Myopia Control

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Disclosures
- Bausch + Lomb: research materials

End of Lecture, You Will Be Able To...
- Talk to parents about myopia control options
- Understand how myopia progression slowed
- Understand how to maximize myopia control

Myopia Control Summary

Soft Multifocal Myopia Control
Soft Multifocal Myopia Control

- Center-distance design
- No evidence for center-near design in literature
- Oasys for Presbyopia; J & J Vision Care
- Proclear Multifocal “D”; CooperVision
- Biofinity Multifocal “D”; CooperVision
- NaturalVue; Vision Technology Engineering
- MiSight; CooperVision
  - Not available in the US


Walline JJ, et al. OVS 2013;90:1207-14

Lam CS, et al., BJO 2014;98:40-5

MiSight Brochure distributed by CooperVision at BCLA 2017
Soft Multifocal Myopia Control

- NaturalVue by VTI

Cooper J, et al. Eye Contact Lens. 2017

- % slowing by soft bifocal contact lens type

<table>
<thead>
<tr>
<th></th>
<th>Refractive Error</th>
<th>Axial Elongation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentric Ring</td>
<td>36.3</td>
<td>44.4</td>
</tr>
<tr>
<td>Gradient</td>
<td>36.4</td>
<td>31.6</td>
</tr>
</tbody>
</table>


Soft Multifocal Myopia Control

- Spherical equivalent, vertexed
- Strongest add (+2.50)
- Most require -0.50 to -0.75 D for best vision


If vision still poor, decrease add power

- One step (0.50 D)
- Rare!
High Contrast Distance OU

High Contrast Near OU

Low Contrast Distance OU

BLINK Questionnaire

- No differences
  - Distance vision
  - Near vision
  - Ghost images
  - Computer
  - Strain or tiredness
  - Contact lens comfort
  - Sporting activities

Glare or Starbursts

Changing Fixation Distance

p = 0.33

p = 0.27

p < 0.001

p = 0.03

p = 0.05
Overall

![Graph showing overall vision change](image)

$p = 0.05$

Change in Vision-Specific QoL

<table>
<thead>
<tr>
<th></th>
<th>BLIMP</th>
<th>ACHIEVE</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Vision</td>
<td>11.1 ± 27.9</td>
<td>4.6 ± 21.6</td>
<td>0.34</td>
</tr>
<tr>
<td>Near Vision</td>
<td>2.8 ± 27.2</td>
<td>5.1 ± 21.2</td>
<td>0.73</td>
</tr>
<tr>
<td>Far Vision</td>
<td>9.3 ± 25.1</td>
<td>6.5 ± 25.1</td>
<td>0.69</td>
</tr>
<tr>
<td>Symptoms</td>
<td>5.6 ± 19.2</td>
<td>9.8 ± 26.4</td>
<td>0.50</td>
</tr>
<tr>
<td>Appearance</td>
<td>17.9 ± 32.0</td>
<td>17.0 ± 30.4</td>
<td>0.91</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>31.5 ± 29.9</td>
<td>31.5 ± 35.1</td>
<td>1.00</td>
</tr>
<tr>
<td>Activities</td>
<td>35.2 ± 35.2</td>
<td>14.4 ± 32.5</td>
<td>0.03</td>
</tr>
<tr>
<td>Academics</td>
<td>4.2 ± 21.1</td>
<td>-3.2 ± 20.1</td>
<td>0.19</td>
</tr>
<tr>
<td>Handling</td>
<td>9.5 ± 20.2</td>
<td>13.9 ± 18.3</td>
<td>0.41</td>
</tr>
<tr>
<td>Peer Perceptions</td>
<td>10.2 ± 20.9</td>
<td>13.3 ± 22.3</td>
<td>0.60</td>
</tr>
<tr>
<td>Overall Score</td>
<td>13.7 ± 16.7</td>
<td>13.1 ± 16.3</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Bonferroni, $p < 0.005$ indicates statistical significance

Orthokeratology Myopia Control

![Graph showing orthokeratology myopia control](image)

Orthokeratology Myopia Control

![Graph showing orthokeratology myopia control](image)

**Cho P & Cheung SW. IOVS, 2012;53:7077-85.**
Orthokeratology Myopia Control

Chen C, et al. IOVS 2013;54:6510-7

Which is Better: OK or SBCL?


How Do OK and SBCL Slow Myopia?

Peripheral Optical Profile

Myope corrected with specs, CL

Myope corrected with corneal reshaping or soft bifocal
Atropine Myopia Control

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Author (year)</th>
<th>Duration</th>
<th>Completion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% atropine</td>
<td>Chua (06)</td>
<td>2 years</td>
<td>87</td>
</tr>
<tr>
<td>0.5-0.5% atropine</td>
<td>Shih (99)</td>
<td>2 years</td>
<td>93</td>
</tr>
<tr>
<td>0.5% atropine</td>
<td>Shih (01)</td>
<td>18 months</td>
<td>87</td>
</tr>
<tr>
<td>GP</td>
<td>Walline (04)</td>
<td>3 years</td>
<td>100</td>
</tr>
<tr>
<td>GP</td>
<td>Katz (04)</td>
<td>2 years</td>
<td>37</td>
</tr>
<tr>
<td>GP</td>
<td>Khoo (99)</td>
<td>3 years</td>
<td>53</td>
</tr>
<tr>
<td>GP</td>
<td>Perrigin (00)</td>
<td>3 years</td>
<td>56</td>
</tr>
<tr>
<td>GP</td>
<td>Baldwin (69)</td>
<td>1 year</td>
<td>70</td>
</tr>
</tbody>
</table>


1% Atropine Myopia Control


1% Atropine Myopia Control


1% Atropine Myopia Control


1% Atropine Myopia Control


1% Atropine Myopia Control

Atropine Myopia Control


Atropine Myopia Control


Atropine Myopia Control


Atropine Myopia Control


<table>
<thead>
<tr>
<th>Atropine</th>
<th>Control</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No progression in myopia</td>
<td>15/23 (65.2%)</td>
<td>2/23 (8.7%)</td>
</tr>
<tr>
<td>Myopic progression of -0.50D or more</td>
<td>5/23 (21.7%)</td>
<td>19/23 (82.6%)</td>
</tr>
<tr>
<td>Myopic progression of -1.01D or more</td>
<td>3/23 (13.0%)</td>
<td>8/23 (34.8%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accomod (D)</th>
<th>0.01%</th>
<th>0.1%</th>
<th>0.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5</td>
<td>-1.1</td>
<td>-1.8</td>
<td></td>
</tr>
</tbody>
</table>

| Pupil (meso, mm) | 1.15 | 2.71 | 3.56 |
| Pupil (photo, mm) | 0.75 | 2.24 | 3.11 |
| Dist VA (logMAR) | -0.02 | +0.01 | -0.01 |
| Near VA (logMAR) | -0.02 | +0.06 | +0.25 |
| Reading specs (% yes) | 6 | 61 | 70 |

0.01% Atropine Myopia Control


p = 0.08
0.05% Atropine Myopia Control


0.01% Atropine Myopia Control

- 0.01% not commercially available
- Compounded
  - Central Ohio Compounding Pharmacy
    - www.cocprx.com
  - Leiter’s Compounding Pharmacy
    - www.leiters.com
  - O’Brien’s Pharmacy
    - www.obriennx.com
- 1 gtt OU qhs

0.01% Atropine Myopia Control

- $84 10 mL bottle
  - Lasts about 3 months
  - Mailed directly to patient

0.01% Atropine Myopia Control

- Follow-up
  - Accommodation
  - Pupil size
    - Same conditions every time
  - IOP
  - Near blur?
    - PAL
  - Photophobia
  - Transitions

Asians versus Whites


Can We Combine Treatments?

- Contact lens myopia control
- Optical effect
- Atropine
  - Receptors at the retinal or scleral level

Bifocal & Atropine in Myopia Study
Atropine Myopia Prevention

- 6-12 years
- SE +1.00 to -1.00
- F/u at least one year
- 0.025% atropine 1 gtt OU qhs


Atropine Myopia Prevention


Outdoor Time Myopia Prevention


Outdoor Time Myopia Prevention

Outdoor Time Myopia Prevention

Outdoor time *prevents* or *delays* the onset of myopia, but does not *slow progression*.

Counselling Parents

- Children can wear contact lenses
- Visually beneficial, also slow myopia progression
- May slow myopia progression with drops
- Best modality determined by you
  - How often plan to wear CL?
  - Swim?
  - Nap frequently?

Summary

- CLs, low [conc] atropine best myopia control
- Overnight OK, soft multifocal contact lenses = effective
- Use strongest tolerable add for soft bifocal
- Low concentration atropine needs more evidence
- Don’t know if we can combine to get stronger effect