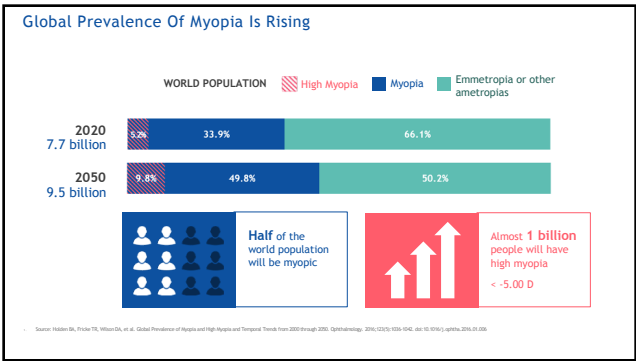
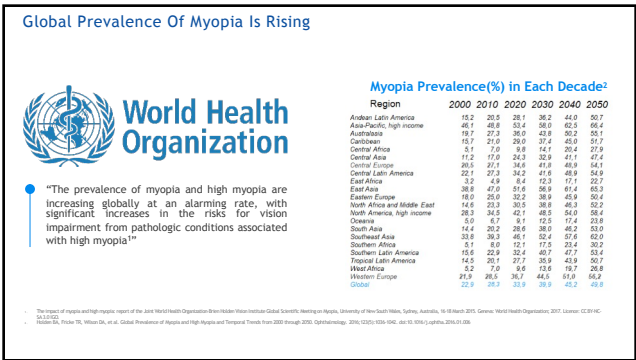




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6

Educating Eye Care Professionals In Partnership With Myopia Profile

- Myopia Profile and Essilor join forces to tackle childhood myopia through education and awareness

World's largest and most popular multi-platform digital suite for myopia management.

Partnership to educate and boost knowledge-sharing among eye care professionals, educational content housed on myopiaProfile.com




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Promoting Public Awareness Of Childhood Myopia With Global Myopia Awareness Coalition

- Essilor is a founding member of Global Myopia Awareness Coalition, an industry-wide collaborative effort on myopia

Committed to raising public awareness of childhood myopia and awareness with governments, NGOs and other health care associations




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Myopia Onset and Progression: Causes

What exactly is Myopia?

Nearsightedness or Myopia
Vision condition in which people can see close objects clearly, but objects farther away appear blurred¹.

Occurs if the eyeball is too long or if the optical power of the eye is not adapted to its length. Thus, light rays entering the eye are not focused correctly, and distant objects appear blurred.

Condition in which the spherical equivalent refractive error is ≤ -0.50 diopter (-0.50 D) in the eye when ocular accommodation is relaxed².



High Myopia
Condition in which the spherical equivalent refractive error is ≤ -6.00 D in the eye when ocular accommodation is relaxed. A threshold of ≤ -5.00 D is also found in literature³.

1. American Optometric Association.
2. Global and Public Myopia Study Group. J Opt Soc Am Opt Opt Technol. 2019;19(1):1-11.
3. International Myopia Conference. Report of the 2019 International Conference of the Asia-Pacific Vision Institute Global Scientific Meeting on Myopia, University of New South Wales, Sydney, Australia, 16-18 March 2019. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 4.0 IGO.

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Myopia Onset and Progression

Myopia Onset: Family History

Family history can be a risk factor for children to develop myopia

ONE MYOPIC PARENT

2-3x

TWO MYOPIC PARENTS

5-6x

Odds ratio (95% CI)



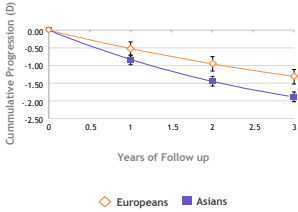
1. Brown G, Smith L, MacKillop S, Mitchell G, MacKillop S. Parental history of myopia, sports and outdoor activities, and future myopia. Invest Ophthalmol Vis Sci. 2007; 48(9): 2044-2050. 2. Parkin J, Brown G, Owen A, Colquhoun J. Family aggregation of high myopia and risk of the sibling recurrence ratio. Invest Ophthalmol Vis Sci. 2004; 45(12): 2070-2075. 3. MacKillop S, Mitchell G, MacKillop S. Parental myopia, near work, school achievement, and children's refractive error. Invest Ophthalmol Vis Sci. 2002; 43(10): 2042-2047. 4. International Myopia Institute

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Myopia Onset and Progression

Myopia Progression: Ethnicity

- High prevalence of myopia and faster progression in myopia is seen among Asian children, compared to European children.
- For Asians, rate of myopia progression was 0.87D/year*
- For Caucasians, rate of myopia progression was lower, at 0.55D/year*



Years of Follow up	Europeans (D)	Asians (D)
0	0.00	0.00
1	-0.55	-0.87
2	-1.10	-1.74
3	-1.65	-2.61

*Brown G, Smith L, MacKillop S, Mitchell G, MacKillop S. Parental history of myopia, sports and outdoor activities, and future myopia. Invest Ophthalmol Vis Sci. 2007; 48(9): 2044-2050.

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Myopia Onset and Progression

Optical Factors¹

Binocular Vision

- Pre-myopes with high acc LAG²
- High AC/A ratio³
- Reduced accommodative responses

Central and Peripheral Hyperopic Defocus⁴

- Stimulates eye elongation⁵



1. Brown G, Smith L, MacKillop S, Mitchell G, MacKillop S. Parental history of myopia, sports and outdoor activities, and future myopia. Invest Ophthalmol Vis Sci. 2007; 48(9): 2044-2050. 2. Brown G, Smith L, MacKillop S, Mitchell G, MacKillop S. Parental history of myopia, sports and outdoor activities, and future myopia. Invest Ophthalmol Vis Sci. 2007; 48(9): 2044-2050. 3. Brown G, Smith L, MacKillop S, Mitchell G, MacKillop S. Parental history of myopia, sports and outdoor activities, and future myopia. Invest Ophthalmol Vis Sci. 2007; 48(9): 2044-2050. 4. Brown G, Smith L, MacKillop S, Mitchell G, MacKillop S. Parental history of myopia, sports and outdoor activities, and future myopia. Invest Ophthalmol Vis Sci. 2007; 48(9): 2044-2050. 5. Brown G, Smith L, MacKillop S, Mitchell G, MacKillop S. Parental history of myopia, sports and outdoor activities, and future myopia. Invest Ophthalmol Vis Sci. 2007; 48(9): 2044-2050.

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Myopia Onset and Progression

Near Work

Myopia Onset:
Increased educational demand and near work is associated with a higher incidence of myopia^{2,4}.

Children who spent 2.2 hours in near work have higher myopia prevalence than those who spent 1.6 hours reading per day⁵.
Children (5-6 yo) who became myopic performed significantly more near work (19.4 hr/wk vs 17.6 hr/wk)⁶.

Myopia Progression:
Greater near work may influence the development and progression of myopia.

Risk of myopia development has been associated with reading at close distances (<20cm) for continuous periods of time (>45 in) rather than total time on near activities.³



1. WHO. Myopia. Geneva: WHO; 2019. 2. Holden BA, et al. The increasing burden of myopia: A global perspective on the epidemic of vision impairment. Lancet Glob Health. 2016;4(10):e161-169. 3. Williams CS, et al. Near work and myopia: A systematic review and meta-analysis. Optom. 2015;96(12):12-21. 4. Williams CS, et al. Near work and myopia: A systematic review and meta-analysis. Optom. 2015;96(12):12-21. 5. Williams CS, et al. Near work and myopia: A systematic review and meta-analysis. Optom. 2015;96(12):12-21. 6. Williams CS, et al. Near work and myopia: A systematic review and meta-analysis. Optom. 2015;96(12):12-21.

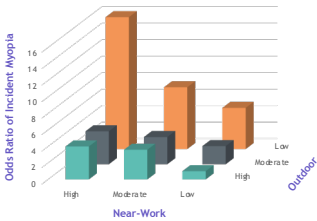
16

Myopia Onset and Progression

Myopia Onset and Progression: Outdoor Time

Increased outdoor time is effective in preventing myopia onset. But it is not effective in slowing progression in eyes that were already myopic.

Children who became myopic spent less time outdoors compared with children who remained non myopic⁷.
Outdoor time is recommended for all children.



7. Smith, A.H., et al., Time outdoors and the prevention of myopia. Supplemental Eye Research (2015). <https://doi.org/10.1016/j.ser.2015.05.001>

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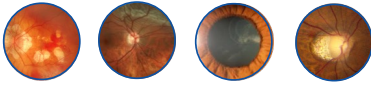


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Risks associated with Myopia

Myopia Can Lead To Serious Long-term Risks, Which May even Cause Vision Impairment

Any level of myopia increases the risks of the below mentioned ocular conditions, compared to emmetropes, but the risk increases exponentially once reaching high myopia⁵.



PRESCRIPTION	MYOPIC MACULAR DEGENERATION ¹	RETINAL DETACHMENT ²	CATARACT PSC ³	GLAUCOMA ⁴
-6.00 to -9.00	40.6 x risk	21.5	5.5	2.46
-3.00 to -6.00	9.7	9.0	3.1	2.46
-1.00 to -3.00	2.2	3.1	2.1	1.65

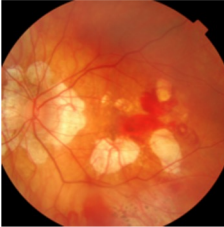
1. Vongthong L, Mitchell P, Wong J. Prevalence and progression of myopic maculopathy in older populations. *Ophthalmology* 2005; 112: 1047-51.
2. Gopal A, Tazawa M. The relationship between myopic macular and retinal detachment: a review of 111 eyes. *Retinal detachment* 2005; 10: 120-20.
3. Smith W, et al. Prevalence of cataract in the United States. *Arch Ophthalmol* 1994; 112: 1400-04.
4. Heikkinen M, et al. Prevalence of glaucoma in the United States. *Arch Ophthalmol* 1994; 112: 1400-04.
5. Hsu J. *Current ophthalmology* 2005; 112: 1400-04.

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Risks associated with Myopia

Myopic Macular Degeneration: One Of The Leading Causes Of Visual Impairment

- Myopic Macular Degeneration is one of the leading causes of visual impairment in patients with myopia¹
- Most frequent cause of visual impairment in elderly Chinese in Taiwan, Hong Kong and Japan¹
- Third most common cause of blindness²



1. Hsu J, et al. Myopic macular degeneration in elderly Chinese: a cross-sectional study. *Exp Gerontol* 2004; 39: 145-50.
2. Smith W, et al. Prevalence of glaucoma in the United States. *Arch Ophthalmol* 1994; 112: 1400-04.

20

Why Myopia Management Is Important

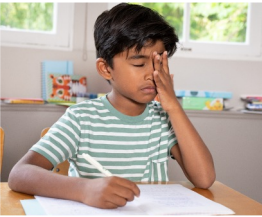
Level of Risks Linked to Myopia progression

Reducing myopia by 1 D, has the potential to reduce the risk of myopic maculopathy by 40%*.

Reducing myopia by 1 D, has the potential to reduce the risk of retinal detachment by 25%*.

Reducing myopia by 1 D, has the potential to reduce the risk of open angle glaucoma by 20%*.

Reducing myopia by 1 D, has the potential to reduce the risk of visual impairment by 20%*.



*Balderson MA, Brennan TA. Myopia Control: Why Don't Optometrists? *Optom Vis Sci* 2015;92:403-5

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Myopia Management and Solutions		
Myopia Correction Vs. Myopia Management		
Undercorrection ¹	Myopia Correction	Myopia Management
- May lead to more rapid myopia progression^{1,2}. Undercorrection of myopia by ~0.75 D compared with full correction, shown to worsen myopia progression¹. - May be due to peripheral and central blur, stimulating axial length growth. - Not encouraged as it has not shown to be successful in slowing down myopia progression. ⇒ Refractive correction of progressing myopes should be updated regularly	- Provides good central vision. - Process of correcting the refractive error with single vision spectacle lenses or single vision contact lenses. - Does not delay the development or slow the progression of myopia.	- Provides good central vision and slows down myopia progression. - Aimed to delay development or slow myopia progression to avoid or reduce the risk of potential pathologies in later life³. - Includes multiple options over the long term as myopia develops - May be modified depending on the result of the myopia progression

¹ Chung Y, Mitchell A, Chung Y. Undercorrection of myopia: faster than full correction. *Optom*. 2012;93:20-25.
² Hooper, J. et al. (2015) The effect of undercorrection of myopia on myopia progression: a meta-analysis. *Optom*. 2015;96:10-15.
³ The impact of myopia management on the risk of future myopia progression: a systematic review. *Optom*. 2018;99:10-15.

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Myopia Management and Solutions
Interventions For Myopia Management

The progression of myopia may be slowed down with myopia management solutions, reducing the number of sight-threatening eye diseases in the years to come



Spectacle Lenses
Progressive lenses/Bifocals
Peripheral Defocus lenses
Dual Focus lenses
Spectacle lenses with aspherical lenslets



Contact Lenses
Multifocal CL
Extended Depth of Focus CL
Dual Focus CL
Orthokeratology



Pharmaceuticals
Atropine

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Myopia Management and Solutions

Management Solutions: Advantages And Disadvantages



Spectacle Lens

Advantages

- Simple
- Non-invasive
- No adverse effects
- Skills already established

Disadvantages

- Aesthetics issue in bifocals



Contact Lens

Advantages

- Wider field of vision
- Excellent in cosmesis
- Sports
- Stable on the eye

Disadvantages

- Lower quality vision (ghosting)
- Risk of infection
- Not suitable for dry eyes
- Difficulties in insertion
- Parental supervision



Orthokeratology

Advantages

- No need to wear correction during day
- Wider field of view
- Sports

Disadvantages

- Higher risk of microbial keratitis than daily wear CL
- Lower quality of vision with large pupil
- Limited prescription range than multifocal CL
- Skills update by practitioner
- Parental supervision



Atropine

Advantages

- Likely to have good VA when used with SV correction

Disadvantages

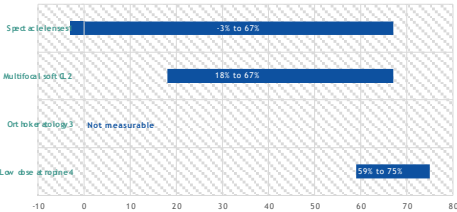
- Duration of treatment
- Dosage and long-term effects are still not known
- Can dilate pupil and reduce accommodation with higher concentrations
- Limited availability
- Rebound effects with high dosage

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Myopia Management and Solutions

Myopia Management Solutions: Summary

Efficacy SER%



Solution	Efficacy SER%
Spectacle lenses	-3% to 67%
Multifocal soft CLs	18% to 67%
Orthokeratology	Not measurable
Low dose atropine	59% to 75%

1) Sources in annex (Slide 31-32)

2) Sources in annex (Slide 34-35)

3) Sources in annex (Slide 37-39)

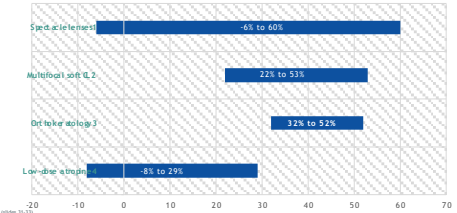
4) Low Dose Atropine (0.5%, 0.1%, 0.01%). Results from Atropine 1% were not taken into consideration because of the strong rebound effect observed after cessation of the treatment with such concentration. Sources in annex (Slide 40-42).

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Myopia Management and Solutions

Myopia Management Solutions: Summary

Efficacy AL%



Solution	Efficacy AL%
Spectacle lenses	-6% to 60%
Multifocal soft CLs	22% to 53%
Orthokeratology	32% to 52%
Low dose atropine	-8% to 29%

1) Sources in annex (Slide 31-32)

2) Sources in annex (Slide 34-35)

3) Sources in annex (Slide 37-39)

4) Low Dose Atropine (0.5%, 0.1%, 0.01%). Results from Atropine 1% were not taken into consideration because of the strong rebound effect observed after cessation of the treatment with such concentration. Sources in annex (Slide 40-42).

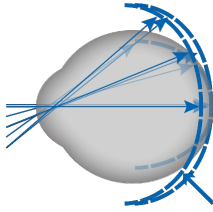
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9

CORRECT MYOPIA WITHOUT CONTROLLING PROGRESSION

One theory of myopic progression suggests peripheral hyperopic blur signals eye growth.²⁴

Traditional SV (ophthalmic and contact) lenses eliminate foveal blur- but induce peripheral hyperopic blur.²⁵



Traditional Myopic Correction
(peripheral hyperopic blur)

24 Earl L Smith Jr, OD, The Challenge of Presbyopia Assisted Lecture 2010: A Case for Peripheral Optical Treatment Strategies for Myopia, Optom Vis Sci, 2011 September; 88(9):1029-1044.
25 Walline JJ, et al., A randomized trial of the effect of soft contact lenses on myopia progression in children, Invest Ophthalmol Vis Sci, 2008 Nov; 49(11):4702-6.

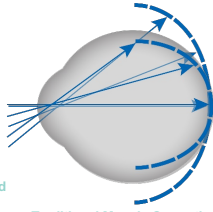
28

CORRECT MYOPIA WITHOUT CONTROLLING PROGRESSION

SV LENSES: Some studies suggest traditional SV lenses accelerate the progression of myopia vs. leaving the child uncorrected.²⁶

	Uncorrected	Fully Corrected
Progression @ one year	-0.39D	-0.58D
Progression @ two years	-0.75D	-1.04D

(AOU = -1.31D)*



Traditional Myopic Correction
(peripheral hyperopic blur)

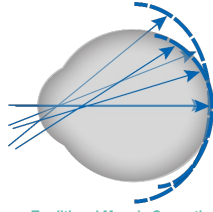
26 Yan-Yan Sun, et al., Effect of uncorrected versus full correction on myopia progression in 12-year-old children, Arch Clin Exp Ophthalmol, Published on-line 28 October 2016 DOI: 10.1007/s40171-016-0229-1

29

ENHANCED SV LENSES

Enhanced SV lenses feature a “boost” of plus power in the bottom of lens- reducing hyperopic blur (and in some cases creating myopic blur) in the superior periphery.

Do They Work? **NO**



Traditional Myopic Correction
(reducing foveal hyperopic blur)

26 Yan-Yan Sun, et al., Effect of uncorrected versus full correction on myopia progression in 12-year-old children, Arch Clin Exp Ophthalmol, Published on-line 28 October 2016 DOI: 10.1007/s40171-016-0229-1

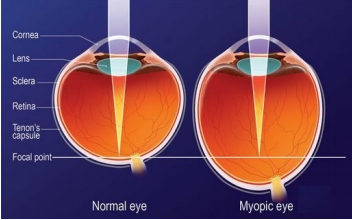
30

10

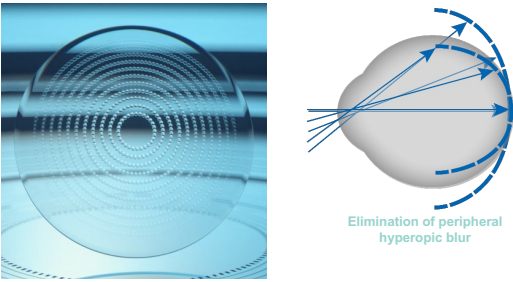
Axial length is where it is at
 % issues: Myopia faster=younger
 Myopia rates vary based on ethnicity

.1mm equals .25D

DIMS .55D .32mm 2 year
 HALT .80D .35mm 2 year
 SGV .77D .27mm 2 year
 Ortho K .25mm to .32mm
 Atropine 0.02% .32D .16mm
 Atropine 0.01% .23D .09mm
 Atropine .01% avg .07mm AVG
 MiSight .67D and .28mm 3 year



31



Elimination of peripheral hyperopic blur

32

Myopia Management and Solutions



Spectacle Lens

Advantages

- Simple
- Non-invasive
- No adverse effects
- Skills already established

Disadvantages

- Aesthetics issue in bifocals

- 9 mm
- Central distance
- Magic is in the rings
- Follow Up
- Accuracy

- Monocular PD
- OC
- VS. RX and Axial Length
- 1.37 and 26.45 mm
- New ways/historic skill
- Your skills are key

33



TO SEE MORE
TO PLAY MORE
TO LEARN MORE
TO BECOME MORE

"Children do not make up 100% of our population today, but they do make up 100% of our future"

34



Thank You

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