Specialty Contacts for Kids

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Global Specialty Lens Symposium
January, 2024
Las Vegas, Nevada

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Disclosures

Vision Service Plan

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Introduction

- Standard contacts lenses for kids to correct for refractive error
- Kids with pathology requiring specialty contact lenses
  - Pediatric Aphakia
  - Overnight orthokeratology
  - Pediatric Keratoconus
  - Refractive Amblyopia

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Case #1: Pediatric Aphakia

- 8 year old male referred by pediatric ophthalmologist for CL fitting
- History of bilateral aphakia S/P cataract extraction, lensectomy and vitrectomy
- Congenital Cytomegalovirus (CMV) Syndrome
- Esotropia S/P bilateral medial rectus resection
- Aphakic glaucoma OD, Glaucoma suspect OS
  - Xalatan qhs and Cosopt bid

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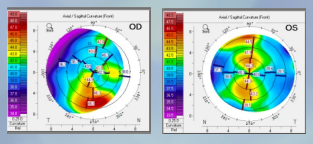
Case #1: Pediatric Aphakia

- Current spectacle Rx
  - OD: +18.00 -2.50 x 165 / Add +2.75 DVA 20/50 NVA 20/30
  - OS: +17.50 -3.00 x 003 / Add _2.75 DVA 20/50 NVA 20/30
- K readings:
  - OD: 40.60 / 42.10 @ 43.0
  - OS: 40.10 / 44.00 @ 82.0
- HVID:
  - OD: 7.0 mm
  - OS: 8.0 mm



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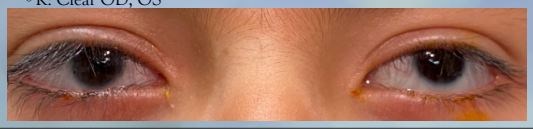
Case #1: Pediatric Aphakia

- SLE
  - L/L: inferior lid margin 3 mm below inferior limbus OD, OS
  - Conj: W/Q OD, OS
  - K: Clear OD, OS



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Case #1: Pediatric Aphakia

- Diagnostic evaluation with Advanced Vision Technology PediaSITE GP
  - OD: 8.31 BC / 6.8 OAD – well centered, good central fit, tight edge
  - OS: 8.31 BC / 6.8 OAD – inferior decentration, marginal central fit, tight edge
- Final lenses:
  - OD: +22.87 / 8.31 BC / 6.8 OAD / 3 FLAT edge / - lenticular / Optimum Extreme / green with dot
  - OS: +22.62 /+20.12 / 8.37/7.90 BC / 6.8 OAD / 2 FLAT edge / - lenticular / Optimum Extreme / blue no dot

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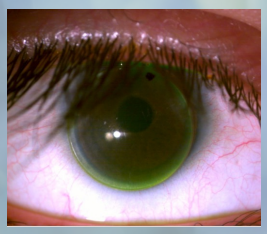
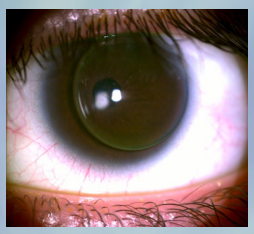
Case #1: Pediatric Aphakia

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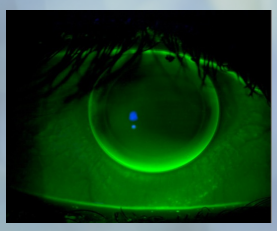
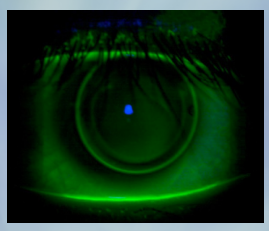
Case #1: Pediatric Aphakia

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Congenital Cytomegalovirus (CMV) Syndrome

- Occurs when an infant is infected with CMV before birth
- Most infants do not develop any symptoms
- 10% develop health problems
  - Lungs
  - Liver / spleen
  - Hearing loss
  - Vision loss
  - Intellectual disabilities
  - Seizures
  - Small head size
  - Lack of coordination

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Congenital CMV Syndrome

- Leading cause of congenital cataracts
- No direct link between CMV and microcornea or microphthalmia
- Both are associated with developmental disruption during embryologic stages

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Case #1: Pediatric Aphakia

- Congenital cataracts
  - Increased risk of complication due to extension of sensitivy period beyond age 4.5
  - Fragile nature of visual system during developmental period
  - Any disruption -> permanently decreased vision and binocular vision disorder
  - Amblyopia and strabismus

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Case #1: Pediatric Aphakia

- Infants and children with IOL implants after cataract extraction are more likely to develop strabismus
- American Academy of Ophthalmology
  - Keep child aphakic after lens extraction
  - Best Corrected with contact lenses

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Pediatric Aphakia and Secondary Glaucoma

- Time of surgery is strongest predictor for developing glaucoma
  - Younger child → higher risk
- Corneal diameter
  - Small corneal diameter -> higher risk

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Pediatric Aphakia and Contact Lenses

- High Dk materials
  - High plus Rx
  - Thick center
- Silicone Hydrogel (SiHy) soft CLs
- Gas Permeable CLs
  - Smaller OAD
  - Minus lenticular
  - Two different colors

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Overnight Orthokeratology (OK)

- History
  - Ancient China
  - 1960's – George Jessen: orthofocus
    - PMMA lenses fit flat, worn during the day
    - Months of treatment
    - Progressive flattening
- 1970's and 80's – OK lost popularity
  - Unpredictability
  - Complications from low Dk lenses
  - Length of treatment
- 2002
  - FDA approved Paragon CRT lenses

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Modern Orthokeratology (OK)

- Non surgical
- Reverse geometry corneal GP
- Typically worn overnight
- Reshapes the cornea
- Temporarily decreases myopia

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Benefits of Orthokeratology (OK)

- Alternative to LASIK
- Active patients
- Non surgical
- Reversible
- Reduces myopia progression

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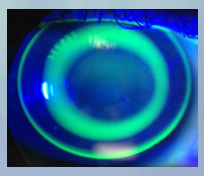
Paragon Corneal Refractive Therapy (CRT)

- FDA approved for up to
  - -6.00 D of myopia
  - -1.75 D of Astigmatism
- No age restrictions
- Two optic zone diameters
  - Standard 6 mm OZ
  - 5 mm OZ
    - Smaller optic zone = larger area for peripheral hyperopic defocus
    - Better for myopia control
- Dual Axis available for corneal astigmatism



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Other Overnight Orthokeratology Designs

- Dream Lens (Truform)
- Moon Lens (Art Optical)
- REM Lens (Xcel)
- Euclid / Euclid Toric / Euclid Max / Euclid Max Toric
- WAVE

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Overnight OK Clinical Pearls

- Calculate Internal Astigmatism
- Patient selection
- Follow up schedule
- Realistic Expectations
- Parent involvement

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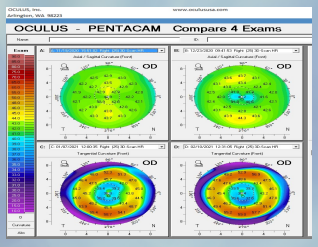
Overnight OK Clinical Pearls

- Centration Centration Centration
- Corneal Topography at every follow up
- In the first 2-4 weeks, If fit and over refraction are OK, resist the urge to change



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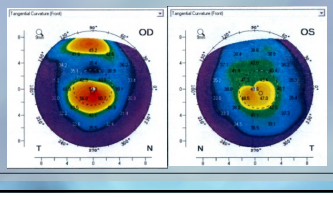
Case #2: Pediatric Keratoconus

- 12 year old male referred by local OD with suspicion of keratoconus
- Previous ocular and medical history unremarkable
- VA sc:
  - OD: 20/100 ph: 20/50 -
  - OS: 20/60 ph: 20/30 -
- Manifest
  - OD: -10.00 -3.50 x 030. DVA: 20/50 -
  - OS: -1.50 -3.25 x 090 DVA 20/30 –
- K_{s}
  - OD: 49.7/51.8 @ 132
  - OS: 44.1/47.4 @ 031



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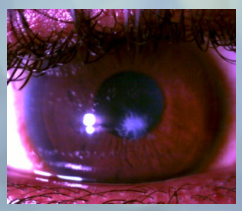
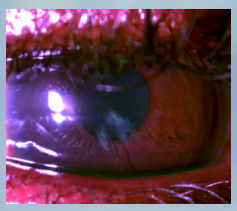
Case #2: Pediatric Keratoconus





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Case #2: Pediatric Keratoconus

- Corneal GPs:
  - Rose K 2 in Boston ES
  - OD: -14.75 / 5.90 BC / 8.7 OAD / green with dot DVA: 20/40-
  - OS: -7.00 / 6.8 BC / 8.7 OAD / blue NO dot DVA: 20/30–
- Patient returned for 4 insertion and removal training visits
- Finally dispensed
- At 1 week follow up, patient presents uncorrected.
- Patient reports that lenses are "painful, he can't wear them"
- What next?

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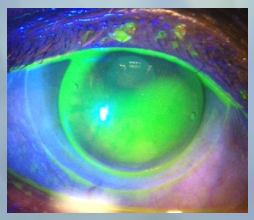
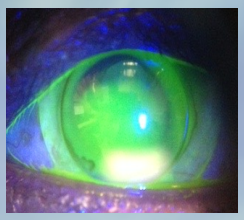
Case #2: Pediatric Keratoconus – Piggyback System

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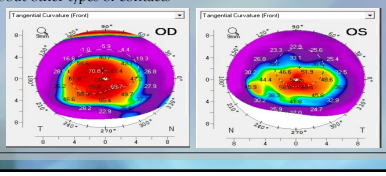
Case #2: Pediatric Keratoconus

- 2 years later, patient is now 14 years old
- Patient has been wearing piggy back system, but reports blurred vision and discomfort
- Patient and mom ask about other types of contacts
- K's
- OD: 63.0 / 73.8
- OS: 60.3 / 81.0



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Case #2: Pediatric Keratoconus

- Scleral Lenses
- Corneal Cross Linking
  - April 2016, FDA approved Avedo Inc's corneal cross linking system
  - Progressive keratoconus and post LASIK ectasia
  - Approved for age 14 and up.

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Corneal Cross Linking

- **Epithelium Off**
  - FDA Approved
  - May be more effective in slowing progression of KC
  - More post op complications
    - Pain
    - Keratitis
    - Epithelial healing problems
    - Endothelial damage
    - Diffuse lamellar keratitis post LASIK
- **Epithelium On / Transepithelial**
  - Off Label – no approved FDA protocol
  - Faster recovery
  - Less pain
  - Thinner corneas
  - Return to CL wear faster
  - May be less effective in halting progression of KC

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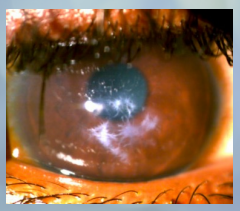
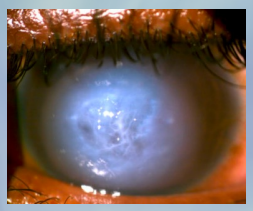
Case #2: Pediatric Keratoconus - Hydrops

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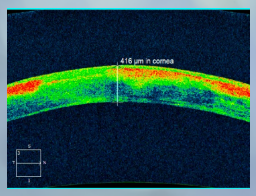
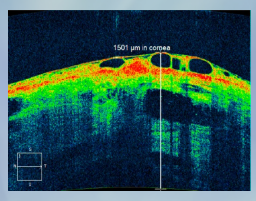
Case #2: Pediatric Keratoconus - Hydrops





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Corneal Hydrops

- Occurs in 2-3% of patients with keratoconus
- Break in Descemet layer and endothelium
- Allows aqueous to enter the corneal
- Stromal corneal edema → blurred vision
- Epithelial microcysts
  - If microcysts rupture → pain

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Corneal Hydrops

- May resolve spontaneously over 2-6 months
- Treatments may include
  - Muro 128
  - Topical antibiotic – if microcysts rupture causing epithelial defects
  - Topical steroids – debatable
  - Cycloplegics – if microcysts rupture causing pain
- IOP lowering medications
  - Decrease aqueous production → less aqueous getting into cornea
  - Increase aqueous outflow → less aqueous getting into cornea
- Surgical treatment
  - Intracameral gas bubble may hasten healing time
  - Penetrating keratoplasty if visually significant scarring develops after healing.

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Case #3: Occlusive Contact Lens

- 6 year old male
- History of refractive amblyopia due to anisometropia OS
- Referred by Pediatric OD for CL evaluation
- Refraction:
  - OD: plano sph BCVA 20/20
  - OS: +5.00 sph BCVA 20/80
- Intermittent accommodative esotropia

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Case #3: Occlusive Contact Lens

- Prescribed daily disposable contact lens OS
  - BCVA c CL OS: 20/80
- Fit with prosthetic black pupil contact lens OD
- Co-Manage with Pediatric OD for vision therapy
- Over time, BCVA OS improved to 20/30 with contact lens

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Case #3: Occlusive Contact Lens

- Black center 1-2 mm larger than pupil size in dim illumination
- Worn only during vision therapy sessions and home VT
- Conventional soft contact lens
- Low dK
- Disinfect with multipurpose cleaner to prevent fading of color
- Discontinue occlusive contact lens wear when vision therapy completed

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Clinical Pearls

- Contact lenses for children can provide good vision but also improve self esteem and be more convenient for sports and activities
- Cataract on children has risks and potential complications, but not removing a congenital cataract will cause deprivational amblyopia
- Pediatric aphakic patients typically have a very high plus refractive error
- Paragon CRT lens are FDA approved for up to -6.00 D of myopia and -1.75 D of astigmatism but internal astigmatism must be calculated
- Corneal cross linking is FDA approved for progressive keratoconus in patients as young as age 14

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Thank you!

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