

Myopia Control

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Financial Disclosures

- None

Prevalence of Myopia

- 42% of the United States population is myopic and 25% of children are myopic
- By 2050, it's estimated 50% of the population worldwide will be myopic (~5 billion people) and ~1 billion will have high myopia

Holden et al., 2016

Importance of Myopia Control

- Complications associated with myopia:
 - Glaucoma
 - Cataracts
 - Retinal holes and tears
 - Retinal and vitreal detachments
 - Myopic macular degeneration
 - Choroidal neovascular membranes
 - Lacquer cracks
 - Lattice degeneration

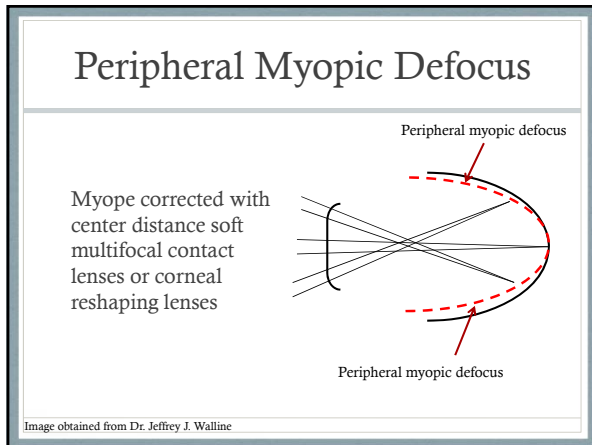
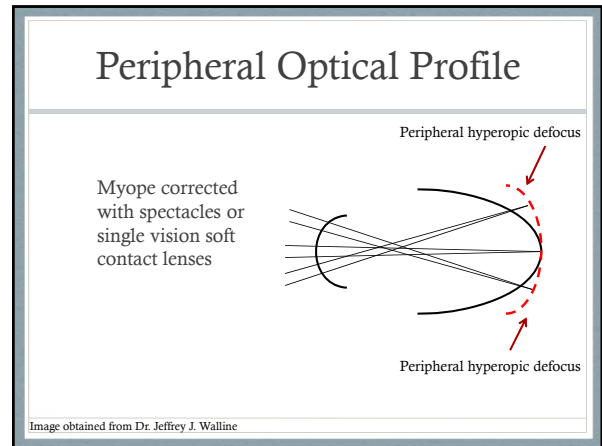
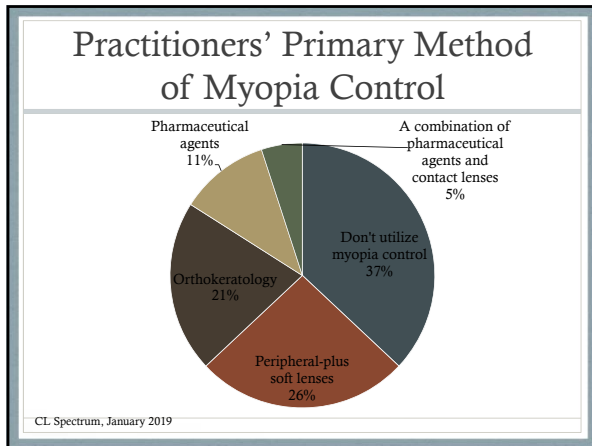
Myopia Control Treatment Options

- **Topical Agents**
 - Atropine
 - Pirenzepine
- **Spectacles**
 - Bifocals
 - PAL's
 - Undercorrection
- **Contact Lenses**
 - Alignment fit GP's
 - Corneal reshaping lenses
 - Soft multifocal lenses

Myopia Control Treatment Options

- **Least effective**
 - Undercorrection (-16 to -22%)
 - Gas permeable contact lenses (-5 to -8%)
- **Moderately effective**
 - Soft multifocal contact lenses (34 to 79%)
 - Corneal reshaping contact lenses (36 to 63%)
- **Most effective**
 - Atropine (59 to 96%)

% = reflects the percentage of reduction of myopia progression when compared to a control group



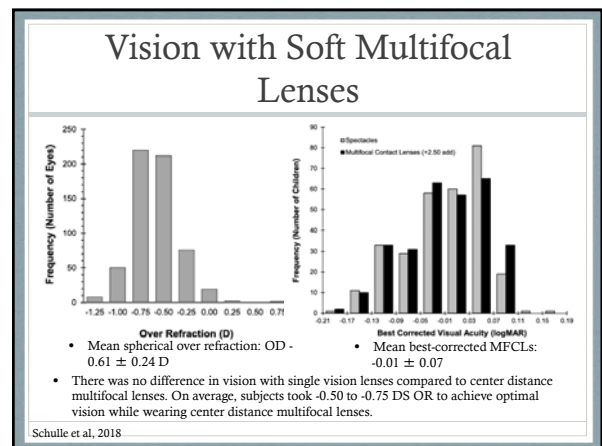
Center Distance Soft Multifocal Contact Lenses

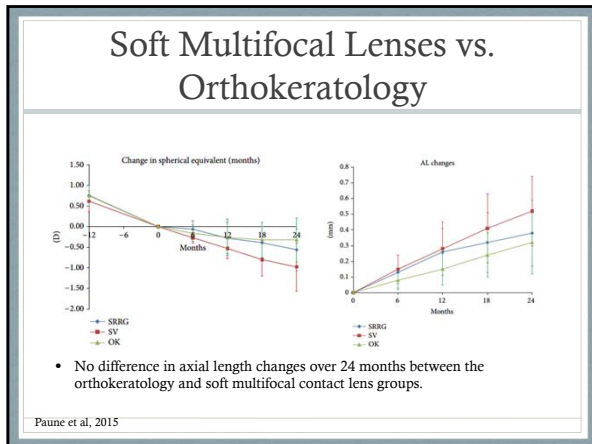
Brand	Proclear Multifocal "D" and XR "D"	Biofinity Multifocal "D"	Proclear multifocal toric "D"	NaturalVue
Material	Omafilcon A	Comfilcon A	Omafilcon B	Etafilcon A
Power ranges	+20.00 to -20.00 D	+6.00 to -8.00 D	+20.00 to -20.00 D (Cylinder power: -0.75 to -5.75 D) (Axis: 5-180° in 5° steps)	+4.00 to -12.25 D
Add powers	+1.00 to +4.00 D in 0.50 D steps	+1.00 to +2.50 D in 0.50 D steps	+1.00 to +4.00 D in 0.50 D steps	1 add power
Replacement	Monthly	Monthly	Monthly	Daily

Center Distance Soft Multifocal Contact Lenses

Brand	Acuvue Oasys for Presbyopia	SpecialEyes Multifocal	SpecialEyes Multifocal Toric	MiSight
Material	Senofilcon A	Hioxifilcon D	Hioxifilcon D	Omafilcon A
Power ranges	+6.00 to -9.00 D	+25.00 to -25.00 D	25.00 to -25.00 D (Cylinder power: -0.50 to -8.00 D) (Axis: 0-180° in 1° steps)	-0.25 to -6.00 D
Add powers	Low, Mid, and High	Up to +4.00	Up to +4.00	1 add power
Replacement	Bi-weekly	Quarterly	Quarterly	Daily disposable

↑
Not currently available in the US





Soft Multifocal Lenses vs. Orthokeratology

	Soft multifocal lenses	Orthokeratology
Swimmer or very active		X
Low or high Rx (-5.00 to -6.00 DS)	X	
High astigmatism	X	
Large pupils	X	
Dry eyes or ocular allergies		X
Reduced dependence on glasses		X
Allows for part-time wear	X	
Perception of complex fit	X	
Cost	X	
Parent involvement		X

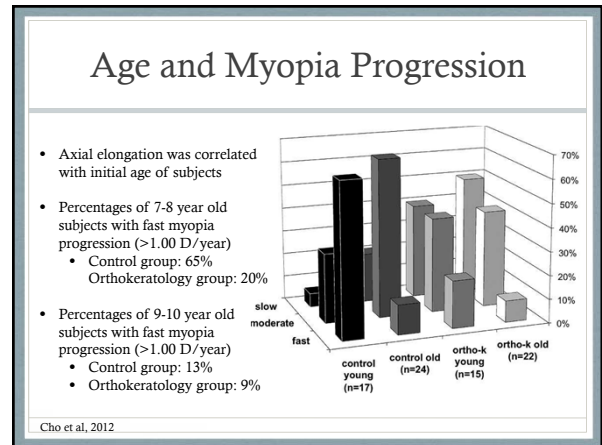
Orthokeratology Safety

	Children	Adults	Overall
N	677	640	1317
Cases	2	0	2
Years at risk	1435	1164	2599
Rescaled incidence rate (95% CI)	13.9 (1.7 to 50.4)	0 (0 to 31.7)	7.7 (0.9 to 27.8)

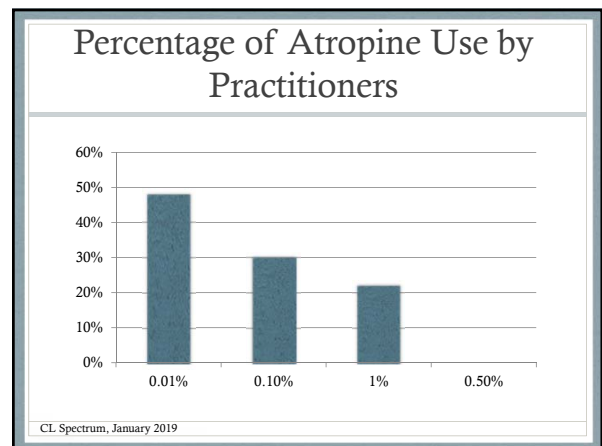
*Rescaled rate is per 10,000 patient-years

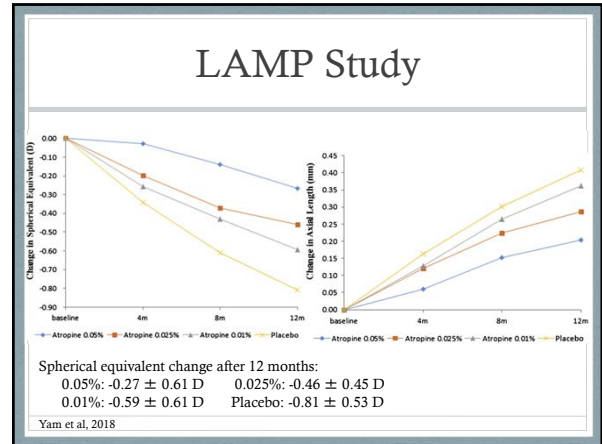
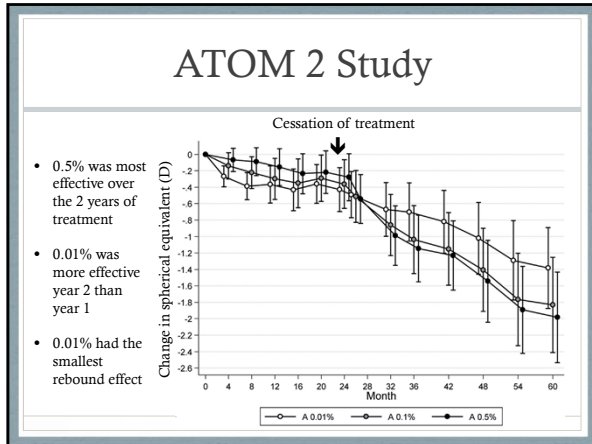
Conclusion: Overnight corneal reshaping contact lenses and other overnight contact lens modalities show similar risks of microbial keratitis

Bullimore et al, 2013



- ### Atropine
- Atropine for myopia control was first conducted in in the late 19th century
 - Mechanism of action is unknown
 - Dosage: 1 GT OU QHS
 - Concentrations used: 0.01% - 1.0%
 - Compounding pharmacies needed for low dose atropine
 - Central Ohio Compounding Pharmacy





Atropine Side Effects

	0.05%	0.025%	0.01%	Placebo
Photochromatic glasses needed (%)	30.3	34.3	30.0	39.6
Progressive glasses needed (%)	0.9	0.0	1.8	0.9
Photophobia at 2 weeks* (%)	31.2	18.5	5.5	12.6
Photophobia at 1 year (%)	7.8	6.6	2.1	4.5

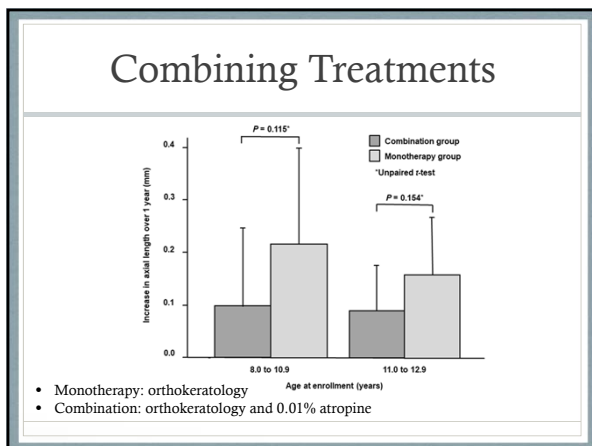
- Minimal side effects were observed with 0.05% atropine compared to placebo with the only significant difference being photophobia at 2 weeks

Combining Treatments

Difference in axial length after 2 years of treatment

	Atropine (0.125%)		Atropine (0.025%)	
	OrthoK	No OrthoK	OrthoK	No OrthoK
<-6.00 D	0.55 ± 0.12	0.58 ± 0.09	0.65 ± 0.18	0.83 ± 0.16
≥ -6.00 D	0.57 ± 0.17	0.64 ± 0.14	0.58 ± 0.08	0.40 ± 0.15

- Combining low dose atropine and orthokeratology may be more effective than individual treatment



- ### Patient Management and Education
- All treatment options discussed are used off-label for myopia control as there are no FDA approved treatments for myopia control
 - Informed consent
 - Choose the most appropriate treatment option
 - Consider the impact on the patient's vision, ocular health, and quality of life
 - Set realistic expectations for the patient and patient's parent(s)

Thank you!

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