In this context, what does the word *comitant* mean?
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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?*
In this context, what does the word **comitant** mean?
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What common cause of ET is effectively ruled out by comitancy?
A recent-onset CN6 palsy
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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*Why can’t comitancy rule out an ‘old’ CN6 palsy as well?*
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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?*
Because of the possibility of ‘spread of comitance’
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Because of the possibility of ‘spread of comitance’

What is spread of comitance?
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It means the ET is the same in all fields of gaze.

What common cause of ET is effectively ruled out by comitancy?  
A recent-onset CN6 palsy.

Why can't comitancy rule out an ‘old’ CN6 palsy as well?  
Because of the possibility of ‘spread of comitance’.

What is spread of comitance?  
The phenomena in which a longstanding palsy gradually transforms from incomitant to comitant.
In this context, what does the word **comitant** mean? It means the ET is the same in all fields of gaze.

What common cause of ET is effectively ruled out by comitancy? A recent-onset CN6 palsy.

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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?
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?
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There is a predilection pattern among US whites, blacks and Asians—what is it?
In this context, what does the word **comitant** mean?
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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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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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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?
ET is significantly more common
Comitant Esotropia

Comitant esotropia

?  ?

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

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

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?
Why is the term congenital a misnomer here?
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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).
Congenital (onset < age 6 m)  Acquired (onset > age 6 m)

Comitant esotropia

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 30\(\Delta\)),
...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
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
Without Nystagmus

With Nystagmus

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

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

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

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?
Comitant esotropia

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

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

**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
Comitant esotropia

- Congenital (onset < age 6 m)
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    -- 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
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**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?**
Comitant Esotropia

Comitant esotropia

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

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It is virtually always horizontal
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Do CMN pts usually have good vision, or poor?
Comitant esotropia

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

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Do CMN pts usually have good vision, or poor?  Good (rule of thumb: If a pt has nystagmus + good VA, it’s CMN)
**Comitant Esotropia**

**Comitant esotropia**

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

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

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

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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?**
Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

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Comitant Esotropia

Comitant esotropia

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

A paradoxical OKN response
Comitant esotropia

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

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

A paradoxical **OKN response**

---

**Nystagmus blockage syndrome**

---

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A paradoxical **OKN response**
Comitant Esotropia

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

A paradoxical OKN response

Comitant esotropia
**Comitant Esotropia**

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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 (i.e., follow) a stimulus, then engage in a rapid return saccade to pick up the next stimulus.

How is OKN testing performed?

A paradoxical OKN response

A paradoxical OKN response is a phenomenon that occurs when a CMN patient is presented with an OKN drum spinning in the direction congruent with the patient’s nystagmus. Spinning in this direction would be expected to amplify (i.e., worsen) the patient’s nystagmus. However, in a CMN patient, the presentation of congruent OKN movement produces a dampening or even reversal of the nystagmus—hence the term paradoxical OKN response.
Comitant Esotropia

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How is OKN testing performed?
Usually with an OKN drum that is spun about its axis

...
Comitant Esotropia

#OldSchoolCool: OKN drum
Comitant Esotropia

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Comitant esotropia

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Comitant Esotropia

Comitant esotropia

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

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]

- 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...congenital motor nystagmus (CMN)
--Pt ‘learns’ that their nystagmus is decreased (and thus acuity is increased) when their eyes are...converged

- Nystagmus blockage syndrome
- Latent nystagmus
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Nystagmus blockage syndrome
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--Key exam finding: Pt 'eats up' prism when deviation is being measured

- Latent nystagmus
- Ciancia syndrome
Without Nystagmus

With Nystagmus

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

Comitant Esotropia

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Comitant Esotropia

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

--Pt ‘learns’ that their nystagmus is decreased (and thus acuity is increased) when their eyes are...converged
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-Nystagmus blockage syndrome
-Latent nystagmus
-Ciancia syndrome
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.

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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.)

With Nystagmus

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**Why do NBS pts eat up prism?**

---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

---Nystagmus blockage syndrome

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**Comitant Esotropia**

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*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.

---

- Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome

---

**With Nystagmus**

-- 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
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.’

--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

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

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

--No nystagmus when vision is...binocular

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

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 vs occluded eye.
Comitant esotropia

- Congenital (onset < age 6 m)
  - With Nystagmus
    - Nystagmus blockage syndrome
    - Latent nystagmus
  - 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
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...
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
-- 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

Congenital (onset < age 6 m)

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

- Without Nystagmus
  - Ciancia syndrome

Acquired (onset > age 6 m)

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

Acquired (onset > age 6 m)
- Without Nystagmus
- With Nystagmus
  - Latent nystagmus blockage 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...suppressed

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

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 is 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.

**Latent nystagmus and manifest latent nystagmus are sometimes referred to by what single name?**
Fusion maldevelopment nystagmus syndrome (FMNS)
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... [magnitude]
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
Comitant Esotropia

Ciancia syndrome
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**

*How large is ‘very large’?*
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

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

Without Nystagmus

Acquired (onset > age 6 m)

How large is 'very large'? Greater than 50Δ
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

- With 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]

- Without Nystagmus

Acquired (onset > age 6 m)

- Nystagmus blockage syndrome
- Latent nystagmus

Ciancia syndrome
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)

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?

---

**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 abducts**
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 [two words] for which the null point is located in convergence (ie, the ET is in a sense caused by the nystagmus)

---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 (ie, the ET is in a sense caused by the nystagmus)

--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

\[\text{Nystagmus blockage syndrome}\]

--Damped when the eyes are converged

--\textbf{Nystagmus appears upon attempted\ldots\textbf{abduction}}

\[-\text{Nystagmus blockage syndrome}\]

--Latent nystagmus

\[-\text{Ciancia syndrome}\]

\[-\text{Ciancia syndrome}\]

\[\text{Ciancia syndrome}\]

--Deviation tends to be very large

--\textbf{Nystagmus increases when the fixating eye\ldots\textbf{abducts}};

decreases when it\ldots\textbf{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,

--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**
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 (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.

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 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 ad ducts.

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome
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.
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?**

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**
Without Nystagmus

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

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...
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,

- **May**? Why the hedging?

With Nystagmus

---Damped when the eyes are...converged

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

---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
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 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 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**
- Ciancia 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?***

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 \( \leq 35 \text{PD} \) of congenital ET probably has NBS, whereas an infant with nystagmus and \( \geq 55 \text{PD} \) of congenital ET likely has Ciancia syndrome.

---

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

---

*Prior to ‘eating up prism’
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 vs absent]
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

- 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...[magnitude]
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

- 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)

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

With Nystagmus

Acquired (onset > age 6 m)

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

How large is ‘large’?
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
-- Deviation tends to be... large

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

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?
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

*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

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

**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

- 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? 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
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?]
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

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

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 will be equal OU
Comitant esotropia

Congenital (onset < age 6 m)

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

With Nystagmus

Acquired (onset > age 6 m)

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

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 equal OU

What exam finding is key to determining whether the infant’s vision is equal bilaterally?
**Comitant Esotropia**

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

**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 **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

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

**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

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 will be equal OU

Is amblyopia common?
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  
    What does this imply about VA?  
    It will be equal OU  
    Is amblyopia common?  
    Yes  

Acquired (onset > age 6 m)
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

  If amblyopia is present:
  -- Will vision be equal OU?

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

What does this imply about VA?
It tends to 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

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

What does this imply about VA?

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

Is amblyopia common?

- Yes

This imply about VA?
- Will vision be equal OU? No
Comitant Esotropia

Comitant esotropia

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

With Nystagmus

Without Nystagmus

If amblyopia is present:

--will vision be equal OU? No
--Will a gaze preference be present?

Congenital ET without nystagmus

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

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 tends to be equal OU?

No

Is amblyopia common?

Yes

If amblyopia is present:

--Will vision be equal OU? No
--Will a gaze preference be present?
Comitant esotropia

Congenital (onset < age 6 m)

Without Nystagmus
- Nystagmus
- Latent nystagmus
- Ciancia syndrome

With Nystagmus

Comitant

Acquired (onset > age 6 m)

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

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 tends to be equal OU?
No

Is amblyopia common?
Yes

If amblyopia is present:
-- Will vision be equal OU? No
-- Will a gaze preference be present? Yes
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
    -- 2/3 with concomitant...[strabismic conditions]

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
--2/3 with concomitant DVD and IO overaction

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)  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**

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

**DVD:**

**IO:**
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**

In this context, what do DVD and IO stand for?
**DVD**: Dissociated vertical deviation
**IO**: Inferior oblique (muscle)
Without Nystagmus

With Nystagmus

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Congenital (onset < age 6 m)

Congenital ET without nystagmus

Acquired (onset > age 6 m)

Comitant esotropia

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

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)**

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

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

**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

DVD
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?
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

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
    -- 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?

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
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)
- Without Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Ciancia syndrome
- With 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…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**

What does this mean, exactly?
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...weakening

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

DVD violates Hering's law; IO overaction doesn't

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)

With Nystagmus
- Nystagmus blockage syndrome
- Latent nystagmus
- Cicancia syndrome

Congenital ET without nystagmus

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

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

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

Comitant esotropia

Congenital (onset < age 6 m) Acquired (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
-- 2/3 with concomitant... DVD and IO overaction

Management:
-- Prescribe full...
Comitant Esotropia

Comitant esotropia

Congenital (onset < age 6 m)

Without Nystagmus

With Nystagmus

Without Nystagmus

- Nystagmus blockage syndrome
- 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
-- 2/3 with concomitant DVD and IO overaction

Management:
-- Prescribe full cycloplegic refraction
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

Management:
-- Prescribe full...cycloplegic refraction

Why prescribe the full CR?
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

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

**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

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)

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... MR recession
-- Best if by age...
Comitant Esotropia

Comitant esotropia

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

--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
  --Best if by age...24 months
--If IO overaction present, consider...[surgery]
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

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

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

Without Nystagmus

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

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

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

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?
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
Comitant esotropia

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

Acquired (onset > age 6 m)

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

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
Without Nystagmus
With Nystagmus

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Comitant esotropia

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?

Mnemonic is…SAM

Monofixation syndrome

--S
--A
--M

Comitant Esotropia

With Nystagmus

- Nystagmus block
- 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

What about high-grade stereopsis?
It’s not gonna happen
Without Nystagmus

With Nystagmus

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Comitant esotropia

- Nystagmus block
- Latent nystagmus
- Ciancia syndrome

What is the realistic goal of treatment?

Monofixation syndrome, or a small-angle esophoria

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
Comitant esotropia

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

With Nystagmus

- Nystagmus block
- Latent nystagmus
- Stringing

What is the realistic goal of treatment?

Monofixation syndrome, or a small-angle esophoria

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
- Monofixation syndrome

Mnemonic is...SAM

For more on sensory responses in strabismus, see slide-set P14
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 | 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 6 months and 7 years; average age 2.5 years

Comitant Esotropia

Ciancia syndrome

Latent nystagmus

Nystagmus blockage syndrome
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

Latent nystagmus
Nystagmus blockage syndrome
Ciancia syndrome
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..., eventually becoming...
Comitant Esotropia

Comitant esotropia

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

With Nystagmus  Nonaccommodative

Without Nystagmus  Accommodative

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

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)
- 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...
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

With Nystagmus

What is ‘suppression’ in this context?

**Accommodative**
– Onset between ages 6 months
– Initially…intermittent, eventually constant
– Amblyopia is…common
– c/o diplopia early, but stop after developing a…facultative suppression scotoma
**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 and 7 years; average age 2.5 years
- Initially...intermittent, eventually 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?
It is the prevention of an image in one eye from reaching conscious awareness

How does the phenomenon of suppression come about?
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?
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
--Initially...intermittent, eventually
--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
Comitant Esotropia

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

With Nystagmus  Without Nystagmus

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

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

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

With Nystagmus  Without Nystagmus

With Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Accommodative  Nonaccommodative

Two basic forms

Refractive  Nonrefractive
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

According to age:
- Congenital (onset < age 6 m)
- Acquired (onset > age 6 m)

According to nystagmus:
- With/Without

According to refractive status:
- Refractive
- Nonrefractive

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
Comitant Esotropia

Comitant esotropia

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

What does the term divergence refer to in this context?

Ciancia syndrome

Acquired (onset > age 6 m)

Refractive

Nonrefractive

Nonaccommodative
Comitant esotropia

Accommodative: Refractive
- Combo of uncorrected hyperopia and inadequate divergence

Ciancia syndrome

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 are the general terms for the set of efferent pathways responsible for establishing and maintaining bifixation on objects of regard?

The supranuclear pathways

---

Comitant Esotropia

Acquired (onset > age 6 m)

Refractive

Nonrefractive

Nonaccommodative
Comitant esotropia

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?
Comitant esotropia

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?
The supranuclear pathways

Ciancia syndrome

Comitant Esotropia

Acquired (onset > age 6 m)
Refractive Nonrefractive

Nonaccommodative
Comitant Esotropia

Comitant esotropia

Accommodative: Refractive
• Combo of uncorrected hyperopia and inadequate divergence

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

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

– Ciancia syndrome

Acquired (onset > age 6 m)

Refractive

Nonrefractive

Nonaccommodative

Congenital (onset < age 6 m)
Comitant esotropia

Acquired (onset > age 6 m)

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

- Latent nystagmus
- Ciancia syndrome

Nonaccommodative

Refractive

Nonrefractive
Comitant esotropia

Acquired (onset > age 6 m)

Accommodative
- Latent nystagmus
- Ciancia syndrome

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

Nonaccommodative

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

---

Acquired (onset > age 6 m)

Accommodative

- Latent nystagmus
- Ciancia syndrome

Nonaccommodative

Refractive

Nonrefractive
Comitant Esotropia

Comitant esotropia

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

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

Accommodative

Nonaccommodative

**Refractive**

Nonrefractive

Latent nystagmus
Ciancia syndrome
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... [refraction]

Nonaccommodative

Refractive

Nonrefractive

Latent nystagmus
Ciancia syndrome
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

Nonaccommodative

Refractive

Nonrefractive

Latent nystagmus
Ciancia syndrome
Comitant esotropia

Acquired (onset > age 6 m)

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...

Nonaccommodative

Accommodative

Nonrefractive

Latent nystagmus
Ciancia syndrome

Refractive
Comitant Esotropia

Comitant esotropia

Acquired (onset > age 6 m)

Accommodative

Nonaccommodative

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

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

Latent nystagmus
Ciancia syndrome
Comitant esotropia

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

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

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

**Nonaccommodative**

Latent nystagmus
- Ciancia syndrome

**Refractive**

**Nonrefractive**
Comitant Esotropia

---

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

- Latent nystagmus
- Cicancia syndrome

---

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

---

**Accommodative**

**Nonaccommodative**

**Refractive**

**Nonrefractive**

---

Comitant esotropia

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

---

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

---

- Acquired ET: Accommodative:
  - 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.
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.

**Comitant Esotropia**

- Latent nystagmus
- Ciancia syndrome

**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 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.

- 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

- 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  Nonaccompanyative

Accommodative  Nonrefractive

--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
Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

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

Accommodative
Nonaccommodative

Nonrefractive

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

What is the AC/A ratio?

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

Accommodative

Nonrefractive

Nonaccommodative
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.

Accommodative: Nonrefractive
--ET secondary to high 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.)
What is the AC/A ratio?
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**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**

---

**Comitant Esotropia**
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
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
Comitant Esotropia

What is the 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

How is the AC/A ratio measured?

1. 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.

2. 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.)

3. 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.

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

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

Comitant esotropia

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Accommodative: Nonrefractive
-- ET secondary to high AC/A ratio
-- ET \( \lt \) ET'

Accommodative

Nonaccommodative

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'

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.)
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'

Nonaccommodative

Accommodative

Nonrefractive

How much greater is the ET at near?
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?  
At least 10Δ

Acquired (onset > age 6 m)  

Accommodative  
Nonaccommodative

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 #, but can be anything, even myopic

Accommodative
Nonaccommodative

Accommodative
Nonrefractive
Comitant esotropia

Congenital (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

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

Accommodative  Nonaccompanyative

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

Accommodative  Nonaccommodative

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:

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: <10∆ ET
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

Nonrefractive

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

Nonrefractive

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

Is high 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 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

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

Nonrefractive

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? Yes
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

Nonrefractive

Is low AC/A ratio a thing?
Yes

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

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

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)

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
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
    - 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
  - Nonaccommodative
    - Basic
    - Sensory
    - Divergence insufficiency
    - Spasm of the near
    - Consecutive
    - Cyclic
Comitant esotropia

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

Acquired (onset > age 6 m)
- Accommodative
- 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
    - Ciancia syndrome
    - Nystagmus blockage syndrome
    - Late onset insufficiency

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
  - Nystagmus blockage syndrome
- Without Nystagmus

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
Comitant esotropia

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

- Acquired (onset > age 6 m)
  - Accommodative
  - Nonaccommodative
    - Basic
    - Sensory
      - Ciancia syndrome
      - Latent nystagmus
      - Nystagmus blockage syndrome

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 is warranted?
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? 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  Accommodative  Nonaccommodative

Nystagmus blockage syndrome  Latent nystagmus  Ciancia syndrome

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

Congenital (onset < age 6 m)
- With Nystagmus
  - Nystagmus blockage syndrome
  - Latent nystagmus
  - Cianci syndrome

Acquired (onset > age 6 m)
- Without Nystagmus
  - Accommodative
  - Nonaccommodative: Basic
    -- In essence, is the acquired version of ‘congenital ET w/o nystagmus’
    -- Consider workup for a… CNS lesion
  - Nonaccommodative: Sensory

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

What is prism adaptation?

--Consider prism adaptation prior to bilateral medial rectus recession

---

--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

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.
**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.
Comitant Esotropia

Comitant esotropia

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

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
Sensory (aka deprivational) nonaccommodative esotropia develops in response to vision loss.

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

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

Acquired (onset > age 6 m)
- Accommodative
- 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

That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles secondary to trauma or word + abb.

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Comitant Esotropia

- Spasm of the near
- Consecutive
- Cyclic

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Comitant esotropia

That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles secondary to trauma or increased ICP.

What does ICP stand for in this context?

Divergence insufficiency
- Spasm of the near
- Consecutive
- Cyclic

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What does ICP stand for in this context? Intracranial pressure

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Divergence insufficiency
- Spasm of the near
- Consecutive
- Cyclic

Comitant esotropia that is present at distance, but not at near
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Comitant Esotropia

- Spasm of the near
- Consecutive
- Cyclic
Comitant Esotropia

Left, normal LR muscle positioning in pt without involutional changes. Right, inferomedial displacement of the LRs in a pt with them.
That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures responsible for suspending the globe within the orbital space—ie, the check ligaments, intermuscular bands, and/or Tenon’s capsule. Involutional changes to these structures allow the globe to literally sag, and the too-inferior position of the globe alters the line-of-force between the LR and the globe. This in turn renders ‘normal’ levels of LR innervation inadequate to completely offset MR inputs, the result being the eyes are slightly ET at distance. Because of its origin in involutional changes, this condition is called age-related distance esotropia. (It is known also by the more precise but less diplomatic term sagging eye syndrome). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

Comitant Esotropia

Comitant esotropia

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MRI demonstrates inferior “sagging” of the lateral rectus (LR) with rupture of the LR–superior rectus (SR) band bilaterally. The horizontal line depicts the center of the medial rectus (MR) muscle, which intersects the upper pole of the LR muscle.
That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures responsible for suspending the globe within the orbital space—ie, the check ligaments, intermuscular bands, and/or Tenon’s capsule. Involutional changes to these structures allow the globe to literally sag, and the too-inferior position of the globe alters the line-of-force between the LR and the globe. This in turn renders ‘normal’ levels of LR innervation inadequate to completely offset MR inputs, the result being the eyes are slightly ET at distance. Because of its origin in involutional changes, this condition is called *age-related distance esotropia*. (It is known also by the more precise but less diplomatic term *sagging eye syndrome*). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

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Comitant Esotropia

Spasm of the near
Consecutive
Cyclic

esotropia that is present at distance, but not at near
That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures, such as ligaments, intermuscular bands, and/or Tenon’s capsule. Involutional changes to these structures allow the globe to literally sag, altering the line-of-force between the LR and the globe. This in turn renders normal levels of LR innervation inadequate to completely offset MR inputs, resulting in a modest esotropia. Because of its origin in involutional changes, this condition is called age-related distance esotropia. (It is known also by the more precise but less diplomatic term sagging eye syndrome). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

**Comitant Esotropia**

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**Divergence insufficiency**

- Spasm of the near
- Consecutive
- Cyclic

**What other findings will clue you in that your divergence-insufficiency pt has SES?**

- ?
- ?
- ?
- ?

**esotropia that is present at distance, but not at near**
Comitant Esotropia

That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures, including ligaments, intermuscular bands, and Tenon's capsule, which allow the globe to lower between the LR and the orbital cheek ligaments, intermuscular bands, and Tenon's capsule. Involutional changes to these structures allow the globe to literally sag, and the too-inferior position of the globe alters the line-of-force between the LR and the globe. This in turn renders 'normal' levels of LR innervation inadequate to completely offset MR inputs, the result being the eyes are slightly ET at distance. Because of its origin in involutional changes, this condition is called age-related distance esotropia. (It is known also by the more precise but less diplomatic term sagging eye syndrome). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

What other findings will clue you in that your divergence-insufficiency pt has SES?

--The pt will be older than ___ (often significantly older)

---?
---?
---?

Divergence insufficiency
- Spasm of the near
- Consecutive
- Cyclic

esotropia that is present at distance, but not at near
Comitant Esotropia

That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles secondary to trauma or increased ICP. Another cause to be aware of is secondary to involutional changes of the orbital structures. This can allow the globe to sag, altering the line-of-force between the LR and the globe, resulting in a too-inferior position of the globe. The classic presentation is that of an esotropia that is present at distance, but not at near.

What other findings will clue you in that your divergence-insufficiency pt has SES?
-- The pt will be older than 50 (often significantly older)
-- ?
-- ?
-- ?

Divergence insufficiency
- Spasm of the near
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That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles second to trauma or increased ICP. Another cause to be aware of is second to involutional changes of the orbital structures, including ligaments, intermuscular bands, and Tenon's capsule. Involutional changes to these structures allow the globe to sag, altering the line of force between the LR and the globe. This in turn renders normal levels of LR innervation inadequate to completely offset MR inputs, the result being a slight ET at distance. Because of its origin in involutional changes, this condition is called age-related distance esotropia. (It is known also by the more precise but less diplomatic term sagging eye syndrome). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

What other findings will clue you in that your divergence-insufficiency pt has SES?
--The pt will be older than 50 (often significantly older)
--The onset will be sudden vs gradual

esotropia that is present at distance, but not at near
That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures including ligaments, intermuscular bands, and Tenon's capsule. Involutional changes to these structures allow the globe to sag, changing the force between the LR and the globe. This in turn renders 'normal' levels of LR innervation inadequate to completely offset MR inputs, resulting in an esotropia. Because of its origin in involutional changes, this condition is called age-related distance esotropia. (It is known also by the more precise but less diplomatic term sagging eye syndrome). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

**What other findings will clue you in that your divergence-insufficiency pt has SES?**

--- The pt will be older than 50 (often significantly older)
--- The onset will be gradual
--- ?
--- ?

--- Esotropia that is present at distance, but not at near
--- Spasm of the near
--- Consecutive
--- Cyclic
Comitant esotropia

That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures: the check ligaments, intermuscular bands, and Tenon's capsule allow the globe to literally sag, altering the line-of-force between the LR and the globe. This in turn renders normal levels of LR innervation inadequate to completely offset MR inputs, resulting in a modest esotropia. The classic presentation is that of an esotropia that is present at distance, but not at near.

What other findings will clue you in that your divergence-insufficiency pt has SES?
--The pt will be older than 50 (often significantly older)
--The onset will be gradual
--A small vertical deviation may be present
That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures, involving ligaments, intermuscular bands, and Tenon's capsule. Involutional changes to these structures allow the globe to loosen between the LR and the orbital structures, incompletely offsetting MR inputs. This in turn results in an esotropia that is present at distance, but not at near. This condition is called age-related distance esotropia. (It is known also by the more precise but less diplomatic term sagging eye syndrome). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

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**Comitant Esotropia**

Comitant esotropia

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**What other findings will clue you in that your divergence-insufficiency pt has SES?**

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What other findings will clue you in that your divergence-insufficiency pt has SES?

--The pt will be older than 50 (often significantly older)
--The onset will be gradual
--A small vertical deviation may be present
--Involutional changes of the eyelid are often present

Comitant Esotropia

Divergence insufficiency

- Spasm of the near
- Consecutive
- Cyclic
Without Nystagmus

With Nystagmus

Accommodative

Nonaccommodative

Refractive

Nonrefractive

Congenital (onset < age 6 m)

Acquired (onset > age 6 m)

Comitant

esotropia

That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles 2ndry to trauma or increased ICP. Another cause to be aware of is 2ndry to involutional changes of the orbital structures: ligaments, intermuscular bands, and Tenon's capsule. Involutional changes allow the globe to sag, altering the line of force between the LR and the globe. This in turn renders 'normal' levels of LR innervation inadequate to completely offset MR inputs, the result being a modest esotropia that is present at distance, but not at near.

What other findings will clue you in that your divergence-insufficiency pt has SES?

--The pt will be older than 50 (often significantly older)
--The onset will be gradual
--A small vertical deviation may be present
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Comitant Esotropia

Divergence insufficiency

- Spasm of the near
- Consecutive
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What if, instead of an elderly pt with evidence of orbital involution, the divergence insufficiency pt is a young(er) high myope?

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.
That said, the more common causes of divergence insufficiency have nothing to do with inadequate supranuclear input. One such cause is mild weakness of one or both LR muscles secondary to trauma or increased ICP. Another cause to be aware of is secondary to involutional changes of the orbital structures responsible for suspending the globe within the orbital space—i.e., the check ligaments, intermuscular bands, and/or Tenon’s capsule. Involutional changes to these structures allow the globe to literally sag, and the too-inferior position of the globe alters the line-of-force between the LR and the globe. This in turn renders ‘normal’ levels of LR innervation inadequate to completely offset MR inputs, the result being the eyes are slightly ET at distance. Because of its origin in involutional changes, this condition is called *age-related distance esotropia*. (It is known also by the more precise but less diplomatic term *sagging eye syndrome*). Prisms, Botox injection of the MR muscles, and surgery have all proven safe and effective interventions.

**What if, instead of an elderly pt with evidence of orbital involution, the divergence insufficiency pt is a young(er) high myope?**

This pt may have Heavy Eye Syndrome (HES)

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

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):** \( ET \ll ET' \)

**Divergence insufficiency:** \( ET \gg ET' \)

- Sensory
- Spasm of the near
- Consecutive
- Cyclic

- Nystagmus blockage syndrome
- Latent nystagmus
- Ciancia syndrome

Refractive  Nonrefractive
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

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 response to .

Nonaccommodative

- Basic
- Sensory
- Divergence insufficiency
- Spasm of the near
- Consecutive
- Cyclic
Comitant esotropia

Congenital (onset < age 6 m)

- With Nystagmus
- Without Nystagmus

Acquired (onset > age 6 m)

- Accommodative

Nonaccommodative
- Basic
- Sensory
- Divergence insufficiency
  - Spasm of the near
- Consecutive
- Cyclic

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

Comitant Esotropia

Acquired (onset > age 6 m)

Congenital (onset < age 6 m)

With Nystagmus

Without Nystagmus

Accommodative

Nonaccommodative

- Basic
- Sensory
- Divergence insufficiency
- Spasm of the near
- Consecutive
- Cyclic

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Comitant esotropia

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

With Nystagmus  Without Nystagmus

Nonaccommodative
- Basic
- Sensory
- Divergence insufficiency
- Spasm of the near
- Consecutive
- Cyclic

Spasm of the near (aka convergence spasm) is almost always a functional 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.
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Comitant Esotropia

Comitant esotropia

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

With Nystagmus  Without Nystagmus  Accommodative

Nonaccommodative
- Basic
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Spasm of the near (aka convergence spasm) is almost always a functional 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.
Comitant esotropia

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

**Spasm of the near** (aka convergence spasm) is almost always a functional 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.
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.
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 two-words

- Basic
- Sensory
- Divergence insufficiency
- Spasm of the near
- Consecutive
- Cyclic
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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.
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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 esotropia** is a rare disorder in which a comitant ET is present intermittently, usually with a cycle time.
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.
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

Cyclic esotropia is a rare disorder in which a comitant ET is present intermittently, usually every other day. The typical pt is of preschool age.
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.
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.