops in someone with a history of exotropia. In almost all cases, consecutive esotropia is two-words.
Concomitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

With Nystagmus  Without Nystagmus  Accommodative  Nonaccommodative

Nystagmus blockage syndrome

Consecutive esotropia refers to esotropia that develops in someone with a history of exotropia. In almost all cases, consecutive esotropia is post-surgical.
Concomitant esotropia

Concomitant esotropia refers to esotropia that develops in someone with a history of exotropia. In almost all cases, concomitant esotropia is post-surgical, i.e., it represents an apparent overcorrection in someone who underwent strab surgery for exotropia.
Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus
  - Nystagmus blockage syndrome

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic
  - Sensory
  - Divergence insufficiency
  - Spasm of the near
  - Consecutive
  - Cyclic

**Consecutive esotropia** refers to esotropia that develops in someone with a history of exotropia. In almost all cases, consecutive esotropia is post-surgical, i.e., it represents an apparent overcorrection in someone who underwent strabismus surgery for exotropia. Consecutive esotropia often resolves spontaneously, so unless it is very large (in which case it likely represents a slipped/lost muscle), observation for a month or two is usually the preferred management option.
Consecutive esotropia refers to esotropia that develops in someone with a history of exotropia. In almost all cases, consecutive esotropia is post-surgical, i.e., it represents an apparent overcorrection in someone who underwent strab surgery for exotropia. Consecutive esotropia often resolves spontaneously, so unless it is very large (in which case it likely represents a slipped/lost muscle), observation for a month or two is usually the preferred management option.
Comitant esotropia

**Congenital (onset < age 6 m)**
- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome
- Without Nystagmus

**Acquired (onset > age 6 m)**
- Accommodative
- Nonaccommodative
  - Basic
  - Sensory
  - Divergence insufficiency
  - Spasm of the near
  - Consecutive

**Cyclic esotropia** is a rare disorder in which a comitant ET is present intermittently, usually cycle time.
Cyclic esotropia is a rare disorder in which a comitant ET is present intermittently, usually every other day.
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
  - With Nystagmus
    - Nystagmus blockage syndrome
    - Latent nystagmus
    - Ciancia syndrome
  - Without Nystagmus

Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
    - Sensory
    - Divergence insufficiency
    - Spasm of the near
    - Consecutive
    - Cyclic

Cyclic esotropia is a rare disorder in which a comitant ET is present intermittently, usually every other day. The typical pt is of an early life stage.
Comitant esotropia

Congenital (onset < age 6 m)
  - With Nystagmus
    - Nystagmus blockage syndrome
    - Latent nystagmus
    - Ciancia syndrome
  - Without Nystagmus

Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
    - Sensory
    - Divergence insufficiency
    - Spasm of the near
    - Consecutive

Cyclic esotropia is a rare disorder in which a comitant ET is present intermittently, usually every other day. The typical pt is of pre-school age.
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)
- With Nystagmus
- Without Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome

Acquired (onset > age 6 m)
- Accommodative
- Nonaccommodative
  - Basic
  - Sensory
  - Divergence insufficiency
  - Spasm of the near
  - Consecutive
  - Cyclic

Cyclic esotropia is a rare disorder in which a comitant ET is present intermittently, usually every other day. The typical pt is of pre-school age. Surgical correction of the maximum observed ET is the treatment of choice.