



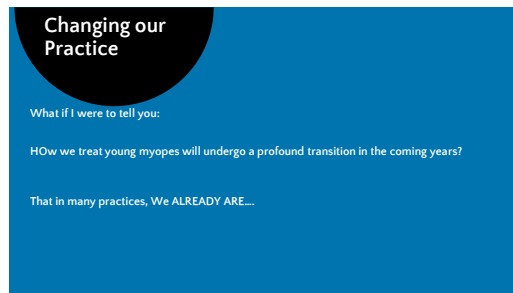
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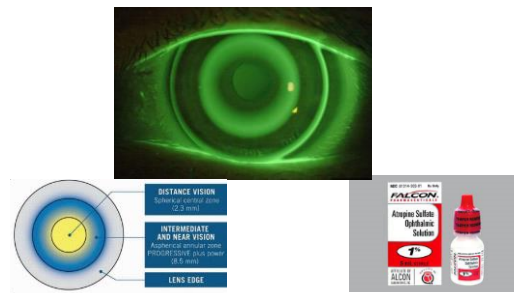
2



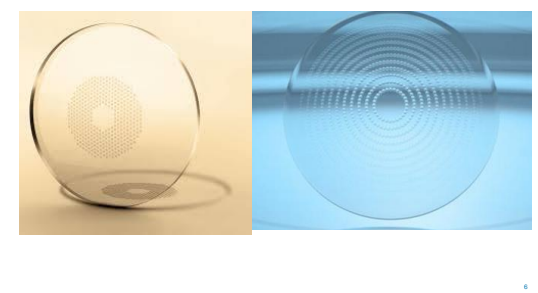
3



4



5



6

Dr. Aarlan Aceto, Optometrist

First part time job in optican 1987

2 year Opticianry degree 93-95

Optician until 2006

- various modalities (private, corporate, boutique, wholesale...)

7

Dr. Aarlan Aceto, Optometrist

- 2003, decided to change gears and become an Optometrist

Graduated in 2009

8



9

From Private Practice...

To Academia...

Involved with the development of 2 new Optometry Schools

CT STATE
COMMUNITY COLLEGE

Back where it all began

Program Director of Opticianry Program
CT State Community College- Middlesex

10

Dedicated my career to education

Opticians, Technicians and associate staff

11

The staff is the HEART AND SOUL of a practice..

Potentially more important than the Doctors

12

**Staff at a Doctors Office
And
Opticians**
(private practice corporate, etc)..
You **MUST** be the expert to communicate to the patients

13

MYOPIA control

Opticians and Technicians will be front line providers of most of the strategies that address Myopia Control

Will be instrumental in educating patients and their parents

NEED TO BE EDUCATED ON SUBJECT

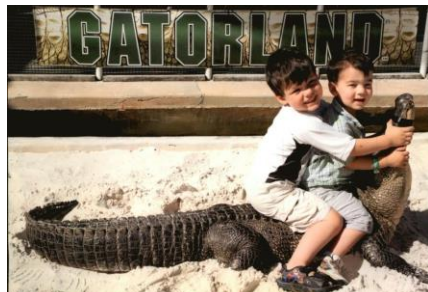
14

“

When I was 5 years old, my mother always told me that happiness was the key to life. When I went to school, they asked me what I wanted to be when I grew up. I wrote down "happy". They told me I didn't understand the assignment, and I told them they **didn't understand life.**

—John Lennon

15



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MYOPIA control

Myopia control has forefront of Optometry Education and Research since the 2000's

Better UNDERSTANDING the PROBLEM

Effective STRATEGIES to address the issue.

17

MYOPIA control

Opticians have been strangely silent and absent from the process (studies, research, implementation of strategies)

Techs often know WHAT we are doing, but now the WHY

This class is to help familiarize Opticians and Techs to the world of Myopia Control

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MYOPIA control

Optician Colleague I spoke with on Myopia control...

Skeptical....



19

Why are we here?

What is Myopia?

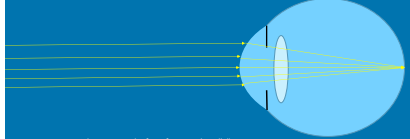
Is it getting worse?

Does worsening Myopia lead to higher likelihood of other problems?

Is there anything we can do to help the issue?

20

EMMETROPIA = NO Refractive error



- Light rays must be from far away (parallel)
- no accommodation

21

basic review

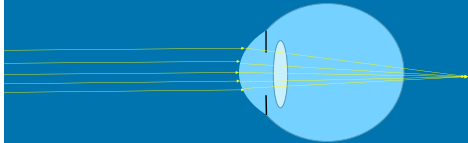
Anatomy of the eye Refractive error

AMETROPIA: = condition where light DOES NOT focus on back of eye

- L

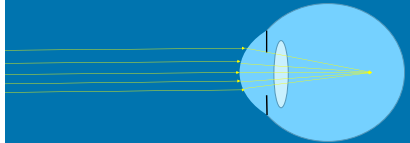
22

Hyperopia focused BEHIND the Retina



23

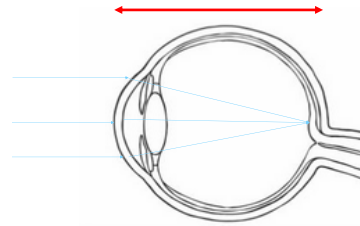
Myopia focused IN FRONT on the Retina



24

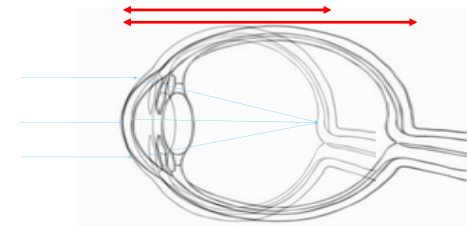
What factors can lead to myopia?
Too strong
OR
Too Long

25



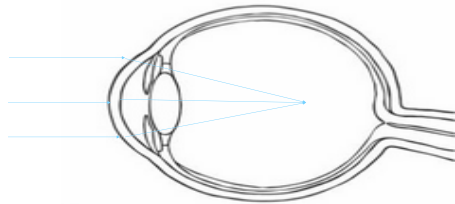
26

<https://en.wikipedia.org/wiki/Near-sightedness>



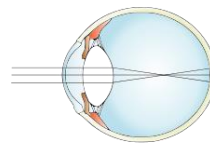
27

<https://en.wikipedia.org/wiki/Near-sightedness>



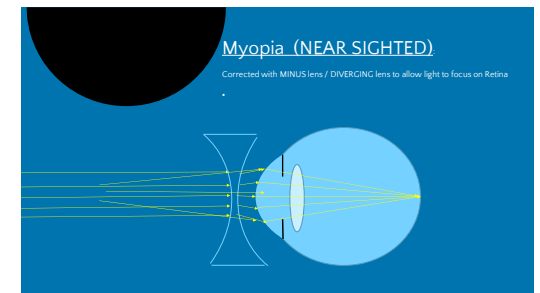
28

<https://en.wikipedia.org/wiki/Near-sightedness>



29

<https://en.wikipedia.org/wiki/Near-sightedness>



30

Development of young eye

Patients, on average, don't START myopic

31

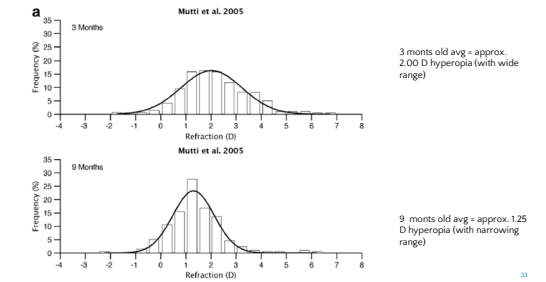
Development of young eye

Generally the average infant is born hyperopic.

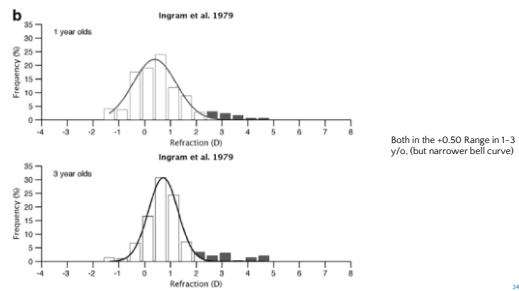
From 6-9months, the amount of hyperopia is reduced

Emmetropization

32



33



34

From Basic Anatomy

WHY DON'T we see a ton of mildly hyperopic Rx's in this age group?

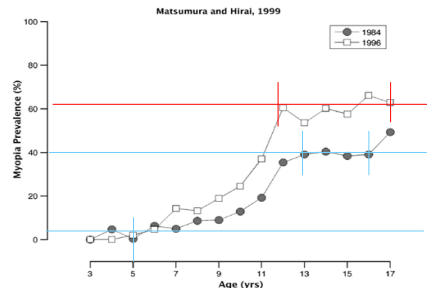
AMAZING ABILITY TO ACCOMODATE

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10289054/>

35

It's now in adolescence that we start to see myopia develop

36



37

From Dispenser's perspective;
 Why we see 9-14 y/o coming in for first time glasses (fewer than infants/preschool age)
 Change can be sudden, and surprise for parents

38

Another example on WHY we MUST ABSOLUTELY have children seen by their eye doctors (OD or OMD) regularly
 "my kid's never needed glasses"
 "school did the exam"
 "Checked at the pediatrician"

39



BIG DEAL???

JUST WEAR GLASSES

Or Contacts 😊

<https://endmyopia.org/2-00-child-myopia-prevention-glasses/>

40

Problem? Why is Myopia a problem?

Risk of pathology INCREASES SUBSTANTIALLY IN MYOPIA	Myopiogenic factors are more prevalent now than in any other time in history	Incidence, prevalence and severity of Myopia is INCREASING...
---	--	---

41

myopia as a minor issue to be corrected

VS.

now a serious health issue with potentially serious long term complications

42

Risk of Ocular pathology

Maculopathy		Retinal Detachment		PSC		Glaucoma	
Rx	Odds Ratio	Rx	Odds Ratio	Rx	Odds Ratio	Rx	Odds Ratio
-1.00 to -3.00	2.2	-0.75 to -2.75	3.1	-1.00 to -3.50	2.1	-1.00 to -3.00	2.3
-3.00 to -4.99	9.7	-3.00 to -4.75	9.0	-3.50 to -6.00	3.1	>-3.00	3.3
-5.00 to -6.99	40.6	-6.00 to -8.75	21.5	>-6.00	5.5		
-7.00 to -8.99	126.8	-9.00 to -14.75	44.2				
>=-9.00	348.6	>=-15.00	88.2				

<https://newgradoptometry.com/myopia-control/>

Figure D: The complex interactions of retinal, optical and environmental factors in myopia pathology. Prog Retin Eye Res 2012;31:622-60.

43

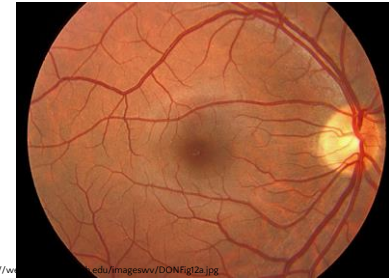
Risk of Ocular pathology

Maculopathy		Retinal Detachment		PSC		Glaucoma	
Rx	Odds Ratio	Rx	Odds Ratio	Rx	Odds Ratio	Rx	Odds Ratio
-1.00 to -3.00	2.2	-0.75 to -2.75	3.1	-1.00 to -3.50	2.1	-1.00 to -3.00	2.3
-3.00 to -4.99	9.7	-3.00 to -4.75	9.0	-3.50 to -6.00	3.1	>-3.00	3.3
-5.00 to -6.99	40.6	-6.00 to -8.75	21.5	>-6.00	5.5		
-7.00 to -8.99	126.8	-9.00 to -14.75	44.2				
>=-9.00	348.6	>=-15.00	88.2				

<https://newgradoptometry.com/myopia-control/>

Figure D: The complex interactions of retinal, optical and environmental factors in myopia pathology. Prog Retin Eye Res 2012;31:622-60.

44



<https://www.fdu.edu/magnewsv/DONfig26.jpg>

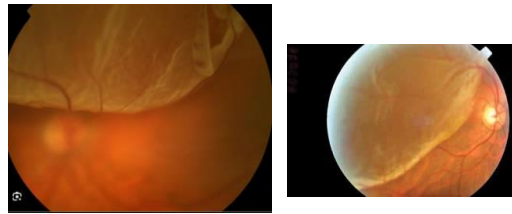
45

Fig. 3. Myopic macular degeneration



Source: Hayashi et al. (33), presented by K. Ohno-Matsu during the meeting.

46

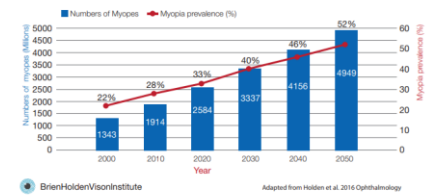


<https://tmothyjackson.london/patients/retinal-detachment/>

<https://www.cedjournal.org/article/retinal-detachment/>

47

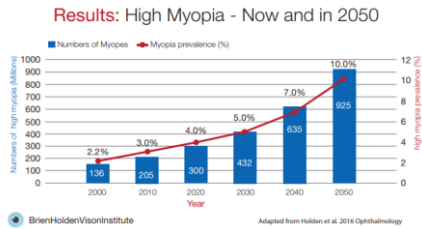
Results: Myopia - Now and in 2050




Brien Holden Vision Institute

Adapted from Holden et al. 2016 Ophthalmology

48



49

Americans 

Myopia prevalence

2015 = 42%

1971 = 25%

50

East Asians = 70% by 15 years old

23% over last decade..

51

Australia (recent study) 

31% of 17 year olds were myopic

DOUBLE the prevalence reported 10 years ago another study

Sydney Myopia study vs Blue Mountain study



<https://bj.o.bmj.com/content/100/7/882>

52

Almost
5 billion
myopes by 2050

53

WHY?

We've established it's happening..

What is Causing it?

54

Heredity

Mom and Pops...

55

Genetics...

Previously though 20-40
genetic factors for myopia

2018 study found 161 genetic factors

Cream Study (consortium for refractive error and myopia)

56

Genetics...

Although in greater numbers, having more genetic
risk factors may increase risk of myopia by 10X

57

ENVIRONMENTAL

Time Spent Outdoors = Lower risk of
becoming myopic

Prescribe your pediatric pts outdoor
activity

58

CLEERE study (collab. Long. Eval of ethnicity and ref error)

- Children in urban environ 2.6x more likely than rural

59

Multiple studies show

↑ outdoor time = ↓ incidence of myopia

2009 Chinese study, 40 minutes of outdoor over 3 years = 25 %
decrease incidence of myopia (39.5 to 30.4)

Taiwan, 80 minutes of outdoor time per day could = 50% decrease
incidence

Hsu M, Xiang F, Zeng Y, Mai J, Chen Q, Zhang J, et al. Effect of Time Spent Outdoors at School on the Development of Myopia Among Children in China: A Randomized Clinical Trial. *JAMA*. 2015; 314(11):1182-9. Wu FC, Tan CL, Wu HL, Yang YH, Kuo HK. Outdoor activity during class recess reduces myopia onset and progression in school children. *Ophthalmology*. 2013; May;120(5):1080-5.

60

What can we do?

- | | | | | |
|---|--|--|--|------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Do Nothing? | Ophthalmic Lenses | ORTHO K | Multifocal CL | Atropine Drops |
| Give regular distance Rx in specs or CL

BAD IDEA | PAL vs Execs

SV peripheral defocus lenses | Overnight reshaping Contact Lenses

Invisaligns for your corneas | Specifically DISTANCE CENTER Multifocal Contacts | Yes, Dilating drops...just diluted |

67

Pharmacological



68



$$\frac{\quad}{\quad} = 100$$

0.01% (or 0.05%)

69

Studies have shown repeatedly that LOW dose Atropine can slow (not reverse or stop) Myopia

Dilating = 1%

Study comparing 0.5%, 0.1%, and 0.01%

<https://www.aaopt.org/assets/28fe020e-593-4416-ae4-889e6cb16b2/635835505202800000/atropine-for-myopia-5-yr-clinical-trial-ophthalmology-2015.pdf?inline=1>

70

Studies have shown repeatedly that LOW dose Atropine can slow (not reverse or stop) Myopia 2015

0.01% = BETTER TOLERATED

0.01% = more effective

<https://www.aaopt.org/assets/28fe020e-593-4416-ae4-889e6cb16b2/635835505202800000/atropine-for-myopia-5-yr-clinical-trial-ophthalmology-2015.pdf?inline=1>

71

Studies have shown repeatedly that LOW dose Atropine can slow (not reverse or stop) Myopia

NOW 0.02 % showed better efficacy than 0.01%

<https://www.aaoptjournal.org/article/50161-642019132356-5/fulltext> 2019 0.05
<https://www.nature.com/articles/s41598-021-07088-7> 2021 0.02

72

Low dose ATROPINE

Method of action?
Compared to peripheral defocus, sunlight or genetics?

Seems to be ↑ in dopamine

73

- dampening vital functions of the retina, atropine boosts dopamine release from cellular stores, which then controls eye growth.

- In experimental animal studies, **the use of either dopamine (or nonselective dopamine receptor agonists) was found to inhibit the development of myopia**

- <https://reviewofmm.com/mechanism-of-action-of-atropine-in-controlling-myopia-progression/>

74

Atropine gtts

NOTE:
nonselective muscarinic acetylcholine receptor antagonist

blocks all muscarinic receptor subtypes: M₁ through M₅ receptors

75

Atropine gtts

Historically atropine CAN be dangerous in high quantities...

Generally safe in low dose topical use

76

Systemic side effect, almost impossible in low concentrations

15ml bottles of 0.05% atropine

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3298216/>

77

Atropine systemic poisoning:

increased antimuscarinic side effects:

"hot as a hare warm"dry skin from decreased sweating
 "blind as a bat"blurry vision
 "dry as a bone" decreased tear production
 "red as a beet" vasodilation
 "mad as a hatter"delirium/CNS effects

78

Atropine gtts

Trade off.....

- STILL NEED GLASSES
 - so glasses to see
 - drops to slow progression

79

Optical solutions?

Classes or Contacts???

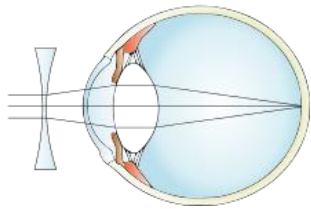
80

Peripheral defocus

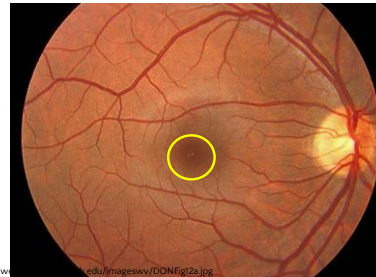
A HUGE FACTOR
In Myopia Development

And one WE can affect as ECPs

81



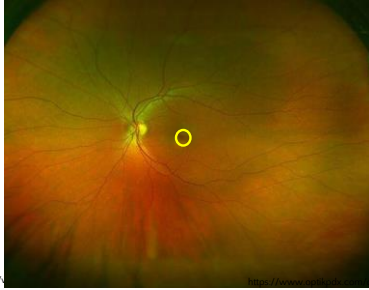
82



83



84



<https://www.stos-retinal-imaging/>

85

<https://vimeo.com/28658893>

86

We are so concerned about CENTRAL vision...the important part is the PERIPHERAL

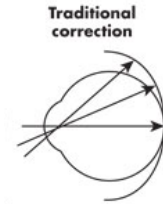
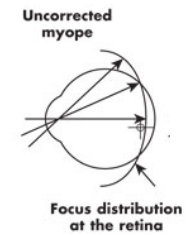
<https://www.eyedoatryblog.com/2015/06/whats-happening-to-our-vision.html>

87

Show studies in animals that show induced peripheral defocus causes myopia

Eye "wants" peripheral light rays on or in front of the retina (myopic defocus)

- IF focused BEHIND RETINA in periphery instead... (hyperopic defocus), then....
- Which axially lengthen bring those peripheral retinal images into focus....
- Which MEANS....MORE MYOPIA...
- So we correct with Traditional correction centrally....
- Which focuses BEHIND RETINA in periphery
- Which axially lengthens...
- Which Means more myopia
- Which focuses BEHIND RETINA in periphery....
 - AND ON AND ON CASCADE EFFECT

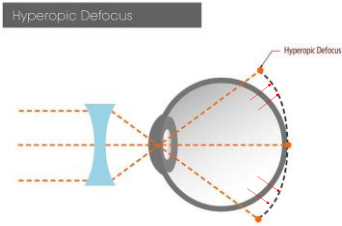


<https://reviewofmm.com/whats-up-with-myopia/>

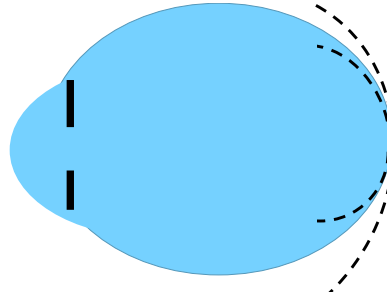
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89

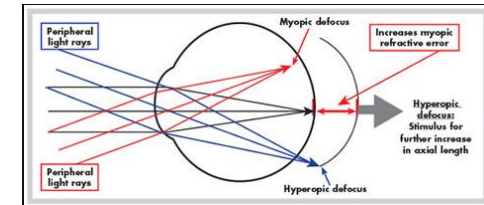
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91



92



<https://www.eyedoatryblog.com/2015/06/whats-happening-to-our-vision.html>

93

What can we do to slow down this epidemic?

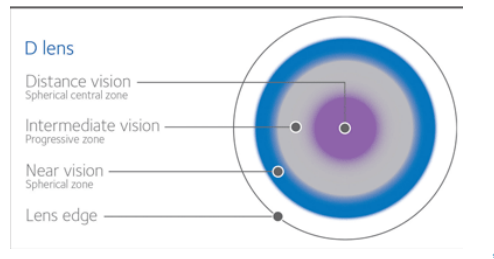
94

From a purely OPTICAL standpoint...
 Move the peripheral focus IN
 Converge more in periphery

95

ADD PLUS
 ONLY to PERIPHERY

96

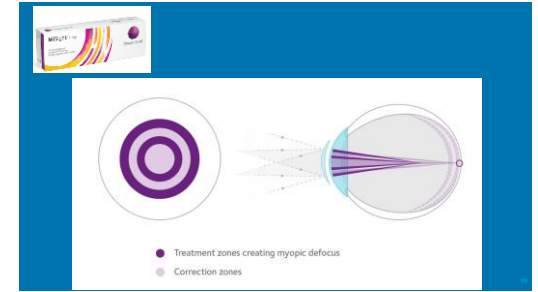


97

VERY IMPORTANT::
 Was NOT FDA APPROVED when I started this course

NOW....:
 NOV 2019, Coopervision MiSight

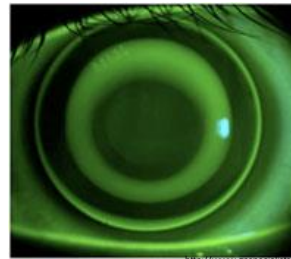
98



99

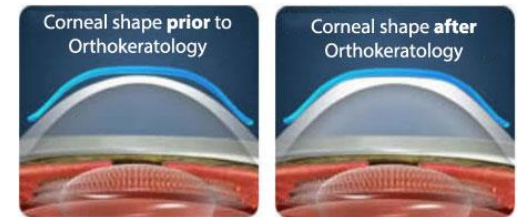
VERY IMPORTANT::
 Some of the following methods not FDA approved
 "off-label"

100



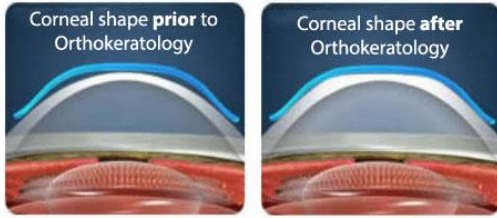
<http://www.gospeccians.com/ortho->

101



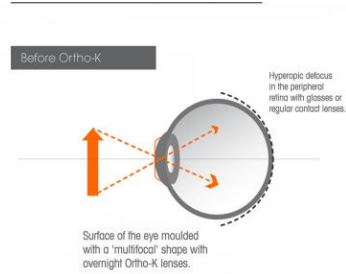
<https://contactsadvice.com/2017/03/are-ortho-k-contacts-for-you/>

102



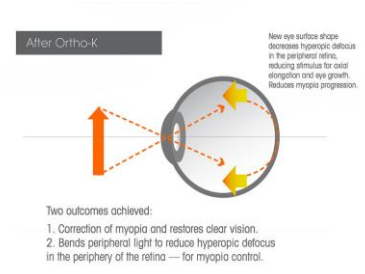
<https://contactsadvice.com/2017/03/are-ortho-k-contacts-for-you/>

103



Surface of the eye moulded with a 'multifocal' shape with overnight Ortho-K lenses.

104



Two outcomes achieved:
 1. Correction of myopia and restores clear vision.
 2. Bends peripheral light to reduce hyperopic defocus in the periphery of the retina — for myopia control.

105

Both Ortho K & Distance Center CL
 provide proper Peripheral Retinal Defocus to slow Myopia Progression

106

Analysis

Spectacles

Traditional SV lenses NOT the answer

Bifocal/PALs?

OR NEW technology?

107



Multifocal lenses for Children

Exec?
 PAL?

108

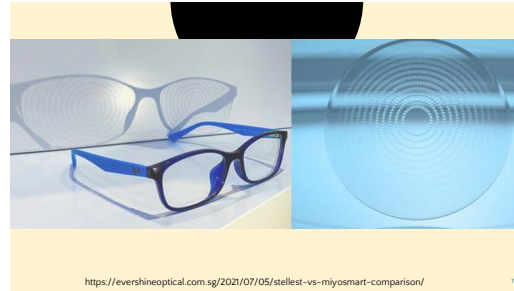
SPECTACLE CORRECTION

Myopia Control SV lenses (peripheral defocus or accommodative lag lenses)

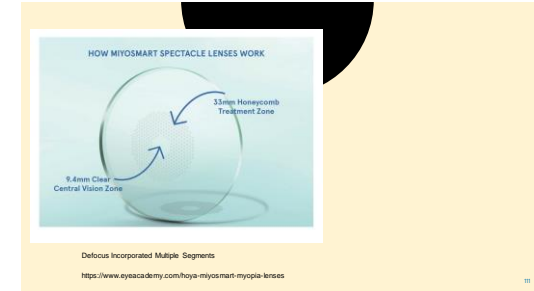
- Essilor Stellest (FDA 2021 "breakthrough device designation")
- Hoya MyoSmart (not FDA, avail in other countries currently)
- Varilux Myopilux
- Zeiss Myovision Pro/ Myokids/Myocare

https://www.essilor.com/medias/press-releases/2021/07/05/stellest-breakthrough-device-designation-for-ocular-children-the-next-generation-of-spectacle-lens-solutions-in-the-light-agent-market

109



110



111



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DECEMBER 2022 Study in JAMA

Studied efficacy in controlling myopia using spectacle lenses with:

- conventional single-vision spectacle lenses
- highly aspherical lenslets
- slightly aspherical lenslets

HAL (MORE PLUS IN PERIPHERY) = Better results

Bao J, Huang Y, Li X, et al. Spectacle lenses with aspherical lenslets for myopia control vs single-vision spectacle lenses. JAMA Ophthalmology. 2022;140(5):472-8. https://jamanetwork.com/journals/jamaophthalmology/fullarticle/2790589

113

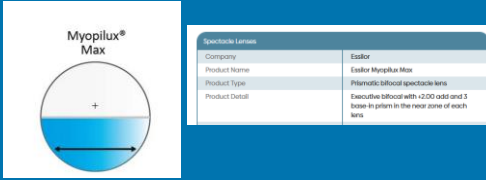
ZEISS MyoVision® Pro

Applying the principles of Peripheral Defocus Management

The central zone provides sharp and uncompromised distance vision.

The periphery of the lens has a specific design with the goal of reducing myopia progression¹.


114



Myopilux® Max

Spectacle Lenses	
Company	Essilor
Product Name	Essilor Myopilux Max
Product Type	Progressive bifocal spectacle lens
Product Detail	Executive bifocal with +2.00 add and 5 base in prism in the near zone of each lens

115



ZEISS MyoKids®

Spectacle Lenses	
Company	ZEISS
Product Name	ZEISS MyoKids
Product Type	Accommodative Lag Management
Product Detail	<ul style="list-style-type: none"> The top half of the lens supplies clear vision in the distance! The bottom active zone simultaneously supports near vision tasks and can help to reduce myopia progression!

116

Analysis

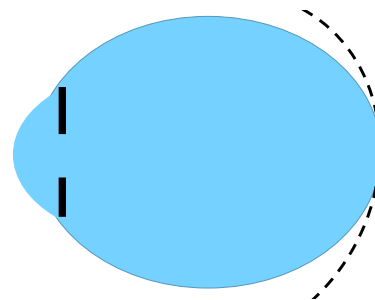
Classes:

- Efficacy?
- Multifocals and children?
- Sports?
- Cosmesis? (exec?)

117

NOTE ON UNDERMINING.

118



119

question....

Can you combine treatments..

We're looking into it! More research EVERY MONTH...

STAY CURRENT!

120

- Higher level of myopia at earlier age = worse final expected Rx
- Earlier treatment = Better results

121

- IT is critical to understand that the study of Myopia AND Myopia control is constantly evolving
- More research every year...

122

Studies have shown that OUTDOOR EXPOSURE TO SUNLIGHT lowers risk for Dx of Myopia

However.....

Once the process begins, DOES NOT slow progression!?!?!?

Or does it....some changes in literature...

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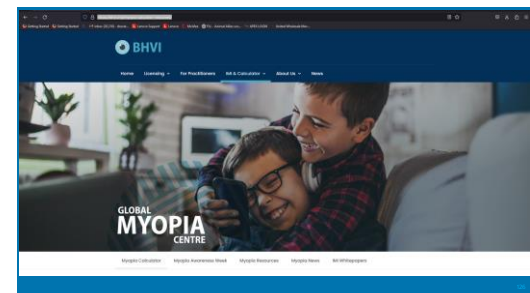


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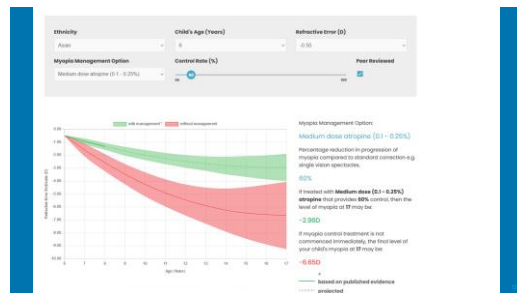
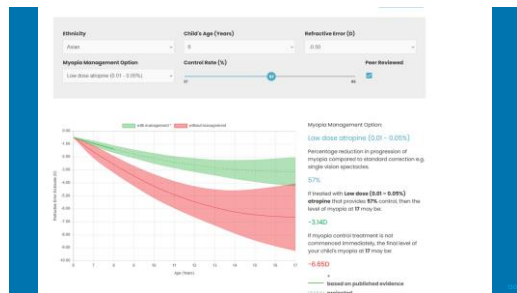
Myopia calculator.
Brien Holden institute

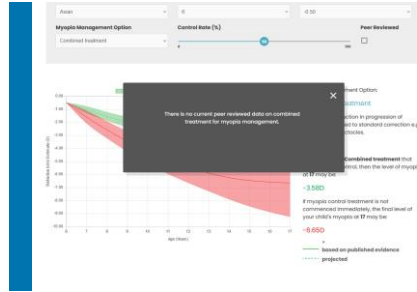
<https://bhvi.org/myopia-calculator-resources/>

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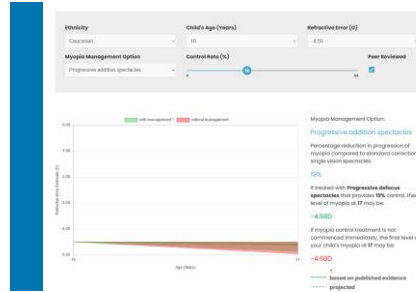


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VERY IMPORTANT::

NO INSURANCE, SELF PAY

Generally patients educated by providers/practitioners, no major corporate backing/marketing..

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Take home:

- Myopia is a worsening problem
 - environmental, genetic, hereditary
- Myopia leads to increase pathology
- Myopia can (and should be) treated to minimize
 - Not reverse or halt (yet)

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Take home:

Consider revisiting our standard of care

- In next 10 years, myopia control strategies likely will be FAR more common
- OPTICIANS/DISPENSERS should be involved and at the table in this endeavor

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