How Do I Get Drops in Kids Eyes???

- Remain calm
- Child in supine position
- Instillation strategies
  - Describing feeling of drops
  - Counting to 10
  - Closed eyes
  - Use flavored drops
  - Drop on patient's hand
  - Enlist another

Dilation Drops?

- Tropicamide 1% or 0.5%
- Phenylephrine 2.5%
- Proparacaine?
  - May increase absorption through cornea
  - Eliminates stinging of tropicamide & cyclogel

Dilation Spray

- Bartlett spray
  - 0.5% cyclopentolate, 2.5% phenylephrine, 0.5% tropicamide
- Other spray options
  - 0.5% tropicamide, 2.5% phenylephrine
  - 1% cyclopentolate

When to Cycloplege?

- Strabismus or amblyopia
- ≥1.50 D hyperopia; suspected latent hyperopia
- ≥0.75 D anisometropia
- High esophoria or high lag of accommodation at near
- VA not corrected to predicted level
- Symptoms inconsistent with manifest refractive error
- Subjective responses variable / inconsistent during manifest refraction
- Prescription/vision fluctuation during dry ret/refraction
- Uncooperative or non-communicative patients
Cycloplegic Refraction Drops?

- Topical anesthetic (usually)
- 2 gtts cyclopentolate
  - 1% for children ≥ 1 year
  - 0.5% for children < 1 year
- Phenylephrine or tropicamide for mydriasis
- Wait 30 minutes

Timing of Cycloplegia

Tropicamide: Residual Accommodation

<table>
<thead>
<tr>
<th>Tropicamide at 30 minutes</th>
<th>Residual Accommodation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td></td>
</tr>
<tr>
<td>≤ 9</td>
<td>6.25 D</td>
</tr>
<tr>
<td>10 - &lt;15</td>
<td>3.25 D</td>
</tr>
<tr>
<td>15 - &lt;20</td>
<td>3.20 D</td>
</tr>
<tr>
<td>20 - &lt;30</td>
<td>3.10 D</td>
</tr>
<tr>
<td>30 - &lt;40</td>
<td>2.60 D</td>
</tr>
</tbody>
</table>

Milder B. Arch Ophthalmol 1961;66(1):70-72

Accommodative Esotropia

What Do I Need To Know?

Accommodative ET

- Refractive (normal AC/A)
  - +2.00 - 6.00 D, ave = +4.75 D
- Non-refractive (high AC/A)
  - ave = +2.25 D
- Combined

Risk of Esotropia Associated with Bilateral Hyperopia

<table>
<thead>
<tr>
<th>MEPEDS/BPEDS: 9070 AA, Hispanic, White Children 6-72 months</th>
<th>Odds Ratio*</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral SE Hyperopia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0 to &lt;=+1.00 D</td>
<td>reference</td>
<td>—</td>
</tr>
<tr>
<td>&lt;0.00 (myopia)</td>
<td>2.48</td>
<td>0.89 - 6.91</td>
</tr>
<tr>
<td>+1.00 to &lt;=2.00 D</td>
<td>1.81</td>
<td>0.71 - 4.62</td>
</tr>
<tr>
<td>+2.00 to &lt;=3.00 D</td>
<td>6.38</td>
<td>2.56 - 15.93</td>
</tr>
<tr>
<td>+3.00 to &lt;=4.00 D</td>
<td>23.06</td>
<td>9.65 - 55.61</td>
</tr>
<tr>
<td>+4.00 to &lt;=5.00 D</td>
<td>59.81</td>
<td>23.61 - 151.52</td>
</tr>
<tr>
<td>≥5.00 D</td>
<td>122.24</td>
<td>49.86 - 299.70</td>
</tr>
</tbody>
</table>

*Based on multivariate stepwise logistic regression model; adjusted for age, anisometropia, maternal smoking, gestational age.

*Significant Odds Ratio's (DR) in bold. * Level of hyperopia defined by less hyperopic eye

Accommodative ET: Characteristics

- Ave onset = 2-3 yrs (4 mo - 7 yrs)
- Onset gradual/intermittent; ↑ frequency & duration
- ≈20-40°; varies w/ accom & physical state
- Near angle > far angle, sometimes
- Sx: int diplopia, asthenopia, closing eye, none
- Initially no sensory adaptations

Diagnosis of Accommodative ET

- Characteristic onset
- Hyperopia +/- high AC/A
- Response to lenses****
- Follow-up is important

Parent Education - Tips

- The glasses seem to have made the ET worse!
- Will the glasses fix the ET?
- Will s/he always have to wear glasses?

Diagnostic Testing Pearl

Case Examples

Pseudoesotropia

- 32% of pts coded for ET in peds ophthalmol practice
- Follow up: 10% later diagnosed w/ ET

Sibert et al. AAPSO 2012;16(2):118-9.
Pediatric Bacterial Conjunctivitis

- Self-limiting
  - Antibiotic decrease severity & recovery time
- Most common causes
  - Haemophilus influenzae (gram -)
  - Streptococcus pneumonia (gram +)

Antibiotics for Infants

<table>
<thead>
<tr>
<th>Medication</th>
<th>Age Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythromycin Ointment 0.5%</td>
<td>Infants</td>
</tr>
<tr>
<td>Tobrex</td>
<td>≥ 2 mon</td>
</tr>
<tr>
<td>Moxeza</td>
<td>≥ 4 mon</td>
</tr>
<tr>
<td>Polytrim</td>
<td>≥ 2 mon</td>
</tr>
</tbody>
</table>

Antibiotics for ≥1 Year

<table>
<thead>
<tr>
<th>Medication</th>
<th>Age Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciloxan drops*</td>
<td>≥1 year</td>
</tr>
<tr>
<td>Ocuflox*</td>
<td>≥1 year</td>
</tr>
<tr>
<td>Quixin*</td>
<td>≥1 year</td>
</tr>
<tr>
<td>Zymaxid*</td>
<td>≥2 years</td>
</tr>
<tr>
<td>Vigamox</td>
<td></td>
</tr>
<tr>
<td>Besivance</td>
<td></td>
</tr>
<tr>
<td>Ciloxan ointment</td>
<td>≥2 years</td>
</tr>
<tr>
<td>Azasite</td>
<td>≥1 year</td>
</tr>
</tbody>
</table>

Pediatric Viral Conjunctivitis

- Upper respiratory infection common
- Cool compresses
- Artificial tears
- Patient education on hygiene
- May consider antibiotic if concerned about secondary infection

Pediatric Allergic Conjunctivitis

- Cool compresses, artificial tear use
- Antihistamines
- Mast cell stabilizers
- ★ Dual action agents
- Anti-Inflammatory agents
  - Steroidal
  - Non-steroidal

Dual-Action Allergy Meds for Kids

<table>
<thead>
<tr>
<th>Medication</th>
<th>Age Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lastacatf*</td>
<td>≥2 years</td>
</tr>
<tr>
<td>Elestat**</td>
<td></td>
</tr>
<tr>
<td>Bepreve</td>
<td></td>
</tr>
<tr>
<td>Optivar**</td>
<td>≥ 3 years</td>
</tr>
<tr>
<td>Zaditor (OTC)</td>
<td></td>
</tr>
<tr>
<td>Alaway (OTC)</td>
<td></td>
</tr>
<tr>
<td>Patanol</td>
<td></td>
</tr>
<tr>
<td>Pataday*</td>
<td></td>
</tr>
</tbody>
</table>

*1 x per day
** Generic Available
Anti-inflammatory Agents for Kids

<table>
<thead>
<tr>
<th>Medication</th>
<th>Age Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pred forte/Omnipred</td>
<td>Off Label Use</td>
</tr>
<tr>
<td>Durezol</td>
<td></td>
</tr>
<tr>
<td>Lotemax/Alex</td>
<td></td>
</tr>
<tr>
<td>FML/FML ointment</td>
<td>≥ 2 years</td>
</tr>
<tr>
<td>Acular (NSAID)</td>
<td>≥ 2 years</td>
</tr>
</tbody>
</table>

Combination Drugs

<table>
<thead>
<tr>
<th>Medication</th>
<th>Age Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobradex*</td>
<td>≥ 2 years</td>
</tr>
<tr>
<td>Maxitrol*</td>
<td></td>
</tr>
<tr>
<td>Zylet</td>
<td>Off Label Use</td>
</tr>
<tr>
<td>Pred G</td>
<td></td>
</tr>
</tbody>
</table>

*Generic available

What is Wrong with Her Eyes?

Abducens (VI CN) Paresis
Clinical Characteristics

- Noncomitant ET
- Abduction deficit
- Esotropia
  - Largest in affected field of gaze
  - Larger with affected eye fixing
  - Not always tropic
- ± Horizontal face turn toward involved eye

<table>
<thead>
<tr>
<th>CN Palsy</th>
<th>Trauma</th>
<th>Congenital</th>
<th>Neoplasic</th>
<th>Postviral</th>
<th>Undetermined</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

*Holmes et al. AJO 1999;127:388-92 – Incident cases in children

6th Nerve Palsy

Photos

What Else Could It Be?

Holmes et al (1999)
Duane Retraction Syndrome: Type 1
+ Abduction: limitation or absence of
+ Adduction:
  + Retraction of globe
  + Narrowing of palpebral fissure
  ± Upshoot or downshoot
  ± ET 1° gaze; Head turn toward involved eye

Duane Retraction Syndrome Tx
- Patient education/ reassurance
  – If NBV in 1°gaze & no objectionable head turn
- Ergonomics - advise regarding limitation of gaze
- ∆ (relieving or yoked)
- VT to improve VE skills in primary gaze, if needed
- Surgery reserved for:
  – Significant ET in primary gaze
  – Marked head turn

Acute-Onset Comitant Esotropia
- History
  – How / when first noted? Constant or intermittent?
  – Head tilt or turn?
  – Diplopia? Close / cover eye?
  – Anomalous head position in old photos?
  – Other systemic or neurological symptoms?

Diagnostic Testing
- Observation
- Cover testing
- Versions / ductions; comitancy testing
- Visual acuity & refraction
  – Amblyopia?
  – ET improve with plus?
- Pupils, EOMs, Confrontation fields
- Ocular health evaluation
  – Dilated examination important
    - Sensory ET/XT: Presenting sign for retinoblastoma

Eek - My Patient Has An Acute-onset Esotropia…….
Acute-Onset Comitant ET: Etiology

- Following occlusion
- Post physical, emotional shock, or stress
- Idiopathic
- Neurological causes

Acute-Onset Comitant ET

- Rule-out underlying neurological cause
- Neurological signs / symptoms warranting referral
  - Headache
  - ONH edema
  - Clumsiness, ataxia, gait imbalance
  - Nystagmus
  - Nausea or vomiting
  - Enlarged head size

Neurological Causes of Acute-Onset Comitant ET

- Neurological etiologies – non localizing lesions:
  - Cerebellar astrocytoma; cerebellar medulloblastoma; pontine glioma
  - Pseudotumor; posterior fossa pilocytic astrocytoma; nasopharyngeal angiofibroma
- Most have neurological signs & symptoms
- Rare but can have no other signs except the acute-onset ET

Pediatric Headaches
When Should I Worry?

Headache Comprehensive History

1. Specifics of headache
2. General medical history; academic performance; queries regarding anxiety, tension, depression
3. Symptoms of increased intracranial pressure or progressive neurological disease

Headache History

- Do you have the same kind of HA all the time or do you get more than 1 kind of HA?
- How long have you had HAs? How & when did they start?
- How often do you get HAs? How long do they usually last?
- Do you get HAs at any certain time? What time of the day generally? Any pattern? Weekends?
- Worse, better, or the same?
- Where is the pain? (location) What does the pain feel like? (pounding, squeezing, stabbing, other?)
- Other parts of your body involved when you have a HA? (nausea, vomiting, dizziness, vision changes, numbness, weakness or other symptoms?)

References:
Headache History

- Do you wake up at night or in the morning with HAs?
- Any warning signs that a HA is about to start?
- What do you do when you get a HA? Do you have to stop what you are doing (playing, working, studying)?
- Anything special cause you to get a HA?
- What helps your HA feel better or worse? Anything you do that makes your HA worse? Does taking medicine or eating foods give you a HA or make a HA worse?
- Taking any medicines for your HAs or for other reasons?
- Any other health problems or allergies?
- Anyone else in your family get HAs?
- What do you think might be causing your HAs?

Identify the Temporal Pattern

<table>
<thead>
<tr>
<th>Acute Recurrent (migraine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Non-progressive (tension)</td>
</tr>
<tr>
<td>Mixed (migraine &amp; tension)</td>
</tr>
<tr>
<td>Chronic Progressive (organic)</td>
</tr>
</tbody>
</table>

Organic Headache

- Chronic progressive
- ↑ in severity & frequency over several months
- Often from increased intracranial pressure (IICP)
  - Cerebral tumor*
  - Hydrocephalus
  - Subdural hematoma
  - Brain abscess
  - Pseudotumor cerebri

Symptoms of IICP

- Headache
- Lethargy
- Personality or behavior change
- Balance or coordination difficulties
- Seizures
- Loss of consciousness
- Neurological sx: weakness, numbness
- Nausea / vomiting
- Diplopia

Child with Brain Tumor Presenting with HA Complaint

- Likely: ≥ 1 other symptom & ≥ 1 neurologic sign
- ≥ 50% kids have ≥5 neurologic deficits
- <1% kids have no other symptoms other than HA

Symptoms Requiring Close Examination: Related to Organic HA

- More severe, lengthy, or frequent; chronic progressive
- Pain dull/steady (can be throbbing); not diminished by mild pain-killing drugs
- Acute onset, assoc w/ neck stiffness, lethargy, & vomiting
- Wakes child at night and morning HA
- Worse with cough, sneeze, strain, recumbence, sleep
- Changes in personality or behavior
- Abnormal signs on exam; visual or neurologic symptoms**
- Occipital HA’s uncommon in children; may be organic

Child with Headache

- Any chronic progressive HA
  → neurological workup
- Neurological signs on clinical examination
  → neuroimaging

Childhood Brain Tumor Consortium

Pediatric Migraine?

Pediatric Migraine: Clinical Features

- Duration 1-72 hrs; can be bilateral in children
- Relief after sleep: 94%
- Throbbing, pounding quality: 58%
- Nausea, vomiting, abdominal pain: 90%
- Family history of migraine: 69%
- Moderate to severe intensity
- Aggravated by physical activity
- Aura: 10-20% (usually visual for 5-10 min)
- Photophobia +/or phonophobia

Diagnostic Criteria: Pediatric Migraine

- ≥ 5 attacks of 1-72 hrs with at least 2 features:
  - Bi/unilateral frontal/temporal location
  - Pulsating/throbbing quality
  - Moderate to severe intensity
  - Exacerbation with physical activity
- Accompanied ≥ 1:
  - Nausea +/or vomiting
  - Photophobia +/or phonophobia

International Headache Society:
http://ihs-classification.org/en/02_klassifikation/02_teil1/01.01.00_migraine.html

Is This Child Malingering

Malingering

- Common in school-aged children
  - Different than malingering in adults
- Chief complaint usually reduced VA
  - Others: diplopia, eye pain
- May have abnormal findings on any subjective test
- Inconsistent test results common
- Rule-out pathological causes
### If Suspect Malingering?

- Rule-out refractive cause & ocular pathology
- Trial frame +/- 0.12 lenses
- Frames with plano lenses
- Trial frame refraction using lenses that cancel each other
- Different VA optotypes
- Measure VA starting with 20/10

### What Do You Tell the Parents & How?

- Discuss without child present
- Ask re: significant life changes or stressful events
- Can demonstrate TF lenses were of negligible power
- Refer to pediatrician or psychological evaluation if larger problem suspected

### Malingering vs. Psychogenic Vision Loss?

- **Malingering - purposeful**
  - False or grossly exaggerated symptoms for some benefit
  - Different in kids vs. adults
- **Psychogenic vision loss - not purposeful**
  - Not produced consciously or intentionally
  - Truly experiencing symptoms
  - Substitution of physical signs/sx for anxiety or emotional repression
  - **Tubular visual fields common**

### Is this Amblyopia?

### Amblyopia Diagnosis

- Unilateral (sometimes bilateral)
- BCVA worse than 20/20
- No structural or pathologic anomalies... AND....
- ≥ 1 of following occurring before age 6yrs:
  - **Constant unilateral** strabismus
  - Amblyogenic anisometropia
  - Amblyogenic bilateral isoametropia
  - Amblyogenic uni/bil astigmatism
  - Image degradation

Amblyogenic factor must be there (essentially) all the time!

### Key Point

**Amblyopia is NOT only a diagnosis of exclusion!!**
**Potentially Amblyogenic Refractive Error**

<table>
<thead>
<tr>
<th>Anisometropia</th>
<th>Isoametropia*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperopia</td>
<td>≥ 1.00 D</td>
</tr>
<tr>
<td>Myopia</td>
<td>≥ 3.00 D</td>
</tr>
<tr>
<td>Astigmatism</td>
<td>≥ 1.50 D</td>
</tr>
</tbody>
</table>

* 20/25 – 20/60 range

---

**Deprivation Amblyopia**

- Physical obstruction along line of sight - prevents formation of well-focused, high contrast image on retina(s):
  - Congenital cataract
  - Other media opacities
  - Significant ptosis
  - Prolonged occlusion

---

**Amblyogenic??**

- Constant alternating ET 25∆ D/N
- CRXT 20∆ at distance; IRXT 20∆ at near
- CRET 15∆ at distance; CLET 15∆ at near
- CRET 3∆ at distance and near
- PL -2.00 X 180 OD/OS
- OD: +1.50; OS: -2.00D
- OD: Plano; OS: +4.50D

**Stephanie (10 yrs) History**

- OD referral - cause of recently discovered ↓ VA LE at first eye exam?
- Parents/child unaware; passed school screenings
- OD sent for neurological eval & MRI - unremarkable
- Patient/family medical/eye history - unremarkable

---

**Stephanie: Clinical Findings**

- VA sc RE: 20/20 LE: 20/100-
- CT: Orthophoria D/N
- Stereopsis (Titmus): nil
- Color vision: normal
- Cycloplegic retinoscopy:
  - +0.25 DS (20/20)
  - −2.50 − 0.75 x 180 (20/100+1) PHNI
- Eye Health: unremarkable

**Patient Profile**

- Unilateral decrease in BCVA
- No organic cause
- No apparent strabismus
- No history of previous strabismus
- No history of significant anisometropia

*Unilateral Decreased Vision of Unknown Cause*
Diagnostic Strategy

• First, rule out:
  – Refractive error
  – Ocular pathology
• Then, evaluate the following:
  – Eye alignment
  – Monocular fixation
  • Visuosity

Visuosity: OS Covered

Central Fixation

4Δ BO Test

• Does NOT diagnose microtropia
• Diagnoses central suppression only!!
• Many atypical responses (normals & abnormals)
• Poor repeatability

Microtropia with Identity: <D = <EF

In Summary

Patient with Unilateral VA Decrease of Unknown Cause

Check for a Microtropia!

May save patient from costly and unnecessary neurological testing

When Should I Rx Plus for Near?

- It is not a panacea

Plus at Near: Treatment Option

- Convergence Excess
  - Near eso > distance eso
  - ± high lag on MEM, low PRA
- Accommodative Insufficiency
  - Low monoc accommodative amplitudes
  - ± High lag (MEM); ± Low PRA, difficulty with (-) on acc facility testing
- Pseudo CI
  - Really Al

Plus at Near Not Indicated

- Convergence insufficiency
  - XO near > XO far; receded NPC; poor BO'
- Accommodative excess
  - Lead on MEM
- Accommodative infacility??
  - Difficulty with both sides ±2.00D flipper lenses

How to Determine Near Plus Rx?

- For Convergence Excess
  - Lenses that provide desired alignment
    (eso reduced or eliminated at near)
- For AI or Pseudo CI
  - Lenses that produce normal lag on MEM
  - Normal lag on MEM: +0.25 to +0.75D
- Balance NRA/PRA??

Implementing Plus at Near?

- Reading glasses?
- Bifocals
- PALs

“She is Blinking All of the Time!”
**Excessive Blinking**

- Bilateral (89) > Unilateral (10)
- 6 months – 13 years
- 2:1 Boys
- Intermittent (79) vs. Constant (20)
- Characterized by
  - Excessive rate - 46
  - Excessive duration & force - 16
  - Both - 37
- Child complained to parents (29)


**Bilateral Blinking in 89 Children**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th># Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habit tic</td>
<td>21</td>
</tr>
<tr>
<td>Uncorrected refractive error</td>
<td>14</td>
</tr>
<tr>
<td>Conjunctivitis</td>
<td>14</td>
</tr>
<tr>
<td>Psychogenic</td>
<td>10</td>
</tr>
<tr>
<td>IXT or exophoria</td>
<td>10</td>
</tr>
<tr>
<td>Keratitis</td>
<td>5</td>
</tr>
<tr>
<td>Dry eyes</td>
<td>5</td>
</tr>
<tr>
<td>CNS disease</td>
<td>4</td>
</tr>
<tr>
<td>Lid abnormalities</td>
<td>3</td>
</tr>
<tr>
<td>Tourette syndrome</td>
<td>1</td>
</tr>
<tr>
<td>Unclassified</td>
<td>2</td>
</tr>
</tbody>
</table>


**Excessive Blinking - Rule Out**

- Anterior segment or eyelid disorder
- Uncorrected refractive error
- Intermittent strabismus / high phoria
- Routine neurologic & neuroimaging not indicated for isolated excessive blinking*
- Habit tic - management

## Common Medications Used in Treating Pediatric Conjunctivitis

### Common Medications Used for Pediatric Bacterial Conjunctivitis

<table>
<thead>
<tr>
<th>Medication</th>
<th>Class of Medication</th>
<th>Age Approved</th>
<th>Dosing</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ciloxan</strong> (Ciprofloxacin 0.3%) Solution</td>
<td>2nd generation Fluoroquinolone</td>
<td>≥1 year</td>
<td>1-2 drops every 2-4 hours for 2 days, then 1-2 drops QID for 5 days</td>
<td>Ulcer dosing: 2 drops every 30 minutes while awake and every hour to six hours while asleep for 2 days, days 3-7 instill 1-2 drops every hour, days 7-9 and beyond instill four times per day.</td>
</tr>
<tr>
<td><strong>Ciloxan</strong> (Ciprofloxacin 0.3%) Ointment</td>
<td>2nd generation Fluoroquinolone</td>
<td>≥2 years</td>
<td>-1 drop every 2 hours x 2 days, then 1 drop every 4 hours for 5 days</td>
<td>-1/2” ribbon on the lid TID x 2 days, BID x 5 days</td>
</tr>
<tr>
<td><strong>Ocuflox</strong> (Ofloxacin 0.3%)</td>
<td>2nd generation Fluoroquinolone</td>
<td>≥1 year</td>
<td>1-2 drops every 2-4 drops QID for 5 days</td>
<td>Ulcer dosing: 1-2 drops every 30 minutes while awake and every hour to six hours while asleep for 2 days, days 3-7 instill 1-2 drops every hour, days 7-9 and beyond instill four times per day.</td>
</tr>
<tr>
<td><strong>Quixin</strong> (Levofloxacin 0.5%)</td>
<td>3rd generation Fluoroquinolone</td>
<td>≥1 year</td>
<td>1 drop q2h x 2 days, then QID x 5 days</td>
<td></td>
</tr>
<tr>
<td><strong>Zymaxid</strong> (Gatifloxacin 0.5%)</td>
<td>4th generation Fluoroquinolone</td>
<td>≥1 year</td>
<td>1 drop q2h x 1 day, then BID-QID x 6 days</td>
<td></td>
</tr>
<tr>
<td><strong>Vigamox</strong> (Moxifloxacin 0.5%)</td>
<td>4th Generation Fluoroquinolone</td>
<td>≥1 year</td>
<td>1 drop TID x 7 days</td>
<td></td>
</tr>
<tr>
<td><strong>Besivance</strong> (Besifloxacin 0.6%)</td>
<td>Fluoroquinolone</td>
<td>≥1 year</td>
<td>1 drop TID x 7 days</td>
<td>Not available for systemic use</td>
</tr>
<tr>
<td><strong>Azasite</strong> (Azithromycin)</td>
<td>Macrolide</td>
<td>≥1 year</td>
<td>BID x 2 days, QD x 5 days</td>
<td></td>
</tr>
</tbody>
</table>
## Common Medications Used for Bacterial Conjunctivitis in Infants

<table>
<thead>
<tr>
<th>Medication</th>
<th>Class of Medication</th>
<th>Approved Ages</th>
<th>Dosing</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythromycin Ointment 0.5%</td>
<td>Macrolide</td>
<td>Infants</td>
<td>1 cm length ribbon to the eye up to 6x per day</td>
<td>Prophylaxis of ophthalmia neonatorum from N. gonorrhoeae and C. Trachomatis</td>
</tr>
<tr>
<td>Tobrex (Tobramycin 0.3% Soln &amp; Ointment)</td>
<td>Aminoglycoside</td>
<td>≥2 months</td>
<td>½ inch ribbon to eye TID – QID; 1-2 drops every 4 hours</td>
<td></td>
</tr>
<tr>
<td>Moxeza (Moxifloxacin)</td>
<td>4th generation Fluoroquinolone</td>
<td>≥4 months</td>
<td>BID x 7 days</td>
<td></td>
</tr>
<tr>
<td>Polytrim (Polymyxin B and Trimethoprim)</td>
<td>Polymyxin &amp; Dihydrofolate Reductase Inhibitor</td>
<td>≥2 months</td>
<td>1 drop every 3 hrs for 7-10 days</td>
<td>MRSA** susceptible to Trimethoprim</td>
</tr>
<tr>
<td>Medication</td>
<td>Class</td>
<td>Age Approved</td>
<td>Dosing</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------------</td>
<td>--------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td><strong>Alamast</strong> (Pemirolast potassium 0.1%)</td>
<td>Mast Cell Stabilizer</td>
<td>≥ 3 years</td>
<td>QID</td>
<td></td>
</tr>
<tr>
<td><strong>Opticrom, Crolom</strong> (Cromolyn Sodium 4%)</td>
<td>Mast Cell Stabilizer</td>
<td>≥ 4 years</td>
<td>QID</td>
<td></td>
</tr>
<tr>
<td><strong>Alomide</strong> (Lodoxamide tromethamine 0.1%)</td>
<td>Mast Cell Stabilizer</td>
<td>≥ 2 years</td>
<td>QID</td>
<td></td>
</tr>
<tr>
<td><strong>Alocril</strong> (Nedocromil sodium 2%)</td>
<td>Mast Cell Stabilizer</td>
<td>≥ 3 years</td>
<td>BID</td>
<td></td>
</tr>
<tr>
<td><strong>Emadine</strong> (Emastadine difumarate 0.05%)</td>
<td>Antihistamine</td>
<td>≥ 3 years</td>
<td>QID</td>
<td></td>
</tr>
<tr>
<td><strong>Lastacaft</strong> (Alcaftadine 0.25%)</td>
<td>Antihistamine</td>
<td>≥ 2 years</td>
<td>QD</td>
<td></td>
</tr>
<tr>
<td><strong>Elestat</strong> (Epinastine HCl 0.05%)</td>
<td>Antihistamine</td>
<td>≥ 2 years</td>
<td>BID</td>
<td></td>
</tr>
<tr>
<td><strong>Bepreve</strong> (Bepotastine besolate 1.5%)</td>
<td>Antihistamine Mast Cell Stabilizer</td>
<td>≥ 2 years</td>
<td>BID</td>
<td></td>
</tr>
<tr>
<td><strong>Optivar</strong> (Azelastrine hydrochloride 0.05%)</td>
<td>Antihistamine Mast Cell Stabilizer</td>
<td>≥ 3 years</td>
<td>BID</td>
<td></td>
</tr>
<tr>
<td><strong>Zaditor/Alaway</strong> (Ketotifen fumarate 0.025%)</td>
<td>Antihistamine Mast Cell Stabilizer</td>
<td>≥ 3 years</td>
<td>BID</td>
<td></td>
</tr>
<tr>
<td><strong>Patanol/Pataday</strong> (Olopatadine hydrochloride 0.1%/0.2%)</td>
<td>Antihistamine Mast Cell Stabilizer</td>
<td>≥ 3 years</td>
<td>BID/QD</td>
<td></td>
</tr>
</tbody>
</table>
# Common Medications Used in Treating Pediatric Conjunctivitis

## Common Anti-Inflammatory and Antibiotic/Steroid Combo Medication 2014

<table>
<thead>
<tr>
<th>Medication</th>
<th>Class</th>
<th>Age Approved</th>
<th>Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pred forte/Omnipred</strong> (Prednisolone acetate 1%)</td>
<td>Steroidal Anti-inflammatory</td>
<td>Safety and effectiveness in children has not been established</td>
<td></td>
</tr>
<tr>
<td><strong>Durezol</strong> (Difluprednate 0.05%)</td>
<td>Steroidal Anti-inflammatory</td>
<td>Safety and effectiveness in children has not been established</td>
<td></td>
</tr>
<tr>
<td><strong>Lotemax/Alrex</strong> (Loprednol etabonate 0.5%/0.2%)</td>
<td>Steroidal Anti-inflammatory</td>
<td>Safety and effectiveness in children has not been established</td>
<td></td>
</tr>
<tr>
<td><strong>FML/FML ointment</strong> (Fluorometholone acetate 0.1%)</td>
<td>Steroidal Anti-inflammatory</td>
<td>≥ 2 years</td>
<td>BID-QID/ ½” Ribbon 1-3 times daily</td>
</tr>
<tr>
<td><strong>Acular</strong> (Ketorolc tromethamine 0.5%)</td>
<td>Non-Steroidal Anti-Inflammatory</td>
<td>≥ 2 years</td>
<td>QID</td>
</tr>
<tr>
<td><strong>Tobradex</strong> (Tobramycin, Dexamethosone)</td>
<td>Steroidal Anti-Inflammatory Aminoglycoside</td>
<td>≥ 2 years</td>
<td>1 drop every 4-6 hours</td>
</tr>
<tr>
<td><strong>Maxitrol</strong> (Neomycin, Polymyxin B, Dexamethosone)</td>
<td>Steroidal Anti-Inflammatory Aminoglycoside</td>
<td>≥ 2 years</td>
<td>1 drop every 4-6 hours</td>
</tr>
<tr>
<td><strong>Zylet</strong> (Loteprednol and Tobramycin)</td>
<td>Steroidal Anti-Inflammatory Aminoglycoside</td>
<td>Safety and effectiveness in children has not been established</td>
<td>1 drop every 4-6 hours</td>
</tr>
<tr>
<td><strong>Pred G</strong> (Gentamicin and Prednisolone)</td>
<td>Steroidal Anti-Inflammatory Aminoglycoside</td>
<td>Safety and effectiveness in children has not been established</td>
<td>1 drop 2-4 times daily</td>
</tr>
</tbody>
</table>
Comprehensive Case History for Headaches

- How long have you had headaches? ___________
- How and when did they start? __________________

- How often do you get headaches? ______
- How long do they usually last? __________________

- Are the headaches getting worse than they used to be, better, or staying the same? __________________
- Do you have the same kind of headache all of the time or do you get more than one kind of headache? _______

- Where is the pain (location)? __________________

- What does the pain feel like? (pounding, squeezing, stabbing, other?) __________________

- Are other parts of your body involved when you have a headache? (e.g., nausea, vomiting, dizziness, vision changes, numbness, weakness or other symptoms?) __________________

- What do you do when you get a headache? __________________

- Do you have to stop what you are doing (playing, working, studying)? YES_______ NO______

- What helps your headache feel better or worse? Is there anything you do that makes your headache worse? __________________

- Does taking medicine or eating foods give you a headache or make a headache worse? __________________

- Is there anything special that causes you to get a headache? __________________

- Do you get headaches at any certain time? What time of the day generally? Any pattern? On weekends? __________________

- Do you wake up at night or in the morning with headaches? NO YES________________

- Do you have any warning signs that a headache is about to start? NO YES: explain________________

- Are you taking any medicines for your headaches or for other reasons? NO YES: list______________

- Do you have any other health problems or allergies? NO YES: ______________________________

- Does anyone else in your family get headaches? NO YES: who and what kind?________________

- What do you think might be causing your headaches? __________________

Susan Cotter, OD, MS

Headaches in Kids
Migraine Triggers

“Triggers” are specific factors that may increase your risk of having a migraine attack. The migraine sufferer has inherited a sensitive nervous system that under certain circumstances can lead to migraine.

Triggers do not ‘cause’ migraine. Instead, they are thought to activate processes that cause migraine in people who are prone to the condition. A certain trigger will not induce a migraine in every person; and, in a single migraine sufferer, a trigger may not cause a migraine every time. By keeping a headache diary, you will be able to identify some triggers for your particular headaches.

Once you have identified triggers, it will be easier for you to avoid them and reduce your chances of having a migraine attack.”

—American Council for Headache Education

<table>
<thead>
<tr>
<th>Categories</th>
<th>Triggers</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary</td>
<td>Skipping meals/fasting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specific foods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medications</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>See reverse</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overuse of over-the-counter medications can cause rebound headaches (e.g. using ibuprofen, Excedrin Migraine more than 2 days per week). Also, missed medication doses and certain medications (e.g. nitroglycerine, indomethacin) may cause headaches.</td>
</tr>
<tr>
<td>Sleep</td>
<td>Changes in sleep patterns</td>
<td>Napping, oversleeping, too little sleep</td>
</tr>
<tr>
<td>Hormonal</td>
<td>Estrogen level changes and fluctuations</td>
<td>Menstrual cycles, birth control pills, hormone replacement therapies, peri-menopause, menopause, ovulation</td>
</tr>
<tr>
<td>Environmental</td>
<td>Weather</td>
<td>Weather and temperature changes, extreme heat or cold, humidity, barometric pressure changes</td>
</tr>
<tr>
<td></td>
<td>Bright lights</td>
<td>Bright or glaring lights, fluorescent lighting, flashing lights or screens</td>
</tr>
<tr>
<td></td>
<td>Odors/pollution</td>
<td>Smog, smoke, perfumes, chemical odors</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>High altitude, airplane travel</td>
</tr>
<tr>
<td>Stress</td>
<td>Periods of high stress, including life changes</td>
<td>Factors related to stress include anxiety, worry, shock, depression, excitement, mental fatigue, loss and grief. Both “bad stress” and “good stress” can be triggers. How we perceive and react to situations can trigger (or prevent) migraines. Other triggers can include unrealistic timelines or expectations of oneself.</td>
</tr>
<tr>
<td></td>
<td>Accumulated stress</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reacting quickly and easily to stress</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repressed emotions</td>
<td></td>
</tr>
<tr>
<td>Stress letdown</td>
<td></td>
<td>Weekends, vacations, ending a project or stressful task (including presentations, papers, or exams)</td>
</tr>
<tr>
<td>Physical</td>
<td>Overexertion Injuries</td>
<td>Over-exercising when out of shape, exercising in heat, marathon running</td>
</tr>
<tr>
<td></td>
<td>Visual triggers</td>
<td>Eyestrain (if you wear glasses, make sure your prescription is current), bright or glaring lights, fluorescent lighting, flashing lights or computer screens</td>
</tr>
<tr>
<td></td>
<td>Becoming tired or fatigued</td>
<td></td>
</tr>
</tbody>
</table>
Dietary Triggers

Food triggers do not necessarily contribute to migraines in all individuals, and particular foods may trigger attacks in certain people only on occasion. Be your own expert by keeping a journal of foods you have eaten before a migraine attack and see whether the removal or reduction of certain foods from your diet improves your headaches.

Skipping meals, fasting, and low blood sugar can also trigger migraines. If you’re unable to follow a normal eating schedule, pack snacks.

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Not known to trigger migraines</th>
<th>Possible triggers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverages</td>
<td>Fruit juice, club soda, noncola soda (7-Up, gingerale), decaffeinated coffee, herbal tea, soy milk, rice milk. Limit caffeine sources to 2 cups/day (coffee, tea, cola).</td>
<td>Chocolate and cocoa. Alcoholic beverages (especially red wine, beer, and sherry). Caffeine (even in small amounts) may be a trigger for some people.</td>
</tr>
<tr>
<td>Fruits</td>
<td>Any except those to avoid. Limit citrus fruits to ½ cup/day. Limit banana to ½ per day.</td>
<td>Figs, raisins, papayas, avocados (especially if overripe), red plums, overripe bananas.</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Any except those to avoid.</td>
<td>Beans such as broad, fava, garbanzo, Italian, lima, navy, pinto, pole. Sauerkraut, string beans, raw garlic, snow peas, olives, pickles, onions (except for flavoring).</td>
</tr>
<tr>
<td>Bread &amp; Grains</td>
<td>Most commercial breads, English muffins, melba toast, crackers, RyKrisp, bagel. All hot and dry cereals. Grains such as rice, barley, millet, quinoa, bulgur. Corn meal and noodles.</td>
<td>Freshly baked yeast bread. Fresh yeast coffee cake, doughnuts, sourdough bread. Breads and crackers containing cheese, including pizza. Any product containing chocolate or nuts.</td>
</tr>
<tr>
<td>Meat, fish, poultry</td>
<td>Fresh or frozen turkey, chicken, fish, beef, lamb, veal, pork. Egg (limit to 3 eggs/week). Tuna or tuna salad.</td>
<td>Aged, canned, cured or processed meat, including ham or game, pickled herring, salted dried fish, sardines, anchovies, chicken livers, sausage, bologna, pepperoni, salami, summer sausage, hot dogs, pâté, caviar. Any food prepared with meat tenderizer, soy sauce or brewer’s yeast. Any food containing nitrates, nitrites, or tyramine.</td>
</tr>
<tr>
<td>Soups</td>
<td>Soups made from foods allowed in diet, homemade broths.</td>
<td>Canned soup, soup or bouillon cubes, soup base with autolytic yeast or MSG. Read labels.</td>
</tr>
<tr>
<td>Desserts</td>
<td>Fruit allowed in diet. Any cake, pudding, cookies, or ice cream without chocolate or nuts. JELL-O.</td>
<td>Chocolate ice cream, pudding, cookies, cakes, or pies. Mincemeat pie. Nuts. Any yeast-containing doughs and pastries.</td>
</tr>
<tr>
<td>Sweets</td>
<td>Sugar, jelly, jam, honey, hard candy</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Salt in moderation, lemon juice, butter or margarine, cooking oil, whipped cream, and white vinegar. Commercial salad dressings in small amounts as long as they don’t have additives to avoid.</td>
<td>Nutrasweet, monosodium glutamate (MSG), yeast/yeast extract, meat tenderizer (Accent), seasoned salt, mixed dishes, pizza, cheese sauce, macaroni and cheese, beef stroganoff, cheese blintzes, lasagna, frozen TV dinners, chocolate. Nuts and nut butters. Pumpkin, sesame and sunflower seeds. Anything fermented, pickled or marinated. Some aspirin medications that contain caffeine. Excessive amounts of Niacin (Niacinamide is fine). Excessive Vitamin A (over 25,000 I.U. daily).</td>
</tr>
</tbody>
</table>