

## Experience EXPO With Us!

- **Main Stage - Exhibit Hall – Booth F11084**  
Our Main Stage sessions feature free, promotional content for all attendees.
- **Vision Series - Thursday 9/18, Friday 9/19 and Saturday 9/20**  
Grab a bite to eat and continue learning over *Breakfast 8:30-9:30am or Lunch 12:00-1:00pm*!  
Listen to industry leaders as they address the latest clinical innovations in a relaxed and collaborative environment.

*\*Open to Optometrists only. Not for Credit. Meals offered on first-come, first-serve basis to pre-registered attendees.*

- **Exhibit Hall Hours**  
Thursday, Sept 18 9:30am – 6:00pm  
Friday, Sept 19 9:30am – 6:00pm  
Saturday, Sept 20 9:30am – 3:00pm
- **Conferee Cafe – Exhibit Hall – Booth P19087**
- **Education Lounge – Level 1 - Conference Area**
- **Conferee Happy Hour** Thur, Sept 18 4:30 - 5:30pm





## Its Time to stop being so Myopic Or Better Yet Your Patients

**David Kading, OD, FAAO**  
**Brianna Rhue, OD, FAAO, FSL S**

## Financial Disclosures


- Co-Founder Dr. Contact Lens
- Co-Founder TechifEYE
- MAB- OSRX Pharmacy
- Principal Investigator- STAAR Study
- Medical Advisory Board- Visus
- Speaker Bureau- Bausch & Lomb Specialty Vision Products
- Speaker Bureau- Coopervision
- PAC- Johnson & Johnson
- Advisory Board- Ocumetra

All relevant relationships have been mitigated.

## Are you practicing myopia management?

- A. Yes- I am all the way in
- B. No-
- C. Dabbling-
- D. I want to learn more

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## The trick to forgetting the big picture is to look at everything close-up

Chuck Palahniuk

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## Goals

- Understand the treatment options available and what is coming
- How to stand up your clinic for success
- Which treatment to choose in which case
- Build your confidence
- Start talking about it with your patients

### What is holding you back from starting to offer this to your patients?

1. Education
2. I have to set up my program
3. I didn't learn this and I am trying to
4. I don't see kids
5. I don't know what is holding me back

### WHY ARE YOU NOT DOING MYOPIA MANAGEMENT

Not enough patient demand	61.1%
Too time-consuming	31.7%
Novelty and parents are easily not interested or it takes too long to explain myopia management to them	27.5%
It's not covered by insurance and don't offer it	27.5%
Parents focus on other patient age groups	16.8%
Not lucrative enough	7.8%
Technically too difficult	5.4%

Yes: 63.0% | No: 36.4%

### BARRIERS FOR PARENTS SAYING "YES"

- ☐ Treatments not covered by vision or medical insurance
- ☐ Cost to parents
- ☐ Parent never heard of treatments for progressive myopia
- ☐ Parent not convinced of long-term eye health issues associated with myopia
- ☐ Most treatments not FDA approved
- ☐ Not recommended by a medical doctor, e.g., pediatrician, GP, ophthalmologist

Treatments not covered by vision or medical insurance	27%
Cost to parents	16%
Parent never heard of treatments for progressive myopia	14%
Parent not convinced of long-term eye health issues associated with myopia	11%
Most treatments not FDA approved	10%
Not recommended by a medical doctor, e.g., pediatrician, GP, ophthalmologist	8%

### Myopia Belief Busting

1. Myopia is just a refractive error
2. That kids can't get off devices
3. Be careful and not treat is safe
4. Atropine is bad
5. Myopia spectacles are going to save myopia
6. Kids can't wear contacts
7. Ortho k is hard or bad
8. Genetics can't be stopped
9. This is hard to implement
10. Parents won't pay for this treatment

### A goal not written down is just a wish

- Commit that Myopia IS a disease
- Treat your patients how we would treat our own kids
- Have patience for your patient's and listen
- This is about passion and your team getting behind you for success
- There is no cookbook approach... yet

### Vision & Mission

- **Vision:** Provides a context within which people at all levels can make decisions
- **Mission:** Individual mountains you are focusing on in your business
- **Core Values:** How to hire, train and stay on track

### Thank You... 2015

### Plant Seeds



### Looking at Myopia Differently

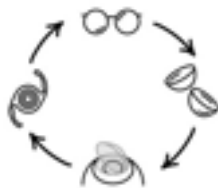


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**Our greatest challenge around Myopia is not our treatments, but the refusal to call it a disease**

### Lifecycle of Myopia

- Pediatrician
- First pair of glasses
- Fitted with contacts (if right for the child)
- Interested in Refractive Surgery
  - LASIK (SMILE)
  - PRK
  - ICL
- Refractive Cataract Surgery
- Retinal specialist

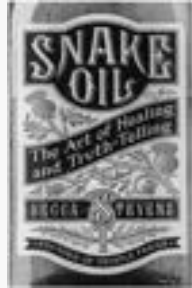


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### 4:00pm on a Friday



Stop being myopic about myopia management!



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**QUARANTINE MYOPIA**

Prevalence of Myopia prior to versus 2020 in 6 year-olds  
5.7% v. 21.5%

**Increase of 15.8%**

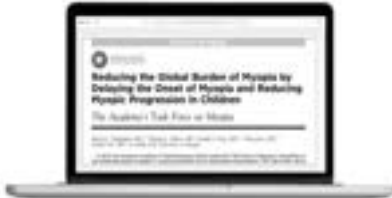
**Societies Recognize the Myopia Epidemic**

Myopia Task Force Recommends the Use of Low Dose Atropine


**Global Myopia Task Force**

June 2021

- AAO (Ophthalmology)
- AAOPt (Optometry)
- AAFP (Family Physicians)
- AAP (Pediatricians)
- AAPOS (Pediatric Ophthalmology and strabismus)




"Myopia is a growing public health problem that carries significant visual morbidity on an individual- and population-based level."





**Other Recent Progressive Myopia Market News**

Awareness of the Seriousness of Disease is Growing



United Healthcare has joined the board of GMAC (October GMAC meeting)

2  
2

**Is Pediatric Myopia Progression a Disease?**

Microsoft-Open AI's Chat GPT Engine categorized myopia as a "disease", not a "condition"

Recent experience with a prominent AI response system (Microsoft Copilot, powered by Open AI's Chat GPT), why is myopia not a disease when it impairs normal functioning and is characterized by specific signs and symptoms that lead to severe sight threatening complications and blindness?

The answer in the past was:

Myopia, also known as nearsightedness, is a common eye condition where distant objects appear blurry while close objects can be seen clearly. This occurs because the light entering the eye is focused in front of the retina instead of directly on it.

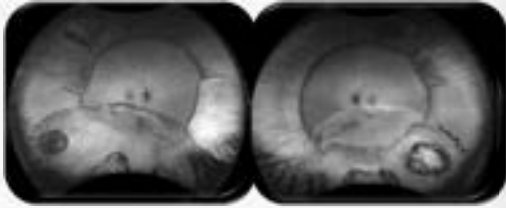
The answer now

**Dr. Chat GPT**

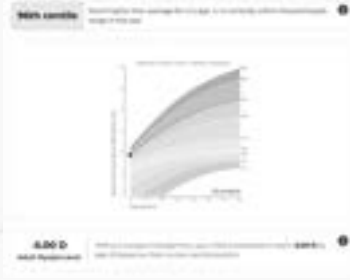


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-13.00 so what...

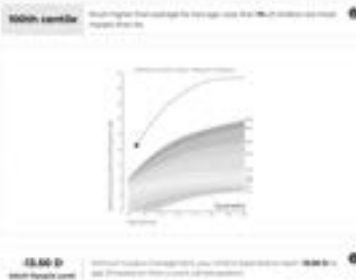


6 year old... First Eye Exam



OD: +0.25 22.96  
OS: +0.25 22.80

7 Year Old



OD: -4.50 24.00  
OS: -4.50 24.10

Resolution: The Standard of Care For Myopia Management by Optometrists



World Council of Optometry Resolution  
The Standard of Care for Myopia Management by Optometrists

1. Defines the evidence-based standards of care as comprising of three main components:
- ⌚ **MITIGATION** - educating parents and patients on risk factors to delay onset of myopia
  - ⌚ **MEASUREMENT** - regular eye exams (frequency not advised by the WCO) with measurement of refractive error and axial length whenever possible
  - ⌚ **MANAGEMENT** - addressing patient needs today by correcting and attempting to control myopia for improved quality of life and better eye health today and into the future.

A little about me...



My Myopic Passion



### Myopia and the Media



### Our Digital Era



**FDA approves first contact lens indicated to slow the progression of nearsightedness in children**

**Johnson & Johnson Vision's ACUVUE Abiliti OrthoK Receives FDA Approval**

May 12, 2023

Johnson & Johnson Vision Receives Approval in Canada for ACUVUE® Abiliti™ 1-Day Soft Therapeutic Lenses for Myopia Management

As of early June 2023, the ACUVUE® Abiliti™ 1-Day Soft Therapeutic Lenses for Myopia Management are not yet available for use in the United States. The lenses are available in Canada and have received awards in Asia.

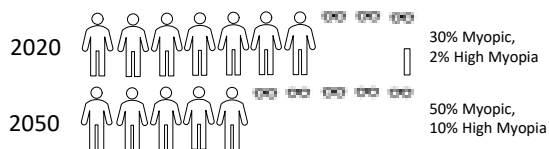
The release of ACUVUE® Abiliti™ 1-Day in the US is expected sometime in 2024, according to a source from October 2023. However, please note that this is an estimation from several years ago, and information about the actual release date might be different.

**FDA PDUFA Date Set: October 2025**

**Sydnexis Announces European Commission Approval of SYD-101, the First and Only Pharmaceutical Treatment for Slowing the Progression of Pediatric Myopia**

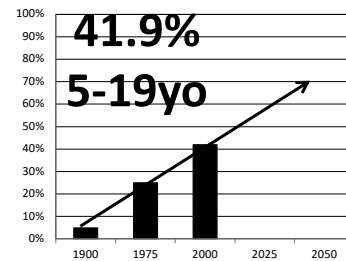
Exclusive Licensing Partner Sydnexis Will Commercialize SYD-101 Under the Brand Name "Sydnex" in the European Union

### Prevalence of Myopia



In 2016 the WHO and the Brien Holden Vision Institute recognized myopia as a public health issue.<sup>3</sup>

### Incidence in US



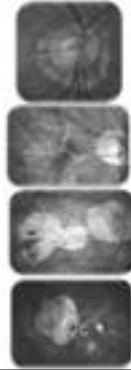
Clinical Ophthalmology: August 2018  
Theophanous, Christos et al. "Myopia prevalence and risk factors in children." Clinical ophthalmology (Auckland, N.Z.) vol. 12 1581-1587. 29 Aug. 2018. doi:10.2147/OPTH.S164641

### Myopia, so What

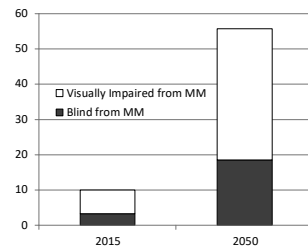


### Why the Big Deal?

- Myopic Maculopathy
  - Stretched blood vessels
  - Peripapillary atrophy
  - Posterior staphyloma
  - Lacquer cracks
  - Geographic atrophy
  - Subretinal hemorrhages
  - Choroidal neovascularization



### Myopic Maculopathy



**Progression of Myopic Maculopathy during 18-Year Follow-up**

Average Age:  $47.7 \pm 14.2$  Years  
Range: 7 to 76

Average Visual Acuity: 20/50

Fricke et al. Global prevalence of visual impairment associated with myopic macular degeneration and temporal trends from 2000 through 2050: systematic review, meta-analysis and modelling. *Fang Y, Yokoi T, Nagaoka N, Shinohara K, Onishi Y, Ishida T, Yoshida T, Xu X, Jonas JB, Ohno-Matsui K. Progression of Myopic Maculopathy during 18-Year Follow-up. Ophthalmology. 2018 Jun;125(6):863-877. doi: 10.1016/j.ophtha.2017.12.005. Epub 2018 Jan 19. PMID: 29375011.*



### The Disruptees can become the Disruptors



How many CEOs, politicians, have stopped fitting single vision soft lenses on kids who are progressing myopes? His judgement. Even if not doing myopia control, would you fit a multifocal just to get some plus on the eye?

This is almost as ridiculous as asking you if you're going to give a myopic child glasses because they're likely to progress. One of the advantages myopia control had there is not an ethical conflict here.



Dear Lord, Myopia is not the plague! Through of this last morning, Thank God I'm a -1. My daughter is -5.50 and my wife is -4.75. It helps immensely with our Q of life. 18, 20, 25 respectively.

1800contacts®

### What are you using for treatment?

- A. Educating
- B. Atropine
- C. Ortho-k
- D. Dual Focus Lense
- E. All of the above
- F. I want to learn more


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### Standing Up Your Myopia Management Practice

- Education
- Program
- Equipment
- Pitch
- Parent Questions

### The Game Plan


1. Commit
2. Kids
3. Analyze your practice
4. Educate yourself
5. Build your program-
6. Team training
7. Invest in equipment
8. The Myopic Exam
9. Select the Treatment
10. Elevator Pitch



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### Goal

**Keep myopia below -3.00  
and  
Axial length below 26mm**



### Myopia Treatments Terms

- **Myopia Correction:** traditional approach to prescribing SV correction for refractive error
- **Myopia Control:** Treatment modalities/intervention (optical or pharmaceutical) with proven efficacy aimed at slowing myopia progression
- **Myopia Management:** employment of a broad range of strategies aimed at slowing progression AND addressing overall impact on visual health and quality of life. Includes behavioral and environmental modifications



### Myopia Control vs Myopia Management

Myopia Control	Myopia Management
- Slows the progression of myopia in age-appropriate children <ul style="list-style-type: none"> <li>• MiSight</li> </ul>	- Refers to the decision to implement a strategy to slow down the progression of myopia in a child <ul style="list-style-type: none"> <li>• Low-dose atropine</li> <li>• Ortho-k</li> <li>• Soft multi-focals</li> <li>• Spectacles</li> </ul>

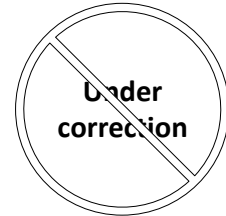
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### Step 1 - Commit



### Single Vision Glasses & Contacts

- Single vision glasses & contacts have **NO** effect on slowing progression
  - 80% of practitioners acknowledged this
- 64% of myopic children around the world are treated with a single vision option



James Wolffsohn: Global trends in myopia management attitudes and strategies in clinical practice – 2019 Update

### Rethink “Refractive error”

# MYOPIA



**A progressive disease that causes eyeball growth.**

Which results in:  
Higher Co-Morbidity Disease Risk  
Blurry Vision  
&  
Changing Prescriptions

### Is Pediatric Myopia Progression Considered a Disease?

YES, it is a disease; not just a refractive condition (October 2024)

This congressionally funded organization was created in partnership with numerous key organizations, including AAO and AOA



### The NASEM Consensus Study Report: Myopia is a Disease

>1,000 studies were referenced in the 375-page published Consensus Study Report

Conclusions: The current evidence for myopia progression has been reviewed in the last 20 years and includes medical, optical, behavioral, and the role of photorefractive treatment. Myopia progression is a disease, not just a refractive error. It is a progressive disease that causes eyeball growth, which results in higher co-morbidity disease risk, blurry vision, and changing prescriptions. The current state of knowledge of myopia progression and its treatment is reviewed and summarized in this report. The report also includes a table of myopia treatments in parentheses that are available and in daily application, all of which are in a state of use or in development. The current state of knowledge of myopia progression and its treatment is reviewed and summarized in this report. The report also includes a table of myopia treatments in parentheses that are available and in daily application, all of which are in a state of use or in development.

Myopia is a disease with increasing worldwide prevalence and associated consequences of the impact of its development. Myopia progression is a disease, not just a refractive error. It is a progressive disease that causes eyeball growth, which results in higher co-morbidity disease risk, blurry vision, and changing prescriptions. The current state of knowledge of myopia progression and its treatment is reviewed and summarized in this report. The report also includes a table of myopia treatments in parentheses that are available and in daily application, all of which are in a state of use or in development.

### HOW SERIOUS ARE THE CLINICAL RISKS OF PROGRESSIVE MYOPIA?

**Increasing Risk of Comorbidities with Increasing Myopia<sup>1</sup>**

Myopia (D)	Glaucoma	Macular Degeneration	Retinal Detachment	Myopic Maculopathy
> -9.00 ~4% myopes	1.5X	1.5X	1.5X	1.5X
> -6.00 ~10% myopes	3.5X	4.5X	7.5X	4.5X
-2.00 → -6.00 ~20% myopes	3.5X	4.5X	7.5X	4.5X
< -2.00 ~60% myopes	3.5X	4.5X	7.5X	4.5X

WHO predicts Myopia to be the #1 cause of blindness worldwide in the future (Cataract is presently)

- <sup>1</sup> 18 million people had visual impairment from myopic maculopathy in 2015, of whom 3 million were blind. By 2050, visual impairment will grow to 55.7 million (1 in 175), 18.5 million of whom will be blind. The risk of myopic maculopathy and its impact on public health are not limited to high myopes.
- <sup>2</sup> Myopes of less than 5 diopters contributed 43% of the cases of myopic maculopathy in the Australian Blue Mountains Eye Study.<sup>2</sup>

Data derived from:  
 1. New England Eye Study, 2002 (1,000 patients)  
 2. World Health Organization, 2002 (1,000 patients)  
 3. Australian Blue Mountains Eye Study, 2011 (1,000 patients)  
 4. International Myopia Study, 2011 (1,000 patients)  
 5. Commented in VisionWeek 2012

### Step 2 – Kids... You have to want & LIKE to see kids

### LEAVE NO ONE BEHIND!

Myopia Kids

- ALL kids in your office Get evaluated
- They fatigue on free follow ups

The phrase:  
"we can see what will happen" no longer applies.

ALERT: We know what is going to happen!

### Step 3 – Analyze Your Practice

Clinic By Refractive Error

- Myopia
- Hyperopia
- None

### WHAT PERCENTAGE OF YOUR PATIENTS AGE 18 AND UNDER WOULD YOU ESTIMATE ARE MYOPIC?

Average: 50.5%

**Key Message:**  
 Respondents estimated that 50% of their patient base aged 18 and under are myopic. This prevalence is consistent with other surveys conducted in the U.S.

461 qualified ECPs Dec 2023

### Managing Progressive Myopia Importance

- Very Important or Important: 50.0%

461 qualified ECPs Dec 2023

### Step 4 - Education

- Understanding Myopia is a Disease
- Why we need to find and treat younger kids
- Understand current treatments
- Deciding what treatment is best for the child and family
- Keeping up on new treatments

### 5 - Your Program

- Develop your program before you start treating your first patient
- How will you present the options?
  - Comprehensive exam vs. Myopia consultation visit
- Chair cost - Charge appropriately & understand your value
  - Global Fee:
    - Ortho-K or Dual-Focus CL
    - Atropine
- Missed Evaluation Visits

This is a non-covered service billed outside of any managed care insurance or vision program

### Setting Yourself and Your Patients up for Success

- Handouts
- Contracts
- Referral Letters
- Compounding Pharmacy
- Fitting Sets, Orthok Lab

### Who is going to be your main referral source?

# YOU!

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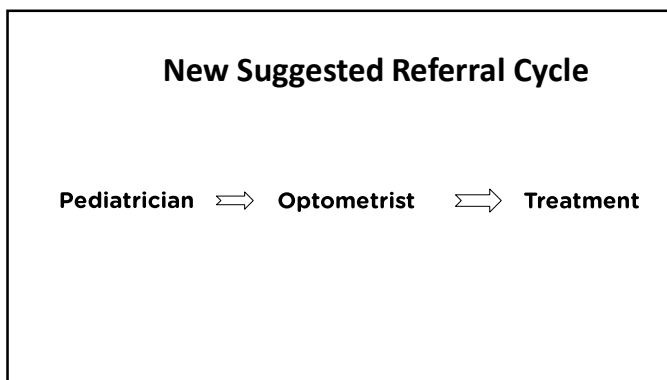
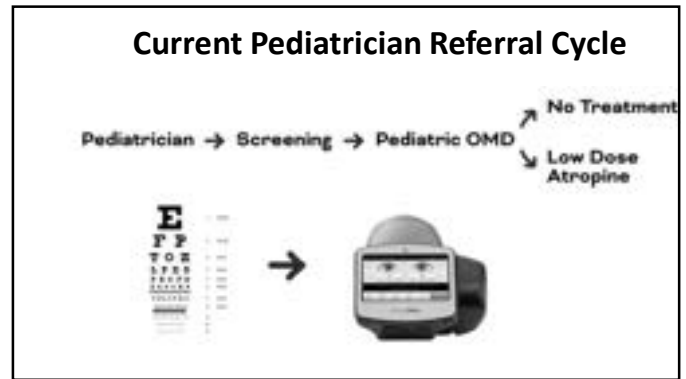
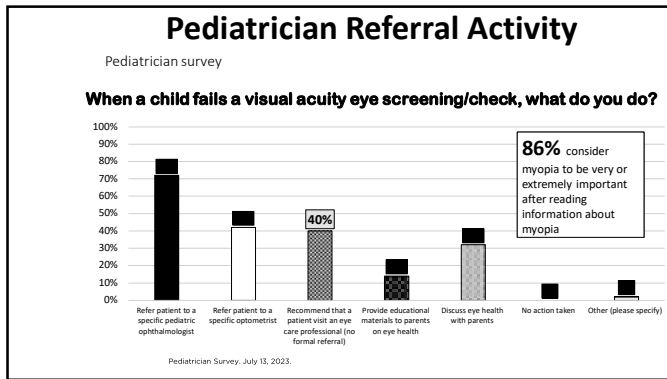
### Stop, Collaborate & Listen

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### Other Referral Sources

- Pediatricians
- Pediatric OMD's
- Lasik Surgeons
- Cataract Surgeons
- Retinal Specialists
- Other OD's
- VT Clinics
- Moms (PTO)
- School Nurses

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### Letters Back to the Pediatrician

- Once you do have a patient referral ensure you send a nice treatment plan letter back.
- Patient feedback loop

### Lasik Surgeons

- Avoid complications of high myopia
- Less corneal tissue removal
- Safer procedure
- Overall better experience and better visual outcomes

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### Cataract Surgeons

Myopia	Odds of NS	Odds of PSC
-0.50D to -1.99D	2.25	1.59
-2.00D to -3.99D	3.65	3.22
-4.00D to -5.99D	4.54	5.36
-6.00D & up	3.61	12.34

No association found between Myopia & cortical opacities.

Chang, et al. The Association between Myopia and Various Subtypes of Lens Opacity. American Academy of Ophthalmology 2005, 112, 8: 1395-1401

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## Slide 70

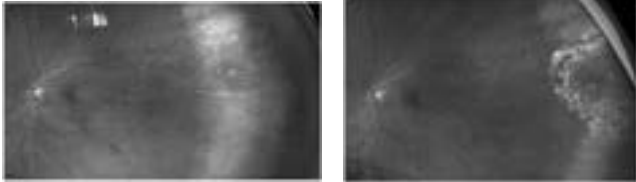
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**WM[NJ1** Mention of slowing progression not allowed in US. Can we get a version that removes "designed to slow progression myopia (nearsightedness). The rest of the letter will be fine!

Waugh, Michelle [VISAU Non-J&J], 2023-08-01T04:09:14.423

### Retinal Surgeons

- 59 year old comes in for annual exam – no complaints
- OD: -3.25 sph
- OS: -3.50-0.25 x 010



### Step 6 - Your Office and Your Team



### Do you have an OCT?

- A. Yes
- B. No
- C. Plan on getting one in the next few months

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### Do you have an axial length device?

- A. Yes
- B. No
- C. Plan on getting one soon
- D. Don't really see the value yet

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### Do you have a topographer?

- A. Yes
- B. No
- C. Plan on getting one
- D. Don't see the value yet

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### Step 7 - Equipment

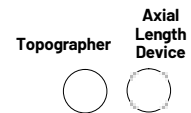
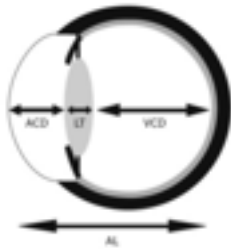


Photo Courtesy Joshua Pasol, MD

### Axial Length



• Emmetropia ~ 23-24mm

### Move from diopters → millimeters



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### Axial Length

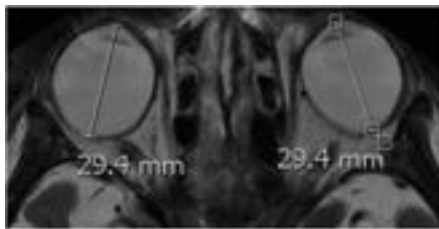
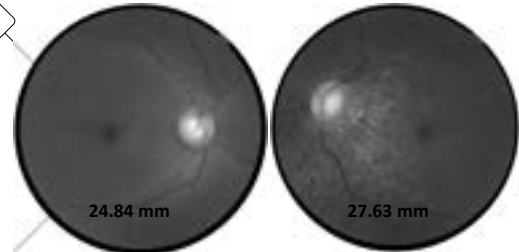


Photo Courtesy of Joshua Pasol, MD

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### Axial Length & Myopic Disease



\*Diopters are easy to measure, but myopia management is about axial length control\*

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### Axial Length Devices



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### Measuring Axial Length



Dalton	Myself	Dalton	Myself
OD: 22.92	OD: 25.11	OD: +1.00	OD: -5.50
OS: 22.94	OS: 25.17	OS: +1.00	OS: -5.50

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### Axial Length Norms\*

Age	Girls	Boys	European	Chinese
6- 7 yo	22.75 mm	23.05 mm	22.33 mm	22.77 mm
8-9 yo	23.29 mm	23.65 mm	23.05 mm	24.02 mm
10-11 yo	23.76 mm	24.09 mm	-	-
12-14 yo	23.80 mm	24.25 mm	23.40 mm	24.69 mm

\*Caution must be taken when applying this data clinically, as many confounding factors affect these norms, including but not limited to, gender and racial background.

Fuensanta A. Vera-Diaz, OD, PhD, FAAO. The Importance of Measuring Axial Length. Review of Myopia Management. August 9, 2020 <https://reviewofmm.com/the-importance-of-measuring-axial-length-when-managing-childhood-myopia/>

### Axial Length & Refractive Error

	Refractive Error	Axial Length
OD	-4.75-0.75x010	23.91
OS	-5.00-0.75x180	24.11

	Refractive Error	Axial Length
OD	-5.50-0.50x180	27.28
OS	-5.50-0.50x165	27.24

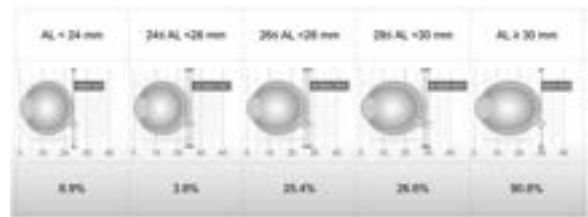
\*Refractive error does not correlate with axial length

### Refraction and Axial Length



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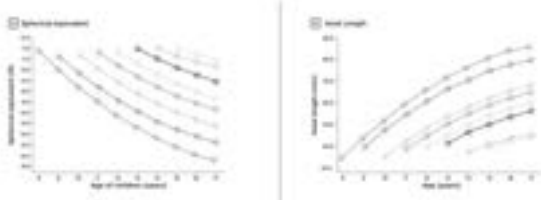
### Risk of Visual Impairment by Age 75



Tideman JW, Snabel MC, Tedja MS et al. Association of Axial Length With Risk of Uncorrectable Visual Impairment for Europeans With Myopia. JAMA Ophthalmology. 2016;134:1355-63.

<https://www.youtube.com/watch?v=5X58gYt8AHE>

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• The earlier the onset the higher chance for high myopia

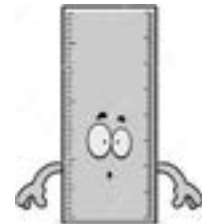
Chua SY, Sabanayagam C, Cheung YB, Chia A, Valenzuela RK, Tan D, Wong TY, Cheng CY, Saw SM. Age of onset of myopia predicts risk of high myopia in later childhood in myopic Singapore children. Ophthalmic Physiol Opt. 2016 Jul;36(4):388-94. doi: 10.1111/oppo.12305. PMID: 27350183.

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### Axial vs Refractive

• 5 Year old- Parents worried about retina and wanted second opinion on what to do

- Current Spectacle:
  - OD: -8.00-0.75x164 20/100
  - OS: -5.00-1.75x178 20/60
- Refraction:
  - OD: -10.00-2.00x180 20/60-
  - OS: -5.50-2.00x010 20/50
- Cyclo:
  - OD: -10.00-2.00x180
  - OS: -5.50-2.25x010



### 5 Year Old

	Refractive Error	Axial Length	K's
OD	-10.00-2.00x180	25.30	49.93@089/47.74@179
OS	-5.50-2.00x010	24.73	48.28@097/45.73@007

### Calculating Axial Length with What You Have

#### Axial Length Estimator

Right Eye: 25.87 mm → 25.30  
 Left Eye: 24.83 mm → 24.73

<https://coopervision.co.uk/practitioner/clinical-resources/myopia-in-children/axial-length-estimator/calculator>

### 5 Year Old

TX: Update RX parents education full time wear  
 Start Atropine 0.025% 1 drop QHS  
 RTC 4 weeks atropine follow up then every 3 months

### 9 Year Old- Can't See the Board

OD: 20/40- OD: -1.00  
 OS: 20/40- OS: -1.25

OD: 43.83@086/42.40@176  
 OS: 44.00@079/42.99@169

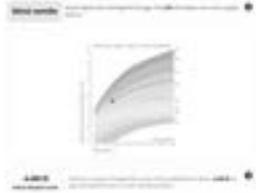
OD: 25.01      OS: 24.83

### 9 Year Old- Can't See the Board

OD: -1.00  
 OS: -1.25

### Treatment

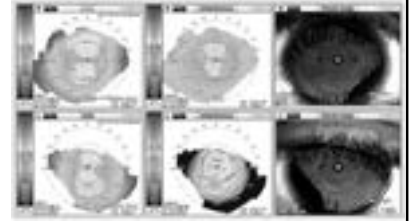
- Parents opted for dual-focus contact lenses and began treatment that day



97

### 11 year old- Second Opinion

OD: 20/50- OD: -1.00  
OS: 20/400- OS: -4.50



OD: 43.87@086/42.40@176  
OS: 44.00@079/42.99@169

98

### 11 year old

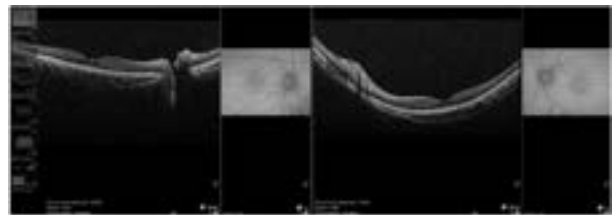


OD: 23.89

OS: 24.89

99

### 11 year old-



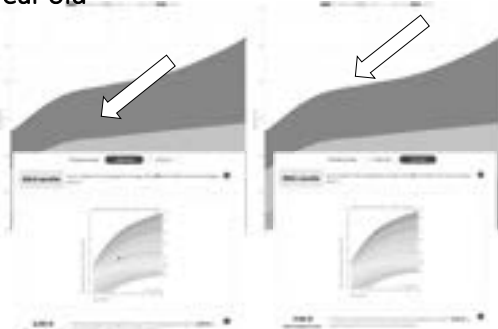
OD: 23.89

OS: 24.89

100

### 11 year old-

OD: -1.00  
OS: -4.50



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### Treatment

- Parents wanted to discuss with her ophthalmologist again on what to do



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### Step 8 – The Myopic Exam

- History (Family history, near work, outdoor time)
  - Assess the risk factors
- Age of onset, progression (if myopic)
- Visual acuity (uncorrected, best corrected)
- Corneal topography
- Pupil size- dim and light
- Binocular vision (lag, eso/exophoria, AC/A)
- Axial Length (average of at least 5 readings)
- Pachymetry
- Objective/subjective cycloplegic refraction
  - 1% Tropicamide → 2 drops 5 minutes apart
- Anterior/posterior examination
- IOP

### Assess the Risk Factors

- Genetics
- Near Work
- Outdoor time
- Education
- Ethnicity
- Age of Onset
  - Current prescription
- Other (prematurity, diet, light exposure)



### What is the Cycloplegic Refraction?

Age	Normal	Refractive Error @ Risk
6 years old	+1.75 → +1.50	+0.75 or less
7 years old	+1.50 → +1.25	+0.50 or less
8 years old	+1.00	+0.50 or less
9 years old	+0.75	+0.25 or less
10 years old	+0.50	+0.25 or less
11 years old	+0.50 → +0.25	0.00 or less

- Tropicamide 1%, 2 drops 5 mins apart
- Follow up every 6 months, sooner if risk factors are high or patient is changing

### Pre-Myopes

≡ < +0.75 @ 6-7yo is high risk

- Independent of family history, ethnicity and other optical and environmental factors.<sup>7</sup>
- Fastest change in refraction is year before onset.
- Watch for eso and lag of accommodation

Jones-Jordan LA, Sinnott LT, Manny RE, Cotter SA, Kleinstein RN, Mutti DO, Twelker JD, Zadnik K, Ethnicity ICL60, Refractive Error Study Group. Early Childhood Refractive Error and Parental History of Myopia as Predictors of Myopia. Invest Ophthalmol Vis Sci. 2010;51(1):115-21

**Step 9 –  
Select the  
treatment that  
is best  
appropriate for  
the patient and  
the family**

#### Myopia Treatments

- Indoor/Outdoor Time
- Spectacles (Available in Canada)
- Low Dose Atropine
- Dual-Focus Soft Lenses
- Orthokeratology

### The Myopia Equation

#### Patient Data

- Current Age
- Ethnicity
- Age of onset
- Indoor/Outdoor time
- K Readings
- Refraction
- Axial Length

**VS.**

#### Patient Data

- Child willingness
- Parent willingness
- Cleanliness
- Able to sit still

### Treatment Goals

- Present the options to the parent and child and decide together what is best
- Set realistic expectations for treatment
- Atropine, MF contacts, Ortho-k all have around 50%-70% efficacy \*depending on studies
  - Children will still likely progress depending on age of onset
  - Which ever method you choose you are providing evidence based myopia treatment
- Atropine should be reserved for younger children
- Contacts lenses should be fit as soon as patient and parent are ready
- Dual treatments are becoming more common

### Why Every Diopter Matters

- 3 benefits of lowering a patient’s level of myopia for the long-term care
  - Less visual disability when uncorrected
  - Better options for, and outcomes from, surgical myopia correction
  - Reduced risk of blindness associated with higher levels of myopia

Bullimore, Mark A. MCOptom, PhD, FFAO<sup>1</sup>; Brennan, Noel A. MScOptom, PhD, FFAO<sup>2</sup>  
 Optometry and Vision Science: June 2019 - Volume 96 - Issue 6 - p 463-465

↑ 1 diopter increase in myopia = ↑ 67% increase in the prevalence of myopic maculopathy

↓ Slowing myopia by 1 diopter = ↓ 40% reduction in the likelihood of developing myopic maculopathy

*Optometry and Vision Science, May 2019*

**Myopia Control: Why Each Diopter Matters**

Mark A. Bullimore, PhD, FFAO<sup>1</sup> and Noel A. Brennan, PhD, FFAO<sup>2</sup>



### Why Every Diopter (and mm) Matter

### Our Kids Today



### Screen time Recommendations Have the Discussion



18 months or younger	18 months to 2 years	2 to 5 years	6 or older
<p>For infants, you will find that they are being very curious.</p>	<p>Limit screen time to 1 hour per day, and only with parental supervision.</p>	<p>Limit screen time to 1 hour per day, and only with parental supervision.</p>	<p>Limit screen time to 2 hours per day, and only with parental supervision.</p>

American Academy of Pediatrics

## TOUCH GRASS

### Send grass anywhere!

1. With a note
2. Give us an address
3. Send anonymously

### Relationship between Sleep and Myopia

Relationships between Sleep Duration, Timing, Consistency, and Chronotype with Myopia among School-Aged Children

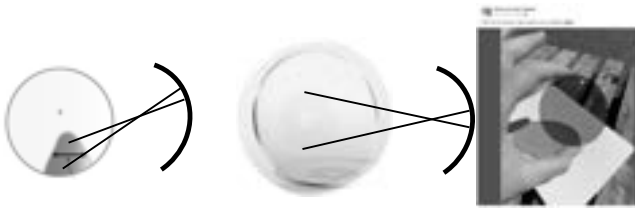
- 10,142 children surveyed (7-12 yo)
- 42% of children meet the recommendation for sleep (9-11 hours)
- Later bed time and later wake up time increased risk
- Shorter sleep duration had increased risk



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9325560/>

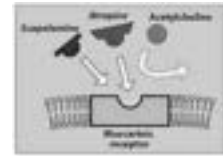
### Optical Correction

### Optical Correction



### Atropine MOA Theories

- A non-specific muscarinic receptor antagonist
- Anticholinergic that binds to M1, M2, M4, and M5 receptors
- May act on one or more muscarinic acetylcholine receptors in the retina or directly on scleral fibroblasts to slow eye growth
- May prevent choroidal thinning due to hyperopic defocus<sup>17</sup>



**Does not work by blocking accommodation<sup>8</sup>**

8. McBrien NA, Moghaddam HO & Reeder AP. Atropine reduces experimental myopia and eye enlargement via a nonaccommodative mechanism. Invest Ophthalmol Vis Sci 1993; 34: 205-215  
17. Samuel T.-H. Chiang and John R. Phillips. "Effect of Atropine Eye Drops on Choroidal Thinning Induced by Hyperopic Retinal Defocus." Journal of Ophthalmology, vol. 2018.

### Atropine Treatment Protocol

- 1 drop 0.025% or 0.05%(QHS) daily
- Can start as young as 3 years old
- Slows rate of progression by 30% - 70% concentration & formulation dependent
- In the first 6 months, may still see progression



**Look for a 2mm dilation in pupil**

### Atropine Evaluation Schedule

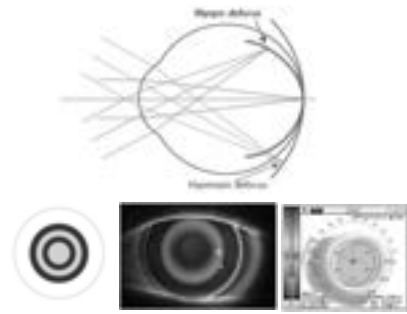
- 4 week follow up (make sure they got their drops and are using them)
- 4 months after starting to ensure no side effects/compliance
- Start assessing treatment efficacy at 6 months
- Assess for progression every 6 months
  - VA
  - Binocular vision
  - A-scan
  - Refraction/Topography
  - If >0.25-0.50 D of change at 1year consider changing dosage
- If stable for 2 years or past the age of 16 → Taper

### How Long Will They Be On Drops?

- May add in another therapy to taper drops
- May start tapering past the age of 16

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### Controlling Peripheral Focus



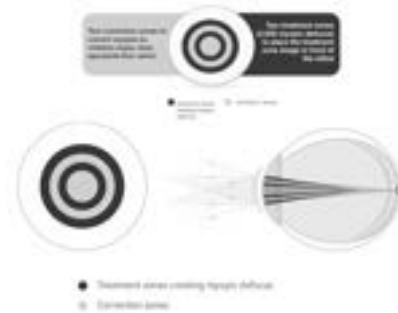
### MiSight Study

- Three-year randomized, controlled clinical trial (4 study sites)
- 135 children ages 8 to 12 at the start of treatment
- MiSight vs. conventional soft contact lens
- Results – (for the full three-year period) progression in myopia of those wearing MiSight lenses was less than those wearing conventional soft contact lenses
- In addition, subjects who used MiSight had less change in the axial length of the eyeball at each annual checkup.
- There were no serious ocular adverse events in either arm of the study

Slowed progression by:  
**59%**  
 cycloplegic spherical  
 equivalent (SE)  
 and  
**52%**  
 mean axial elongation of  
 the eye

<https://www.fda.gov/news-events/press-announcements/fda-approves-first-contact-lens-indicated-slow-progression-nearsightedness-children>

### MiSight® 1 day myopia control soft contact lenses



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### The Future of Soft Contact lenses for Myopia Management

September 8, 2020

Johnson & Johnson Vision Receives Approval in Canada for ACUVUE® Abiliti™ 1-Day Soft Therapeutic Lenses for Myopia Management

Menicon Bloom Day™ Menicon BLOOM™

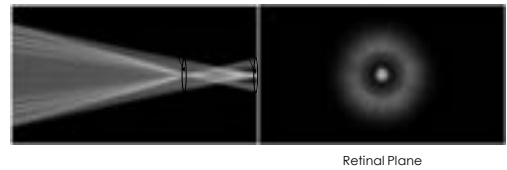
Myoptechs

Benefits:

- Soft, comfortable, and clear
- Available in 1.00 and 2.00 diopter powers
- Available in 1.00 and 2.00 diopter powers
- Available in 1.00 and 2.00 diopter powers
- Available in 1.00 and 2.00 diopter powers
- Available in 1.00 and 2.00 diopter powers

### Why Don't We Give More ADD?

High ADD from bifocal/duo focus designs leads to halos



Ray tracing images courtesy of Dr. James Schwiegerling  
 University of Arizona, Phoenix  
 Department of Optics

### Dual Focus Soft Contact Lens Evaluation Schedule

- Year 1 Follow up schedule
  - 1 week
    - Enroll in the program
  - 1 month
    - Can be done in the office (highly preferred or via telemedicine)
  - Then every 4 months for the first year
- Year 2 Follow up schedule
  - Annual exam
  - Every 6 months if progression has slowed  $< -0.50D$



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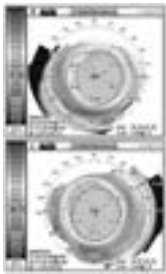
### Astigmatism $> 1.25$

- Extended depth of focus
- Center distance
- Can fit empirically with K's and refraction
- Hybrid Lenses
- Ortho-k

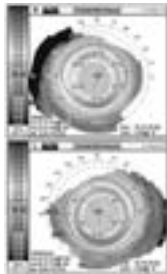


### Which is which?

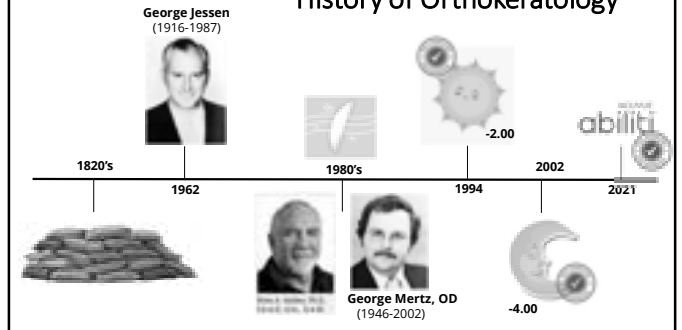
#### LASIK



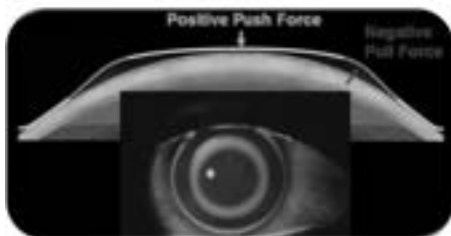
#### ORTHO-K



### History of Orthokeratology

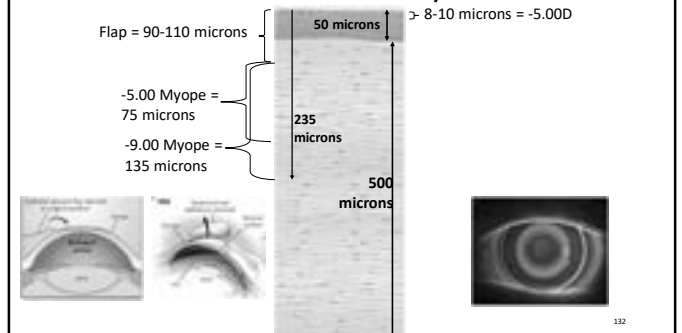


### Ortho-K




- NaFL not visible if tear lens is  $< 20$  microns

### LASIK vs Ortho-k Anatomically




### Designing Ortho-k Lenses




**Empirical Method**

- Refraction
- HVID
- K's
- Topography

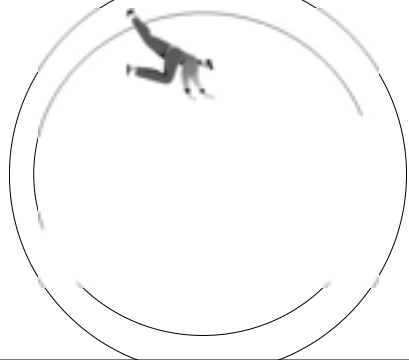


**Trial/ Diagnostic Lens Fitting**




**Topography based software designs**


### Topographer





### Topographer


### Orthokeratology (Ortho-K)

























### Corneal Contour


- The human cornea is not spherical or rotationally symmetric
  - Asphere

### Topography Maps


**Axial Maps (Sagittal) → Power**

- Describes the surface relative to the optical axis
- General view of the corneal contour
- Highly dependent on patient fixation
- Central information



**Tangential Maps (Instantaneous or True Curvature) → Fit**

- Describes the corneal surface independent of the optical axis
- Shows small localized changes of the cornea
- Peripheral information



### Corneal Eccentricity



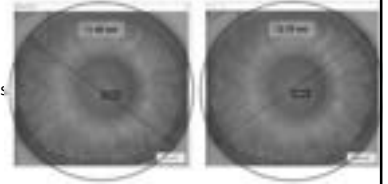
High e (flatter alignment curve)

Low e (steeper alignment curve)

<https://www.clspectrum.com/issues/2017/march-2017/the-anatomy-of-a-modern-orthokeratology-lens>

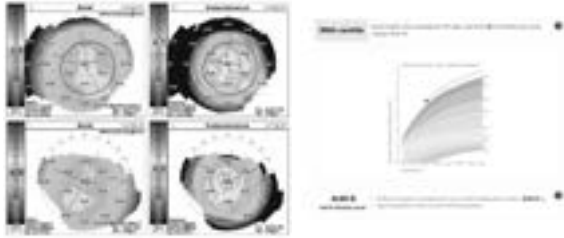
### Capturing Best Topography

- 1 Capture 4-6 baseline maps
- 2 Assess maps: delete poor maps
- 3 Identify your best map
- 4 Measure OVID (Oblique Visual Iris Diameter)

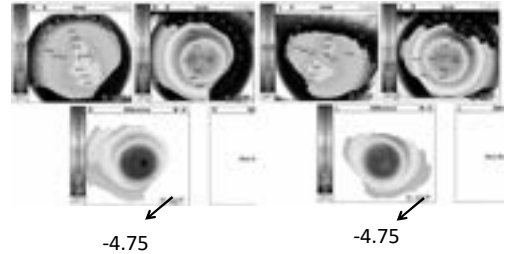


### 10 Year Old- Mother is a -6.00

- OD: -4.75 AL: 25.15
- OS: -4.50 AL: 25.46

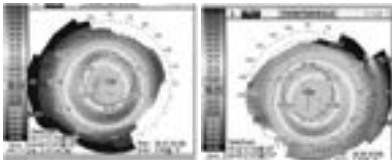


### 1 Week Follow up- Difference Maps



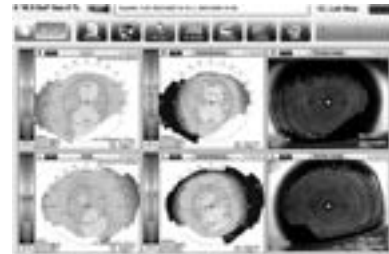
### 1 year, 2 year, 3 year follow up

	Entering Rx	1 <sup>st</sup> AL	Year 1	AL	Year 2	AL	Year 3	AL
OD	-4.75	25.19	pl	25.25	pl	25.73	pl	25.62
OS	-4.50	25.46	pl	25.49	pl	25.88	pl	26.10

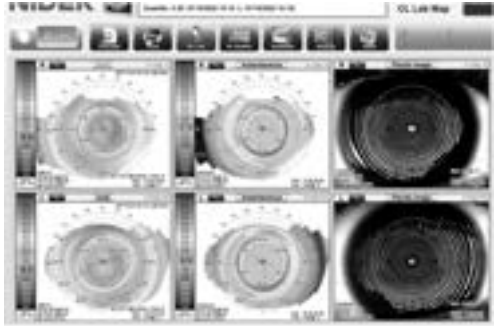


### 11 year old

- OD: -7.50 AL: 27.20
- OS: -7.50-0.50x060 AL: 27.35

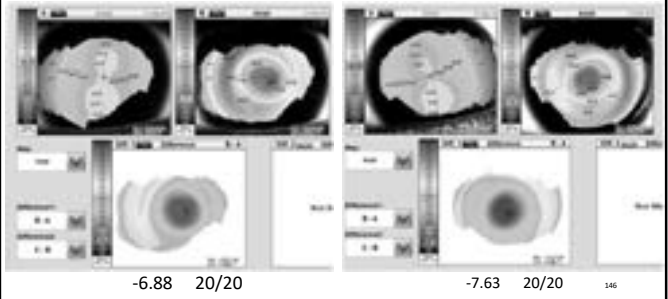


1 Week Map



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Difference Maps

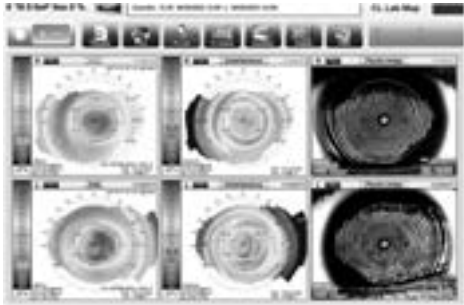


-6.88 20/20

-7.63 20/20

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1 year map



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Ortho K Evaluation Schedule

- Year 1 follow up/evaluation schedule
  - 1 day
  - 1 week
  - 1 month
  - Every 3 months
- Year 2 follow up/evaluation schedule
  - Annual visit (we replace lenses every year no questions asked)
  - Every 6 months if progression has slowed to <-0.50D



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When is my child done with treatment?

- **When they reach ocular maturity or are ready for Refractive Stability**
- **No change in MRX of more than -0.50 in approx. 1 year**

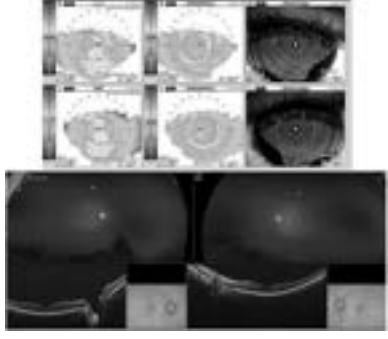
149

At what age does Myopia Stabilize



Age 15: 48%    Age 21: 90%  
Age 18: 77%    Age 24: 96%

**Case 1**  
21 Y/O

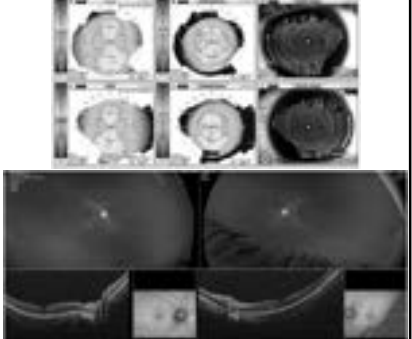


OD: -4.00-0.75x180  
40.52@031/39.11@121  
27.31

OS: -4.25-0.75x010  
41.31@113/39.99@023  
27.04

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**Case 2**  
37 Y/O

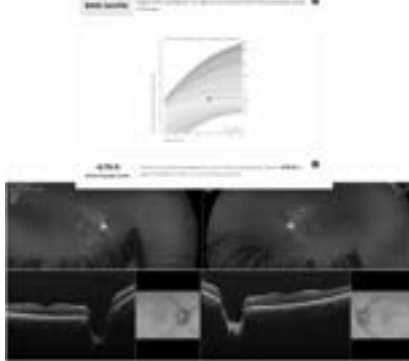


OD: -8.25-2.25x180  
45.25@094/42.88@004  
26.89

OS: -8.00-2.75x180  
45.55@087/42.83@177  
26.63

152

**Case 3**  
14 Y/O




OD: pl-0.75x180  
41.87@093/40.18@003  
25.06

OS: pl-0.75x180  
41.41@095/40.18@005  
24.90

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**Case 4**  
7 Y/O



OD: +0.50  
42.88@088/41.98@178  
22.77

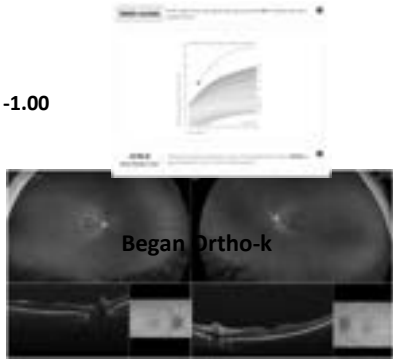
OS: +0.50  
43.16@177/42.08@177  
22.77

Re-evaluate in 6 months

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**Case 5**  
8 Y/O

Last year -3.00, 1<sup>st</sup> Rx @4yo -1.00  
Mom: -3.25 Dad: plano



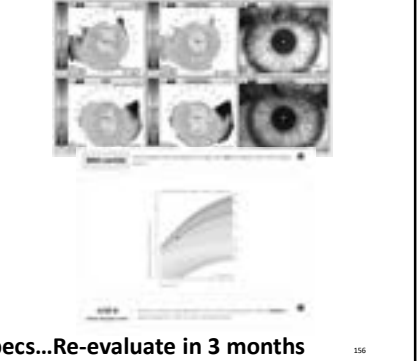
OD: -4.25-0.50x180  
45.98@098/44.88@008  
24.14

OS: -4.25-0.50x180  
46.62@076/45.06@166  
23.99

Began Ortho-k

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**Case 6**  
8 Y/O



OD: -1.00-0.50x095  
44.76@086/44.35@176  
23.84

OS: -0.75-0.75x075  
45.00@086/44.70@176  
23.62

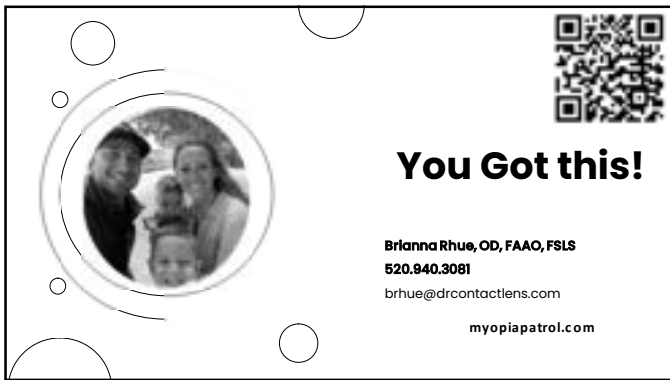
Opted for SV Specs...Re-evaluate in 3 months

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**Providing  
Solutions  
Over  
Sales**

**Generations to  
Come...**



**You Got this!**

Brianna Rhue, OD, FAAO, FSLs  
520.840.3081  
brhue@drcontactlens.com  
myopiapatrol.com