Building a Myopia Control Practice

Andrew D. Pucker, OD, PhD, FAAO, FSLS
Assistant Professor

Why Should You Open a Myopia Control Clinic?

1. Myopia control options likely work
2. A huge myopic population exists
3. We should inform our patients
4. We should inform our students
5. Myopia control can generate revenue

Disclosures

• I have been supported by the following organizations:
  • National Eye Institute
  • American Academy of Optometry
  • Optikal Care Inc.
  • Alcon
  • Paragon Vision Sciences
  • Bausch + Lomb
  • Contamac
  • Euclid Systems

• I have written articles for the following organizations:
  • Contact Lens Spectrum
  • Contact Lenses Today
  • Contact Lens Update
  • Optometry Times

• None of these organizations have affected this presentation

Prevalence of Myopia

United States — 33%
Western Europe — 27%
China — 39%
Taiwan — 85%
Australia — 16%

Myopia Can Result in Visual Devastation

• High myopia (≥9.00D) is associated with a 50% risk of developing myopic retinopathies [Vongphanit 2002]

• Posterior subcapsular cataracts (PSC) [Lin 2004]
  — Associated with Low myopia

• Primary open angle glaucoma (POAG) [Marcus 2011]
  — 2.0x to 2.5x greater chance

• Retinal detachments (RD) [Ogawa 1988]
  — 2.4x to 24x greater chance
Building a Myopia Control Practice

- Clinic structure (contact lens clinic-based)
- Clinic added to special rotations schedule
- Materials development (consent, marketing, didactic)
- Fees and scheduling system created
- Staff awareness meeting

Implementation

Patient Education is Everything

Nearsightedness can be best defined as...

A. A decreased ability to see distance objects
B. A decreased ability to see near objects
C. A decreased ability to see distance and near objects

Myopia can be best defined as...

A. A decreased ability to see distance objects
B. A decreased ability to see near objects
C. A decreased ability to see distance and near objects
Subjects Understanding of the Terms Myopia and Nearsightedness

<table>
<thead>
<tr>
<th>Subjects' Definition of Nearsightedness</th>
<th>219</th>
<th>7</th>
<th>3</th>
<th>229</th>
</tr>
</thead>
<tbody>
<tr>
<td>A decreased ability to see distance objects</td>
<td>219</td>
<td>7</td>
<td>3</td>
<td>229</td>
</tr>
<tr>
<td>A decreased ability to see near objects</td>
<td>25</td>
<td>17</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>A decreased ability to see both distance and near objects</td>
<td>40</td>
<td>5</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>Total Subjects</td>
<td>284</td>
<td>29</td>
<td>8</td>
<td>330</td>
</tr>
</tbody>
</table>

- Survey found that only 66% of subjects were able to correctly define both myopia and nearsightedness

Myopia Control Clinic at UAB EYE CARE

- Intended to educate patient and parent
- Intended to get patient and parent buy-in
- Helps provide legal coverage
- Write it at a 4th grade reading level (Williams 1995)

Myopia Education Topics

- Define myopia, its potential causes, and who gets it

What Causes Myopia?

- Define myopia, its potential causes, and who gets it
**Heritability of Myopia**

- Children with myopic parents have greater risk for becoming myopic (United States) (Jones 2007)
  - 10% if 0 parents myopic
  - 20-25% if 1 myopic parent (2.08 greater odds)
  - 40-50% if 2 parents myopic (5.07 greater odds)

**Twin studies indicate the genetics account for about 90% of myopia variability**

**Myopia Genetics**

- Juvenile-onset myopia likely has a complex inheritance pattern
  - No single gene has been found that "causes" myopia

**Near Work May or May Not Be Associated with Myopia**

- Early work found a link between near work and myopia (e.g., Orthodox Jews)
- Large cross-sectional and longitudinal studies have not found a link between myopia development and near work (e.g., CLEERE Study)

**Accommodative System is Still Linked to Myopia Development**

- Myopic children have increased accommodative lag (Gwiazda J 2005)
- Myopic children have higher response AC/A ratios (Gwiazda J 2000)
- The posterior CM is thicker in myopic children and adults (Oliveira C 2005)

**Education**

- Prevalence of myopia dramatically increased among Inuit after the introduction of Western education (Morgan 1975)
- Severity of myopia increases with years of education (Tu 1991)
- Subjects with higher IQ scores were more likely to be myopic (surrogate for near work?) (Saw 2004)
Urbanization

- Myopic subjects are more likely to live in an urban environment (Paritsis 1983)
- Myopia is more common in “inner cities” than “outer suburban” environments (Ip 2008)
- Myopic subjects are more likely to live in an apartment than a large home (Ip 2008)

Time Outdoors

- Subjects spending more time on “sports and outdoor activities” each week were less likely to be myopic (Jones 2007)

Meta Analysis of Time Outdoors

Define Myopia Control

- Myopia control is the reduction of myopia progression
- Myopia control is not the same as treating myopia

Describe the Control Options

0.01% Atropine

- Center-Distance Multifocal CLs
- Orthokeratology

How Effective is Myopia Control?

- Atropine: 77% slowing of myopia progression or axial elongation
- Orthokeratology: 77% slowing of myopia progression or axial elongation
0.01% Atropine Considerations

- Less rebound and fewer side effects than 1.0% atropine (Chia 2014)
- Willingness to use a drop with an unknown mechanism
- Increases pupil size (photophobia) and decreases accommodation (Chia 2012, 2014, 2016)
- 0.01% atropine acquisition
- Still need vision correction
- Subject age

Orthokeratology Considerations

- Contact lens parameters (sphere and cyl power)
- Must be mature (~8-years-old)
- Must be motivated
- Most expensive option

Multifocal CL Considerations

- Contact lens parameters (sphere and cyl power)
- Must be mature (~8-years-old)
- Must be motivated

Mechanism of Contact Lens-Based Myopia Control

- Smith et al. induced myopia with both minus and form deprivation lenses post foveal ablation (2007, 2009)
- Peripheral retina is important!

Myopic Eyes Have a Prolate Eye Shape

Myopia Control for Astigmatic Patients

- Center-distance, toric, multifocal custom soft lenses
- Bitoric gas permeable lenses
- Scleral lenses

Contact Lens Spectrum
Packer, August 2018
Combination Treatments

- OrthoK + 0.01% atropine was 53% more effective than OrthoK
- OrthoK + 0.01% atropine was more effective with lower amounts of myopia
- Bifocal & Atropine in Myopia (BAM) Study (NCT03312257)

Kids Can Safely Wear Contact Lenses

- Non-CL wearers = ~1/10,000 people/year (Pepose 1992)
- 8- to 14-year-old subjects are less likely to develop a complication than 15- to 25-year-old subjects (Seguro 2014)

Myopia Control Education Topics

- Describe why myopia control is beneficial, who should undergo it, and its safety

Visual Acuity and Over-refraction in Myopic Children Fitted with Soft Multifocal Contact Lenses

- Mean logMAR acuity was −0.01 for each correction method

Cochrane Library

Conventional occlusion versus pharmacologic penalization for amblyopia (Review)

Li T, Sherlock

- “Atropine [1%] is as effective as conventional occlusion for the treatment of amblyopia and therefore should be used as first line treatment for amblyopia”
- “Conventional occlusion and atropine penalization have similar reported rates of adverse event.”

UAB’s Myopia Control Clinic TO DO LIST

PRELIMINARY DATA
- Reviewed and signed informed consent
- Height measurement

DIAGNOSTIC TESTING
- Visual Acuity at distance and near
- Cover Test at distance and near
- Accommodation; Single vs. Dual
- Pupils (Ciliary Versus Scleral)
- Anisocoria; Saccadic Exaggeration
- Topography and Refractoriness with Kx

PROGRESSION MANAGEMENT
- Dry Eye Resolution with Moxol ARK-10
- Axial Length with Lenstar
Myopia Control Fees

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Initial Consult</th>
<th>Office Fees</th>
<th>Additional Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthokeratology</td>
<td>Free</td>
<td>Typical Cost + Myopia Control Fee + 6 Month Exam</td>
<td>Care System</td>
</tr>
<tr>
<td>Multifocal Contact Lenses</td>
<td>Free</td>
<td>Typical Cost + Myopia Control Fee + 6 Month Exam</td>
<td>Contact Lenses Care System</td>
</tr>
<tr>
<td>Atropine Eye Drops</td>
<td>Free</td>
<td>Cost of Two Exams</td>
<td>Drops Glasses</td>
</tr>
</tbody>
</table>

• Fee is only charged after patient has selected a control method

Patient Monitoring

• Contact lens patients are monitored per standard guidelines
• Atropine e-prescribed and patients are called two weeks later
  – Develop relationship with pharmacy
• All patients are monitored at 6 months
  – Develop a recall system

Marketing a New Clinic is Difficult!

• We started with internal referrals until our systems were developed

External Marketing

• We have lectured to pediatric ophthalmologists, distributed newsletters, done a TV interview
Staff & Student Education

- Staff education – meetings and emails
- Student education – didactic and workshop training that includes homework

Current Status

- Systems are fully developed and are being refined
- Patient flow is steady and increasing
- Students consistently provide positive feedback

Contact Lens Spectrum

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March 2018

Myopia Control Summary

- General consensus is that it safe, so we should be prescribing myopia control
- Additional studies are currently underway to better understand myopia control
- Appropriate duration of treatment is unknown
- No treatment is FDA approved for myopia control

Myopia is Optometry

<table>
<thead>
<tr>
<th>Year</th>
<th>Myopic patients</th>
</tr>
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<tbody>
<tr>
<td>2020</td>
<td>2.620 billion</td>
</tr>
<tr>
<td>2030</td>
<td>3.361 billion</td>
</tr>
<tr>
<td>2040</td>
<td>4.089 billion</td>
</tr>
<tr>
<td>2050</td>
<td>4.758 billion</td>
</tr>
</tbody>
</table>

- It will take an entire generation to reverse the myopia boom!

Many Thanks!
Andrew D. Pucker: apucker@uab.edu