

Neuro-Ophthalmic Manifestations in Children

A Practical Guide to Not Missing the Big Things

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Introduction: Why This Matters

- **Key Principle: Children are not miniature adults.**
 - . Their developing nervous system has unique vulnerabilities.
 - . Clinical signs can be subtle or atypical compared to adults.
- **Your Role is Critical**
 - . As pediatricians and optometrists, you are the first line of evaluation.
 - . Timely recognition is both **vision-saving** and **life-saving**.

Red Flag Symptoms - What to Listen For

Symptom	Clinical Pearls for Pediatrics
Headaches	Morning headaches, waking from sleep, or worsening with coughing/lying down are highly suspicious for elevated Intracranial Pressure .
Vision Changes	Ask about "graying out" of vision, especially with standing up (transient visual obscurations). This is a hallmark of papilledema.
Double Vision	Pre-verbal children will show you, not tell you. Look for a new squint, frequent eye rubbing, closing one eye, or a compensatory head posture (tilt or turn).
Eye Pain	Pain with eye movement is the classic sign of optic neuritis.
Systemic Signs	In infants, don't ignore the "soft signs": new irritability, lethargy, poor feeding, or a bulging fontanelle. They can be signs of neurologic distress.



Red Flag Signs - What to Look For on Exam

- **1. New Onset Strabismus:**
 - Especially an **esotropia** (inward turn). This is the classic sign of a **Sixth Nerve Palsy**, a potent "false localizing" sign of high ICP.
- **2. Pupil Abnormalities:**
 - **Anisocoria:** A newly dilated, poorly reactive pupil is a **Third Nerve Palsy** from compression. This is a neurologic emergency.
 - **Relative Afferent Pupillary Defect:** The swinging flashlight test is your best tool for detecting asymmetric optic nerve disease, like optic neuritis.
- **3. Ptosis:**
 - Can cause amblyopia on its own.
 - When combined with pupil changes or strabismus, it signals a **Third Nerve Palsy**.
- **4. Fundus Exam: The MOST Important Sign**
 - **Optic Disc Swelling:** This is the cardinal sign of elevated ICP. Finding this changes everything.

The Swollen Optic Disc - A Critical Distinction

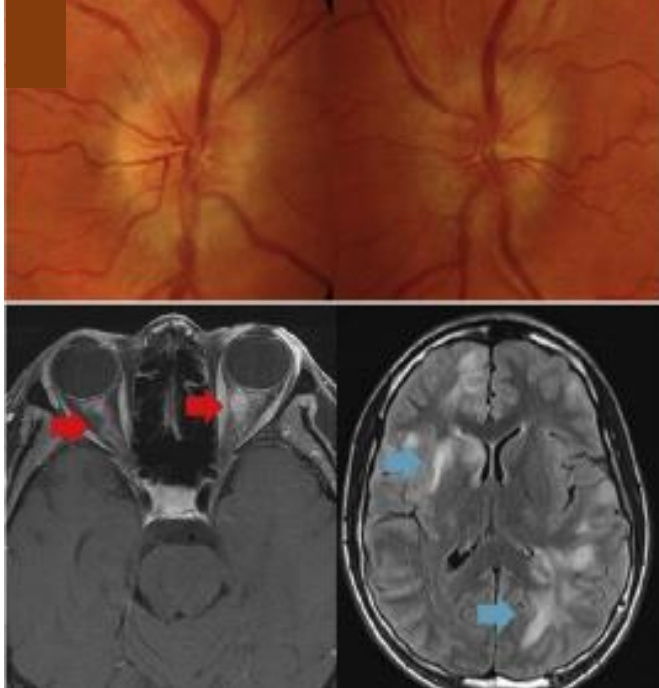


True Papilledema (Medical Emergency)	Pseudopapilledema (Benign Mimic)
Swollen, hyperemic (red), blurred margins	Elevated, "lumpy-bumpy" margins, no redness
Vessels obscured as they cross the disc margin	Clearly visible, anomalous branching pattern
Axoplasmic stasis from high ICP	Usually buried optic disc drusen

If the vessels are blurry at the edge of the disc, it's swelling until proven otherwise. When in doubt, refer!

Pediatric Optic Neuritis - A Modern View

- **Classic Presentation:**
 - *Bilateral* (unlike adults, which is usually unilateral)
 - Severe vision loss
 - *Prominent disc swelling* (papillitis) is common
 - Often follows a viral illness or vaccination
- **The Old vs. New Standard of Care:**
 - *Old Way:* Diagnose "optic neuritis," treat with steroids, and observe.
 - *New Way:* Optic neuritis is not a final diagnosis. It is the beginning of a workup to find the specific cause, which requires serologic testing.



MOGAD (MOG-IgG)	NMOSD (AQP4-IgG)	MS-Associated ON
Severe Disc Swelling	High risk of blindness	Often retrobulbar (no swelling)
Often Bilateral	Often Bilateral	Usually Unilateral
Good visual recovery	Often poor recovery	Good recovery
Steroids, IVIG	Steroids, Plasma Exchange	Steroids

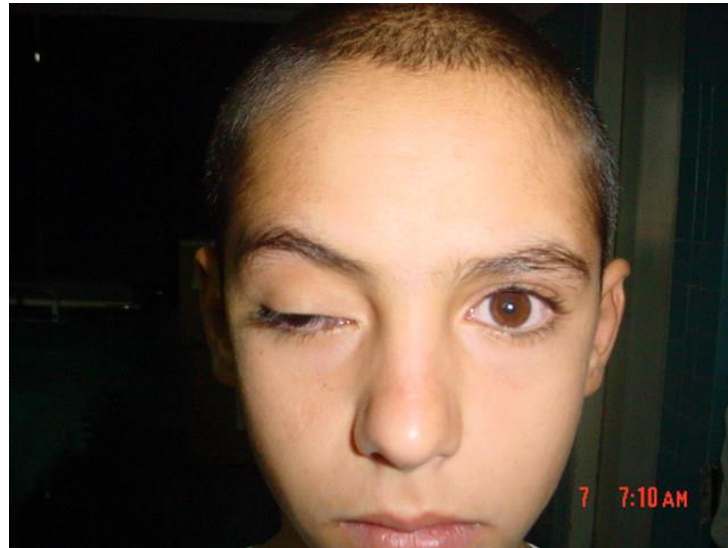
**Serum should be withdrawn for MOG-IgG and AQP4-IgG *before* starting steroids.
This testing determines prognosis and critical long-term therapy.**

Acquired Cranial Nerve Palsies - The Unbreakable Rule

- In **ADULTS**, the most common cause of an isolated nerve palsy is **microvascular ischemia** (diabetes, hypertension). The approach is often observation.
- **THIS IS NOT TRUE FOR CHILDREN.**
- In **CHILDREN**, the most common cause of an acquired, non-traumatic 3rd, 4th, or 6th nerve palsy is a **NEOPLASM**.
- **Rule: Acquired Cranial Nerve Palsy in a Child = Brain Tumor Until Proven Otherwise.**
- **Action:** This requires prompt, high-quality neuroimaging (MRI of the brain and orbits with and without contrast).













Key Takeaways

- **Trust the History:** Morning headaches and compensatory head postures are major red flags.
- **Examine the Fundus:** Finding optic disc swelling is a game-changer.
- **Know the Pediatric Rule:** An acquired cranial nerve palsy is a tumor until proven otherwise.
- **When in Doubt, Refer:** You are never wrong to ask for a second opinion on a child's vision or neurologic health.

Thank You & Questions?