Vision and eye issues affecting individuals with Down syndrome

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Q1. At what age and how often do I need to have my child’s eyes examined?

Q2. What eye problems do I need to watch out for?

Q3. Why do so many people with DS wear glasses?

Q4. Why do doctors use dilating drops during the eye examination?
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When should we get an eye exam?

- See pediatric ophthalmologist by 6 months of age.
- 1 – 5 years of age – every year
- 5 – 13 years of age – every 2 years
- 13 – 21 years of age – every 3 years
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What do I need to look out for?

- Eye misalignment
- Squinting
- Nystagmus
- Head tilting
- Eye drainage
- Eye rubbing
What do I need to look out for?

- Eye misalignment - **Strabismus**
- Squinting
- Nystagmus
- Head tilting
- Eye drainage
- Eye rubbing
Pseudostrabismus: “false” or “fake” eye misalignment
What do I need to look out for?

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Eye Misalignment - **Strabismus**

- Eye crossing is “**Esotropia**”
- Outward turning of an eye is “**Exotropia**”
- Vertical misalignment
Accommodative Esotropia
Nonaccommodative Esotropia

Pre-op

Post-op
Nonaccommodative Esotropia

Pre-op

Post-op
How successful is surgery?

• For people without DS, surgery is successful in 80-90% of cases.
• For people with DS, Cincinnati Children’s case-control study data indicates similar outcomes.
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Nystagmus

• Occurs in about 10% of children with DS but only 1/1000 without DS.
• Usually improves with age.
• May be due to significant eye disease that needs early treatment.
• Usually not associated with neurological disorder.
Head tilting or “torticollis”

- Eye misalignment
- Squinting
- Nystagmus
- Head tilting
- Eye drainage
- Eye rubbing

~30 degrees
Head tilt corrected with eye surgery

Pre-op

Post-op
What do I need to look out for?

• Eye misalignment
• Squinting
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• Head tilting
• Eye drainage
• Eye rubbing
Eye drainage

- If the eyeball is not red then usually due to a **blocked tear duct** or “nasolacrimal duct obstruction.”
- Usually begins before 3 months of age
- Worse with colds and ear infections
Blocked tear duct surgery
Blocked tear duct

• Treatment
  • Massage
  • Topical antibiotics
    • Kill bacteria but do not relieve the blockage
    • Nothing works like “Drāno”.
  • Surgery
Blocked tear duct surgery

- Tear duct probing and irrigation
  - Less successful in children with DS
- Balloon dacryoplasty
- Tear duct stent
- Dacryocystorhinostomy (DCR)
What do I need to look out for?

- Eye misalignment
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- Eye rubbing
Eye rubbing caused by **Blepharitis**

- Dry or oily skin accumulation at the base of the lashes
Eye rubbing caused by **Blepharitis**

- May have associated “chalazion” or “hordiolum”
- Treatment
  - Warm compresses
  - Baby shampoo scrubs
  - Topical or oral antibiotics
  - Other topical medications
  - Surgery
**Keratoconus** may be caused by eye rubbing.

- 0.5 – 18% of adolescents with DS
- Cornea becomes thin and cone-shaped
- Associated with eye-rubbing
- Decreased visual acuity due to severe astigmatism and corneal opacification
- Risk of corneal perforation
Keratoconus Treatment

**Typical**
- Glasses
- Soft contacts
- Rigid contacts
- Corneal Transplant

**Down Syndrome**
- Glasses
- Corneal Transplant

*Corneal collagen crosslinking*
Keratoconus Intervention
Collagen Crosslinking

- Slows progression of disease
- Riboflavin and UV light
- Favorable results in European literature
- Not FDA approved
Corneal Collagen Crosslinking

**US Trials**

- Multicenter clinical trial – topical anesthesia only
- Drs. Erin Stahl and Scott Olitsky (Kansas City) – single center trial using general anesthesia
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• Because they look cool!
• Refractive errors
  • Farsightedness
  • Nearsightedness
  • Astigmatism
• Anisometropia
• Accommodative insufficiency
• Esotropia
Refractive Errors
Refractive Errors in DS

- Almost all babies are born farsighted (small eye) but outgrow it as the eye enlarges with age.
- Birth to 2 years old – Most children with DS have farsightedness similar to typical children.
- Failure of emmetropization during childhood.
Refractive Errors

*Normal* eye
Refractive Errors

Farsighted - Hyperopia

Nearsighted - Myopia

Normal eye
Refractive Errors in DS

- Teenagers and young adults
  - Most have significant refractive error
  - Persistent farsightedness
  - Acquired nearsightedness
  - Astigmatism
Refractive Errors - Astigmatism

- Oblique astigmatism
Accommodation

Normal accommodation

Abnormal accommodation

Normal eye
Accommodative Insufficiency

- Most children with Down syndrome
- Detect with dynamic retinoscopy
- Bifocals may improve accommodation
Tips on Glasses for toddlers and preschoolers

• Need a **good fit**!
  • Erin’s World frames (specs4us.com) & others

• **Consistency** is key!
  • Set aside time
  • Can start 5 minutes per day and work up
  • Books, toys, songs - keep hands busy
  • Wear glasses at PT, OT, Speech and pre-school

• **Strap** or no strap?
Refactive Surgery in DS

• If vision is expected to be much better with glasses but glasses cannot be worn.

• Refractive errors
  • Nearsighted
  • Farsighted
  • Astigmatism
Refractive Surgery in DS

- Laser surgery:
  - LASIK
  - PRK

- Incisional surgery
  - Clear lens exchange
  - Phakic intraocular lens implant

- Investigational, little data
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Dilating Drops

• Necessary to examine for cataract and focusing power of eye (refraction)

• Providers
  • Ophthalmologist (M.D.)
    • Pediatric Ophthalmologist (aapos.org)
  • Optometrist (O.D.)
  • Optician