Ocular Motor Potpourri

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You See What You Look For
Not What You Look At!

Questioning The 3-Step Test

THE 3-STEP TEST

- The Gold Standard for Diagnosis of Vertical Deviation
- Only Considers Single Cyclovertical Paretic Muscle
- Not overactions or tight (contracted) muscles

OBVIOUS PROBLEM

- Individual 3rd Nerve Branches Rarely Affected
Problems With The Three-Step Test

- Does Not Account For Muscle Contractures (e.g., Tight Superior Rectus)
- Does Not Account For Fibrotic Change
- May Result In A False Indication That One Muscle Is Paretic
- Post-Operative Evaluations Misleading
- Multiple muscles, DVD, skew, myasthenia

THREE STEP-STEP THREE
RSOP

1 RIR LIR
2 RSR LSR
3 SOP
4 RSOP

Congenital SOP
Most Common Causes Of Positive 3-Step Test:

- Superior Oblique Palsy (SOP)
- Tight Superior Rectus
- "Jampolsky Syndrome"

More Problems:
Large Horizontal Phorias With Concurrent Small Vertical
NORMAL EYES
OD Intorts
OS Extorts
( ) Means not active

SUPERIOR OBLIQUE PALSY

EXOTROPIA
Eye in action field of SR

ESOTROPIA
Eye in action field of SO

LESSON
- Think of SOP or Tight SR (SR Contracture)
- Very Rare to Have Isolated 3rd N Branch
  - Usually several muscles effected
- Head Tilt Test - Primary Overacting inferior obliques negative
  - DVDs Will Increase on Tilt to Opposite Side

FIXATION DURESS
NOTE HEAD POSITION

FIXATION DURESS

LEFT HEAD TILT

LEFT HEAD TILT

Congential SOP

Fixating With Paretic Eye
Facial Hypotrophy

FIXATION DURESS
- Patient Fixates With Paretic or Restricted Eye
- "Secondary angle of deviation"
- "Rising or Falling Eye"
- Results from strong eye dominance

Rising Eye

LESSON
- Always Perform Cover Test in Different Positions of Gaze and Versions
- Both CT and motilities should support the same diagnosis

Brown Syndrome
- Congenital (Or Acquired - "Click Syndrome")
- Can Be Unilateral Or Bilateral
- Looks Like Paresis OF IO-Inability To Elevate In Adduction
- Positive Forced Duction Test
- Usually Binocular In Primary Gaze

SO Tendon Sheath
SO “Click” Syndrome

- Brown syndrome that is associated with inflammatory conditions.
- Inflammation produces a nodule on the superior oblique tendon, just posterior to the trochlea, thus restricting tendon movement.

OS Brown Syndrome

Bilateral Brown: OD

-5

Bilateral Brown: OS

-5

BROWN OS

Treatment Options

- Steroid (Kenalog) injection or systemic anti-inflammatories if acquired
- Teach to “point nose where looking”
Lesson

- If No Strabismus is Revealed With Binocular Tests, Result Following Cycloplegia is Likely Due to Attempts to Overcome Hyperopia (Increased Mydriatics)

Decompensating Phorias

New or Long-Standing?

- Long-standing Latent Deviation That Becomes Manifest Because of Diminished Compensation
  - Age
  - Illness
  - Medication
  - Will Be Comitant (Usually)
  - Will Often Have Very Large Vergence Ranges

Lesson

- Careful History of Long-Standing Intermittent Problem
- Check For Comitance
- Check Vergence Ranges
- Look Carefully For "Bad Company"

Aberrant Regeneration

DEVELOPMENT OF ABERRANT REGENERATION

- LE
- RE
- 3rd N
PSEUDO GRAFE SIGN

ADDUCTION ON UPGAZE

BILATERAL LID-GAZE DYSKINESIS

ABERRANT REGENERATION

Causes Of Aberrant Regeneration

- Congenital
- Trauma
- Neoplasm
- ANEURYSM!!
Vascular / Ischemic Causes Of III N Palsy

- Diabetes Mellitus
- Hypertension
- Atherosclerosis

COMPARISON

<table>
<thead>
<tr>
<th>DIABETIC III</th>
<th>COMPRESSION III</th>
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<tbody>
<tr>
<td>Pain - Precedes Diplopia</td>
<td>Pain Usually Present</td>
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<tr>
<td>Pupil Involved 15%</td>
<td>Pupil Involved 95%</td>
</tr>
<tr>
<td>No Aberrant Regeneration</td>
<td>Aberrant Regeneration</td>
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<tr>
<td>Tends Toward Older Patients</td>
<td>Any Age</td>
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Lesson

- Interactions Between Muscles That Don’t Follow Normal Neurological Connections - Think Aberrant Regen
- Often Involves III N Innervated Muscles
- Unless Cause is Known, Worry About Aneurysm

Palsy Or Not Palsy?: That is the Question
CAUSES OF III N PALSY

When An Infant Can’t Abduct
- Duane Retraction Syndrome
- Tight MR / Cross Fixation

Duane Retraction Syndrome

Causes of VI N Palsy

With Tight MR or Cross-Fixation
- Patch Fixating Eye and Re-evaluate

Duane Retraction Syndrome (...Of Stilling-Turk-Duane)
- Lateral Rectus Is "Misbehaving"
- Likely VI N Nucleus Absent
- Likely III N Misdirection
- Reduced Or Absent Abduction
- Narrowing Of Palpebral Fissure With Co-Contraction Of MR And LR
- More Frequent In Females And Left Eye
Lesson

- Duane Patient May Be Eso, Exo, or Ortho
- "Lateral Rectus Misbehaving"
- Do Not Mistake For VN Palsy in Adult - No Diplopia

Dissociated Vertical Deviation (DVD)

- Appears At 2 -3 Years Of Age. Even After Earlier Surgery
- Most Commonly Seen in Congenital Esotropes
- May help control latent nystagmus (Guyton)
- Part of Accessory Optic System (Brodsky)
- Differential Diagnosis Is With Overacting Inferior Oblique, Skew Deviation

Note Retraction

LRP or Duane?

True Hyper or Dissociated Vertical Deviations (DVD)?
If a Vertical Deviation Appears to Disregard Hering’s Law - Think DVD

No Pathological Implications

Prescribe Prism?