


The Journey into Myopia Management



Sheila D. Morrison, OD, MS, FSLs // 403-938-8125 // shel@missioncare.com
 Jason Compton, OD, FAAO // 917-658-7847 // jason.c.compton@bentall.com

3/01/24

Dr. Jason E. Compton

OD, FAAO



Founder/Owner, Compton Eye Associates
 Founder/Owner, TheLightContact.com
 Founder/Owner, Bentall's, Bentall.com
 Adjunct Faculty, SUNY Optometry
 Healthy, Resilience Technical Institute
 Regional Trustee, New York State Optometric Association
 Past Chair, AOA Contact Lens and Cornea Section

3/01/24


Financial Disclosures

- Johnson & Johnson
- Coopervision
- Alcon

3/01/24

Dr. Sheila Morrison

OD, MS, FSLs, FAAO



- Optometrist, Mission Eye Care Centre for Dry Eye and Corneal Disease, Calgary
- AIB Canada
- Co-Founder, The Myopia Academy
- Co-Founder, Canadian Contact Lens Academy
- Co-Supervisor, Mission Eye Care
- Residency in Cornea and Contact Lens
- Adjunct Faculty, Northeastern State University, Oklahoma College of Optometry
- Continuing Education Committee, Member, Alberta Association of Optometrists
- Past Fellowship Chair of the Scleral Lens Education Society

3/01/24

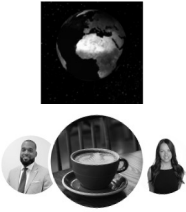
Financial Disclosures

- Blanchard
- Boston Sight
- Coopervision
- Eaglet
- Euclid
- Paragon
- Pentavision
- Vistakon / Johnson & Johnson
- Wave

3/01/24

Welcome to the Journey of Myopia Management

1. Public Health Impact of Myopia in YOUR clinic and the WORLD
2. Treatment Strategies with Safety Studies
3. Implementing Into Clinical Practice
4. Evidence Based Practice
5. Novel Areas of Study
6. Choosing a Myopia Management Strategy
7. Compliance
8. Parent Discussions
9. Marketing Myopia Control
10. Conclusions



3/01/24

Public Health Impact of Myopia in YOUR clinic and the WORLD

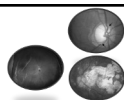
3/01/24

Impact: Myopia on Public Health

- Myopia has reached epidemic levels in East Asian countries
- The prevalence is rising in Western countries
- Studies are finding an earlier age of onset and faster progression of myopia - this will lead to higher risk for pathology
- Myopia is associated with a higher-risk of developing several vision-threatening eye diseases (myopic macular degeneration, glaucoma, retinal detachment)
- Intervention is necessary. What treatment strategies work?
- Not everyone has access to care. What is happening in myopia control globally?

3/01/24

Reduction Myopia = Reduction Risk



Myopia Increases the Risk of Serious Sight-Threatening Complications

CONDITION	Relative Risk of Ocular Disease Secondary to Myopia Compared to Emmetropia ¹		
	-2.00 D	-5.00 D	-8.00 D
Myopic Macular Degeneration	2.2 x higher	40.6 x higher	126.8 x higher
Retinal Detachment	3.1 x higher	9.0 x higher	21.5 x higher
Cataract	2.1 x higher	3.1 x higher	5.5 x higher

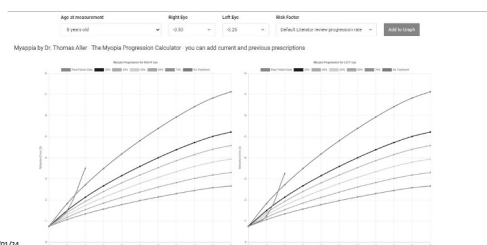
Each Diopter Matters

> Optom Vis Sci. 2019 Jun;96(6):463-466. doi: 10.1097/OPX.0000000000001367.
Myopia Control: Why Each Diopter Matters
 Mark A Bullimore, Noel A Brennan¹
 Affiliations + expand
 PMID: 31161665 DOI: 10.1097/OPX.0000000000001367

- Maculopathy is one of the most sight threatening and serious complications of myopia**
 - n = 21,000 patients
 - 1-diopter increase in myopia is associated with 67% increase in prevalence of myopic maculopathy
 - Slowing myopia by 1-diopter reduced likelihood of patient developing myopic maculopathy

(2019) Optom & Vision Science

Impact: Non-compliance in the Myopia Clinic



3/01/24

Schools of Optometry

- 100% of North American Schools of Optometry include myopia control in regular curriculum



State of Myopia Management in Underprivileged Countries

1. There is a need for global awareness about options to prevent myopic progression.
2. There is a need for specialty eye care, specifically for dry eye and myopia management.
3. There is a need for continued development of sustainable clinics, which can be accomplished by training local eye care providers.
4. Economics play a significant role in access to care and materials in all countries globally, future effort for international mission trips could seek to establish access to myopia control spectacles or other therapies.
5. Specialty contact lenses are largely underutilized in developing countries due to practicality and access of care, including for infant asthopes, irregular corneas, and myopia management.
6. Local ODs and OMDs in Jamaica were highly interested in learning about myopia management, and specialty contact lenses. I would guess this would also be the case in many other Caribbean countries around the world.



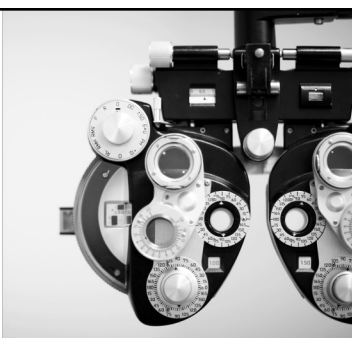
3/01/24

Treatment Strategies & Safety

3/01/24

Treatment Strategies

1. Primary Scientific Approaches (Clinical)
 - a. Pharmaceutical Management
 - b. Optical Management
 1. Spectacles
 2. Contact lens (DW or orthok)



3/01/24

What ARE NOT VIABLE MYOPIA CONTROL OPTIONS

- ◆ Undercorrection of myopia
 - ◆ Historically by -0.50 or -0.75; correlation exists between undercorrecting and increased progression
- ◆ Executive-top-bifocal spectacles
 - ◆ Very little work done looking at axial elongation, lower efficacy
- ◆ Alignment-fit GP contact lenses
 - ◆ Flattens the cornea, no myopia control effect
- ◆ Pirenzepine
 - ◆ Restricted availability, no ophthalmic preparation to be used off-label

Lens Options for Myopia Control

1. Soft
 - Daily
 - Monthly
 - Custom
2. Orthokeratology
3. Hybrid & Scleral



3/01/24

Treatment Options & Safety Studies



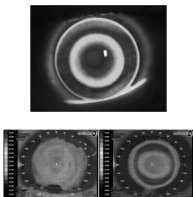
- Contact Lenses
- Atropine
- Spectacles
- Environment

3/01/24

Orthokeratology

Orthokeratology has been used as a method to correct myopia for years.

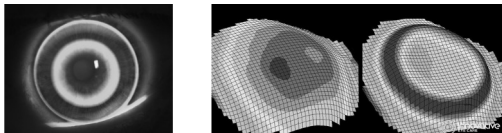
In recent years, evidence indicates that ortho-k can successfully slow the rate of progression of myopia.



3/01/24
Wong J, Wang J, Chen H, et al. (2018). Long-term effect of overnight orthokeratology on axial length elongation in childhood myopia: a 4-year follow-up study. Invest Ophthalmol Vis Sci, 59(12): 3913-9.

Orthokeratology – Overnight Wear

- The orthokeratology lens design—which incorporates a reverse curve—creates a myopic defocus which signals a reduction in axial length progression.



3/01/24
Wolter G. Myopia Control. In Bennett ES, Henry VA, Clinical Manual of Contact Lenses (3rd ed.). Philadelphia, Wolters Kluwer; in Press.

Safety The Risk of Microbial Keratitis With Overnight Corneal Reshaping Lenses

Mark A. Bullimore*, Loraine T. Simons†, and Liu A. Jones-Jordan‡

- The risk of MK with overnight corneal reshaping contact lenses is similar to that with other overnight modalities (2013)

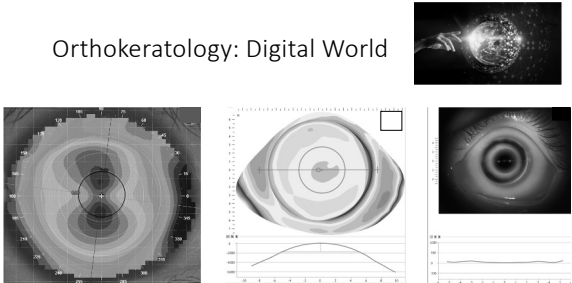
Pediatric Microbial Keratitis With Overnight Orthokeratology in Russia

Mark A. Bullimore, M.Clin.Optom., F.O., Dmitry S. Mirzayev, M.D., Alan R. Khouri, M.D., F.R.C., Leonid B. Komarenko, M.D., Ph.D., Sotomir P. Ivanov, M.D., Andrei M. Simakov, M.D., Ph.D., Kathryn Richards, O.D., Ph.D., and Valery F. Gorov, M.D., Ph.D.

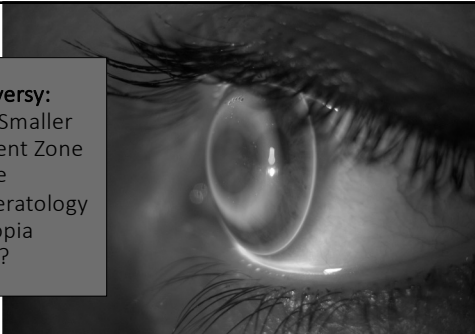
- The incidence of microbial keratitis in children wearing overnight orthokeratology is lower than a previous United States study and similar to rates associated with use of daily wear soft contact lenses (2021)

3/01/24

Orthokeratology: Digital World



3/01/24



Controversy:
 Does a Smaller Treatment Zone Improve Orthokeratology for Myopia Control?

Controversy: Does a Smaller Treatment Zone Improve Orthokeratology for Myopia Control?

- Animal models support this idea
 - Peripheral retina can influence central refractive development (Liu 2011, Smith 2009)
 - Review of optical strategies for controlling myopia suggests that effectiveness of treatments involving imposed myopic defocus is influenced by extent of exposed visual field (Smith, 2013)
 - Reasonable hypothesis but no evidence in humans that this is the case
 - University of Berkeley study showed no statistically significant difference in treatment zone between 5mm and 6mm

Soft Lenses

- Soft contact lenses are increasingly used for myopia management
- Myopia Defocus
- There are two main options to consider:



- **Center distance multifocal soft lenses.** Originally intended for the correction of presbyopia.
- **Lenses specifically designed for myopia control.** Dual focus lenses and extended-depth-of-focus lenses have both been shown to slow myopia progression.

Wolter G, Gouvea Giovanni A, Sivert G, et al. A Randomized Trial of Soft Multifocal Contact Lenses for Myopia Control: Baseline Data and Methods. *Optom Vis Sci*. 2017; 94(10): 1632-1646.
 Chakrabarti P, Prasad DM, Mittal SC, Logan ME, et al. A 3-year Randomized Clinical Trial of Multifocal Lenses for Myopia Control. *Optom Vis Sci*. 2019; 96(2): 154-167.

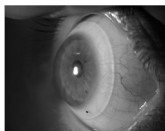
3/01/24

	Extended Depth Of Focus Contact Lens	Dual-focus Contact Lens	Centre Distance Contact Lens
Rationale	Optic defocus image quality and chromatic quality. Total optical defocus free range. Optimization of higher order aberrations to maximize the depth of focus.	Simultaneous Defocus	Peripheral Defocus
Design		Central correction zone and concentric treatment zones (±addition)	Three zones for intermediate and near
Replacement Type	Monthly Soft Contact Lens	Daily Soft Contact Lens	Daily/Monthly Soft Contact Lens
Images (Closest represent the power profile)			

This fantastic summary image of various multifocal and dual focus contact lens optical profiles is adopted with attribution from www.hydrobios.com

Haines, Cassandra, and Kate Gifford. "The Latest and Greatest Research on Multifocal Contact Lenses - Myopia Profile." 31 Mar. 2021. <https://www.myopiaprofile.com/latest-and-greatest-mfc/>.

3/01/24



Hybrid/Scleral



3/01/24

Scleral or Hybrid in Myopia Management?

- Available in MF center D, center N, and EDOF designs
- Not commonly used due to practicality and lack of evidence to use
- Study: A Novel Use of Multifocal Scleral Lenses for Myopia Control In the Setting of Corneal Scarring

Low Dose Atropine



Atropine is the most widely used (globally) pharmaceutical with respect to myopia management, in both clinical trials and in clinical practice.

3/01/24

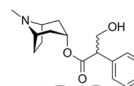
Retinal Theory

Atropine was found to dampen function within the RPE. By dampening these vital functions of the retina, atropine boosts dopamine release from cellular stores, which then controls eye growth.

Choroid Theory

Atropine resulted in rapid and transient choroidal thickening and inhibits eye growth.

Theories



Scleral Theory

The synthesis of glycosaminoglycan of the scleral extracellular matrix was inhibited by atropine in studies involving scleral tissue from chicks.

Additional Receptor Theory

Another consideration is that atropine may be exerting its effect via mechanisms other than blocking muscarinic receptors.

Shahmoradian S, Ghaheri S. Molecular Effects of Atropine on Retinal Dopamine Receptors and Associated Proteins in the Rat. *Int J Ophthalmol*. 2019; 12(10): 1505-1510.
 Ghaheri S, Shahmoradian S. Molecular Effects of Atropine on Retinal Dopamine Receptors and Associated Proteins in the Rat. *Int J Ophthalmol*. 2019; 12(10): 1505-1510.
 Ghaheri S, Shahmoradian S. Molecular Effects of Atropine on Retinal Dopamine Receptors and Associated Proteins in the Rat. *Int J Ophthalmol*. 2019; 12(10): 1505-1510.
 Ghaheri S, Shahmoradian S. Molecular Effects of Atropine on Retinal Dopamine Receptors and Associated Proteins in the Rat. *Int J Ophthalmol*. 2019; 12(10): 1505-1510.


3/01/24

Atropine

Low-Concentration Atropine for Myopia Progression (LAMP) Study

A Randomized, Double-Blinded, Placebo-Controlled Trial of 0.05%, 0.025%, and 0.01% Atropine Eye Drops in Myopia Control

- Atropine 0.025% - 0.050% has minimal side effects compared with atropine at 0.1% and retains comparable efficacy in controlling axial length growth
- Common side effects include:
 - Stinging
 - Blurred Vision
 - Light Sensitivity



3/01/24

Safety

The Royal College of Ophthalmologists

REVIEW ARTICLE


Low concentration atropine and myopia: a narrative review of the evidence for United Kingdom based practitioners

Wivan Javadi¹, Kathryn Saunders², Christopher J Hammond³, Annette Dalhmann-Noor⁴ and Mark A Bullimore⁵
© The Author(s), under exclusive licence to The Royal College of Ophthalmologists 2023

- Atropine 0.05% appears to be superior to atropine 0.01% in managing myopia progression.
- There is a dose-dependent rebound effect when treatment is stopped.
- Atropine is a well-tolerated, safe, and effective intervention. Treatment would be needed for several years and into adolescence, until axial length progression is stable.

3/01/24

Spectacles

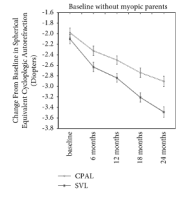


The simplest option for myopia correction (and myopia management) is spectacles.

This is especially the case for young patients who may not be ready for other options.

3/01/24

Spectacles



Studies using PAL or bifocal spectacle lenses show variable success, with some evidence that patients who have binocular vision or accommodative issues may benefit more than those with no binocular vision issues.

3/01/24

New Generation Spectacles

- Defocus Incorporated Multiple Segments (DIMS)
- Highly Aspheric Lenslet Target (HALT)
- Diffusion Optics Technology (DOT)

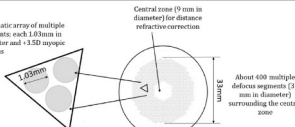
The newest myopia controlling spectacles can both correct and manage myopia as well as the most effective contact lens options.

3/01/24

DIMS Technology

MiyoSmart by HOYA

The DIMS technology works on the concept of creating simultaneous defocus, during both distance and near viewing - one plane on the retina due to the single vision zone(s) of the lens, and one plane creating myopic defocus due to the +3.50D defocus lenslets.



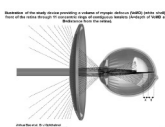
3/01/24

H.A.L.T. Technology

Developed by EssilorLuxottica

The H.A.L.T. technology introduces the concept of a 'volume of myopic defocus'. Uses a central distance area with peripheral aspherical lenses. Creates a three-dimensional 'volume' of defocus in front of the retina of varying dioptric power.

Clear center distance - 11 concentric rings formed by adjacent aspherical lenses, each 1.1mm in diameter



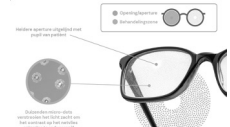
3/01/24

Boo S, Hong A, Huang C, U.S. Park S, Ding L, Liu H, Zhang L, Sprague DP, Doolan R, Lee J, Chen H. Clear zone myopia control efficacy of spectacle lenses with aspherical lenses. *Br J Ophthalmol*. 2021;115:1837.

Diffusion Optics Technology

SightGloss Vision by SightGloss

Diffusion Optics Technology (DOT) which has a clear distance zone with peripheral light scatter of varying size and shape. Reducing contrast detection by retina will prevent axial elongation so these use light scattering elements to reduce retinal contrast.




3/01/24

SightGloss Vision 1. Control of Myopia Using Novel Spectacle Lens Design (CPM170) <https://clinicaltrials.gov/ct2/show/study/NCT03714274> N.J.H. U.S. National Library of Medicine ClinicalTrials.gov 2020.

Combination Treatment


Jury is still out!



3/01/24

Environment and Lifestyle

- The International Myopia Institute White Papers II 2021 series reported a strong and consistently observed association between time outdoors and less myopia.
- Increased outdoor time can also offset the impact of parental myopia and high levels of near work, and the effect seems independent of sports activity levels.



3/01/24


Messias LI, et al. An Risk Factors for Myopia: Investigation of Parental Myopia, Outdoor Time, and Near Work. *Optom*. 2021; 92(2): 3-8.
Wong, Y. et al. The effect of outdoor activities on myopia: a meta-analysis of observational studies. *Acta Ophthalmol*. 2017; 95(4): 513-520.
Smith, K.A., et al. Parental Myopia, Near-Work and Outdoor Activities, and Child Myopia. *Invest Ophthalmol Vis Sci*. 2017; 58(12): 480-485.
Smith, K.A., et al. Outdoor activity reduces the prevalence of myopia in children. *Ophthalmology*. 2008; 115(8): 1632-1639.

Implementing into Clinical Practice

3/01/24

Objectives of Myopia Management

- Do our best for children!
 - Slow or halt progression of myopia
 - Provide good quality vision
 - Healthy eyes
- Practice management
 - Patient/parent experience
 - May seek something different from OD perspective...



3/01/24

Challenges to implement

1. Equipment needs
2. Pre-misconceptions (OMDs) about contact lens use in children/teenagers
3. Finding the right industry connections
4. Communication with parents/caregivers is the key to success... can also be an obstacle
5. Getting patients
6. Dabbling versus creating a system that is **financially worthwhile**

Selecting Candidates for Myopia Control

- i. Who is a good candidate?
- ii. What ages are appropriate for treatment? Too young? Too high?



3/01/24

New Literature Alert

• Key Points

- Higher myopia at younger age indicates higher risk
- Early intervention is best
- Every patient with myopia should be treated (there is no safe level)
- There is a need for axial length and cyclo refraction

REVIEW ARTICLE
Juvenile-onset myopia—who to treat and how to evaluate SUCCESS
 Mark A. Rubenoff¹ and Neil A. Barnard²
 © The Author(s), under exclusive license to The Royal College of Ophthalmologists 2023

The risk of eye disease such as myopic macular degeneration increases with the level of myopia, but there is no safe level of myopia and the burden of lower degrees of myopia remains considerable. Effective treatments are available that slow progression and thus limit the final degree of myopia. In this review, the rationale for slowing progression is summarized, and a case made for treating all myopic children. Measurement of refractive error and axial length is reviewed, alongside the principles of axial lengthometry, but also the need for cycloplegic refraction. The factors affecting progression are considered and the available tools for interpretation of progression rate are discussed. Finally, the need to set achievable treatment goals is emphasized.

Eye: <https://doi.org/10.1093/eye/njz022>

3/01/24



Mind ‘Priming’

- Plant the seed early
- Strike a personal note
- Long-term management strategies
- Look at risk factors that are easy to understand:
 - Parents or siblings with myopia
 - Myopic shift

Review of Emmetropic Age Norms



6yo: +0.75D

Age in Months	Mayer et al Arch Ophthalmology 2001 Spherical Equivalent (D), Mean (SD)
1	+2.20 (1.40)
1.5	+2.08 (1.12)
2.5	+2.44 (1.32)
4	+2.03 (1.56)
6	+1.79 (1.27)
9	+1.52 (1.13)
12	+1.57 (0.78)
18	+1.23 (0.91)
24	+1.19 (0.83)
30	+1.25 (0.89)
36	+1.00 (0.76)
48	+1.13 (0.85)

Controversy: Should We Treat Pre-Myopes?



- le a 3, 4, or 5 year old that is not hyperopic...
 1. ATOM3: Prevention of Myopia using Atropine - ongoing clinical trial
 1. Public health outreach to prevent myopia in Singapore

Controversy: School-aged versus Adult Myopia



Morgan T. Rose K. How genetic is school myopia? *Prog Retin Eye Res.* 2005;24:1-38

Setting Patient Expectations

- We can not fully stop or reverse myopia in children



3/01/24

Goal of the Treatment

50%

The general understanding followed by most practitioners is that a 50% reduction in the rate of progression is clinically significant.

Zara at age 8 with a prescription of -1.00D. She is predicted to progress on average -0.50D per year. What is her predicted refractive error at 16 with no treatment? *Answer: -5.00D*

Myopia management efficacy %	Final refractive error
0%	-5.00D
25%	-4.00D
50%	-3.00D
75%	-2.00D
100%	-1.00D

Success doesn't mean we STOP progression

Phillips R, Wilson C, Tolman BR. Myopia progression from starting first glasses to adulthood: the DIMM Study. *Br J Ophthalmol.* 2021 Jan 21;95(1):e100. doi:10.1136/bjophthalmol-2020-034234. Epub ahead of print. PMID: 33491535.

3/01/24

Consider the Footprint in Your Office

- Doctor Time
- Technician Time
- Equipment Needs



3/01/24

Equipment needs

- Slit Lamp
- Contact Lens Fitting Equipment and Materials
- Topographer
- **Axial Length**
- Refractive Error

Myopia Management is a Specialty Service!



3/01/24

Controversy: Should We Measure Axial Length?



Academic Trend: Axial Length is Gold Standard

Yes Excessive eye length is the putative cue for sight-threatening morbidities associated with myopia.

No Myopia progression and axial elongation are highly correlated.

Walline, J. Spectrum 2020

How to Handle Axial Length Growth

• Key Points

- Parents will ask you what is significant?
- 0.1mm = approximately 0.25D; 1mm is approximately 2.75D
 - Some growth is normal... we want kids to grow
- Non-linear: younger children will grow more than older children
 - Need to measure treatment efficacy
 - Should evaluate younger children q6m
 - Add adjunct therapy as needed

Extra Special Testing Considerations

- Pupil Size
- Binocular Vision Testing
- Accommodative Testing
- Dry Eye Testing
 - Contact lens wear is associated with dry eye
 - Atropine contains harsh preservatives
 - Dry eye disease is exacerbated by increasing use of screens in youth

3/01/24

Dry Eye is Up and Coming in Myopia Control...



3/01/24



3/01/24

Establish Your Fees

- Do not under charge or sell yourself short
- Consider global annual professional fees
 - Materials/drug costs are extra
- Avoids patients declining measurements/visits



3/01/24

Establish Your Protocols

- Everyone in the office needs to be doing the same thing
- Protocol at first encounter
 - Myopia referrals coordinator



3/01/24

Specialty Products Coordinator

- **Support the "Closer"**
 - Provide sufficient education
 - Space to spend whatever time is needed to answer all questions
 - Commission based
 - Platform to follow up with leads
 - Additional resources
 - Manufacturers

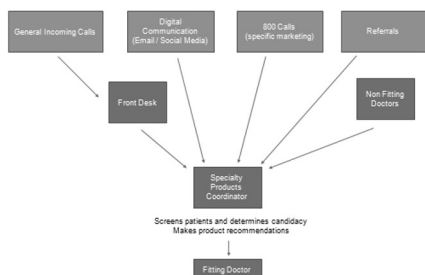


3/01/24

Specialty Products Coordinator

- Provide sufficient education
- Space to spend whatever time is needed to answer questions
- Commission based
- Platform to follow up with leads
- Additional resources
 - manufacturers

3/01/24



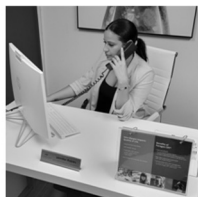
3/01/24

Specialty Products Coordinator

- Following up with leads
 - Phone calls
 - Emails
- Concierge point of contact w patients
 - Myopia management requires a lot of handholding (child and parent)
 - Starting – Initial insertion and removal training
 - Follow-up evaluations (in person/telehealth)
- Point of contact for manufacturers
 - Lens orders
 - Lens modifications

3/01/24

Specialty Products Coordinator



- Following up with leads
 - Phone calls
 - Emails
- Concierge point of contact with patients
 - Myopia management requires a lot of handholding (Child and Parent)
 - Starting - initial insertion and removal training
 - Follow up evaluations (in person / telemedicine)
- Point of contact with manufacturers
 - Lens orders
 - Lens modifications

3/01/24

Sample Myopia Clinic Baseline Work-up


- Dry Refraction
- Cycloplegic Refraction (damp) with 1% tropicamide, 1gtt OU, wait 5 min, instill another 1gtt OU **or cyclopentolate**
 - Wet autorefraction
 - **Axial Length**
 - Corneal Topography
- BV testing: eye posture & accommodation
- Need to evaluate anterior and posterior cornea prior to orthok

Routine Eye Exam Should be Completed Prior


Evidence Based Practice

3/01/24


Evidence Based Practice



Have peer reviewed resources ready




Research summary pages



Co-management with other health professions

3/01/24

Have Your Resources Ready



3/01/24

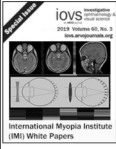
Use Peer-Reviewed Literature

The Role of Orthokeratology in Myopia Control: A Review
Michael J. Lipson, O.D., F.A.A.O., F.S.L.S., Moya M. Brooks, M.D., and Bruce H. Koffler, M.D.

The Safety of Orthokeratology—A Systematic Review
Yue M. Liu, O.D., Ph.D., M.P.H. and Peiyang Xie, M.D., Ph.D.

3/01/24

Research Summary Resources



Special Issue | February 2019
IMI – Clinical Management Guidelines Report
 Kate L. Gifford; Kathryn Richdale; Pauline Kang; Thomas A. Aller; Carly S. Lam; Y. Maria Liu; Langis Michaud; Jeroen Mulders; Janis B. Orr; Kathryn A. Rose; Kathryn J. Saunders; Dirk Seidel; J. Willem L. Tideman; Padmaja Sankaridurg

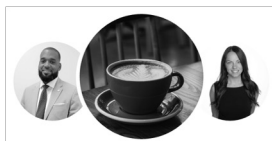
3/01/24

FDA/Health Canada Approvals vs Off Label

- Credibility with other co-managing health professions
- Future insurance coverage gains
- Rigorous peer-reviewed studies and publications
 - Use as a weapon...

3/01/24

Choosing a Myopia Management Strategy



3/01/24

Novel Areas of Study

3/01/24

Nutrition

- Refined carbohydrates: hyperinsulinism could increase elongation of the globe due to metabolism in scleral fibroblasts.^{1,2}
 - Supplementation with omega-3 polyunsaturated fatty acids may be useful to prevent myopic progression.³
 - Good nutrition, rest, hydration, and time outdoors has other benefits to children, considering them beyond a set of eyes is an excellent approach to guiding overall health.
1. Cordain L et al. An evolutionary analysis of the aetiology and pathogenesis of juvenile onset myopia. *Acta Ophthalmol Scand.* 2002; 80:125-135
 2. Galvis V et al. Is myopia another clinical manifestation of insulin resistance? *Med Hypothesis.* 2016; 90:32-40
 3. Sravani G. Omega-3 Supplements are protective for myopia. Article, Review of Myopia Management. 2022 Sept <https://reviewofmm.com/omega-3-supplements-are-protective-for-myopia/>

3/01/24

Light Levels

- The journey to understand the exact mechanisms which play a role in myopic progression have yet to be fully elucidated.
- Light plays an important role in many facets of visual development and therefore has a role in myopia
- The effect of red light on myopia has become popular recently and far red/near-infrared (FR/NIR) light has the potential to control myopia.¹ Two studies published in 2022 demonstrated this by showing safety and efficacy of slowing axial elongation in school-aged myopia using red light exposure treatment; the devices however may or may not be practical in delivering red light conveniently and the dose dependency (analogous to atropine studies) will require further study to determine the most optimal treatment.^{2,3,4}

1. Zhang, P., Zhu, H. Light Signaling and Myopia Development: A Review. *Ophthalmol Ther* 11, 899–907 (2022). <https://doi.org/10.1007/s40123-022-01880-7>
2. Asherman D. Light as a tool for myopia control. *Review of Myopia Management and Eye Care.* Dec 2022. <https://www.reviewofmyopia.com/2022/12/02/light-as-a-tool-for-myopia-control/>
3. Jiang Y et al. Effect of repeated low-level red light therapy for myopia control in children: a multicenter randomized controlled trial. *Journal of Ophthalmology.* 2022; 20(2):295-303. <https://doi.org/10.1016/j.joph.2021.11.003>
4. Dong J et al. Myopia control effect of repeated low-level red light therapy in Chinese children: a randomized, double-blind, controlled clinical trial. *Journal of Ophthalmology.* 2022; 19(2):198-204. <https://doi.org/10.1016/j.joph.2022.08.014>

3/01/24

Light Levels

- Tablets and handheld devices with blue LED backlight display are widely used; blue-light filtering spectacle lenses are often marketed for eye health, which has not been proven. The impact of blue light blockers on school-aged myopic progression is also unknown/conflicted in the literature. Clinical trials have been performed but not published to determine if blue-light filtering spectacle lenses affect myopia progression.¹
1. National Library of Medicine (US). (2018 -) The effect of blue-light filtering spectacle lenses on myopia progression in schoolchildren. Identifier [NCT03538002](https://pubmed.ncbi.nlm.nih.gov/303538002/)

3/01/24

Should we Recommend Limiting Screen Time?



3/01/24

Light Levels

- Several articles have suggested the benefit of at least 120 minutes daily of outdoor light exposure for children and adolescents. When applying this information to clinical practice in a practical and meaningful way, looking at the overall 'big picture' well-being can be helpful to increase compliance of adequate outdoor time.
- In addition to ophthalmic benefits, spending time outdoors and in nature is linked to both cognitive advantages and improvements in mood, mental health, and emotional well-being, all of which contribute to the best overall quality of life for our patients.

- Ackerman D. Light as a tool for myopia control. Review of Myopia Management online article, Dec 2022. <https://reviewofmm.com/light-as-a-tool-for-myopia-control/>
- Weir K. Nurtured by nature. American Psychological Association Epub 2020 April 1. Vol.51, No. 2. <https://www.apa.org/monitor/2020/04/nurtured-nature>

3/01/24

Compliance

3/01/24

How Do We Prevent Ugly Myopia Management?

- Embody the WHY in how you practice and communicate
- KNOW your options... ALL of them, including when and where to refer
- Discuss EVIDENCE-BASED SAFETY
- Practice from a BEST ETHICS perspective
- Understand consequences of non-compliance and implement strategies to ENHANCE COMPLIANCE

Figure 1. An early model for evidence based clinical decisions from Haynes et al. 2002. Image retrieved from <https://dx.doi.org/10.1186/1745-7244-1-1>

3/01/24

Efficacy

Treatment	% Axial length	% Refractive error
Orthokeratology	~55	~55
MF CLs	~55	~60
Peripheral plus spectacle lenses	~65	~55
Low-dose atropine	~55	~65

Figure 1. The percent slowing of axial elongation and myopic refraction progression in orthokeratology contact lenses, soft multifocal contact lenses (MF CLs), orthokeratology contact lenses, and low-dose atropine. Adapted from Myopia Control in 2019, by Jeffrey Walline, March 2019.

3/01/24

What Does Compliance Involve?

- Efficacy is ALSO the product of patient action, and appropriate treatment selection by a myopia management provider to best match a patient's ocular shape, refractive error, and lifestyle.
- Patients are more likely to be compliant with therapies when they are motivated and involved in the process. When it comes to contact lens use, discussing lifestyle and hobbies may uncover benefits such as freedom from glasses for performance.
- Any medical devices will only be successful with safe and compliant use; careful consideration of the patient's whole physical structure, lifestyle, home support, and personality are essential for myopia management success.

3/01/24

Compliance Driven Success... The Ugly

Scenario 1: A careful discussion about all treatment options for a 7-year-old patient with -0.75 diopters of myopia yielded a final decision between starting atropine drops or full-time wear of myopia control glasses; glasses were selected. The patient returned to the clinic for follow up 6 months later and had nearly doubled in refractive error. It turned out that while parents thought the patient was wearing glasses full-time as directed at school, the patient would remove them.

3/01/24

Compliance Driven Success... The Ugly

Scenario 2: It was recommended that a patient use both glasses and contact lenses, with myopia control optics in them; only myopia control daily wear contact lenses were purchased with the intention to wear the devices at least 70% of waking hours to be effective, with the patient's habitual single vision glasses the remaining 30% of the time. The patient returned to the clinic for follow up 18 months later and had increased in axial length by 0.4mm (~1.3D). It turned out that the patient ran out of myopia control contact lenses after wearing them about 50% of the time for a year and single vision glasses the remaining 50% of the first year and then full time for six more months

3/01/24

Compliance Driven Success... The Ugly

Scenario 3: A high myope (-6D) with corneal astigmatism (-2.5D) was selected for orthokeratology treatment. Despite best lens modifications and training with lens handling, the patient struggled with lens adhesion and inadequate final treatment. This resulted in a lengthy fitting process with multiple times out of lenses, blurry distance vision, and eventual drop out of the devices. The patient progressed during this time.

3/01/24

Parent Discussions

3/01/24

Parents Don't Know What They Don't Know

Myopia is a global health dilemma...

but yet, there are serious knowledge gaps and misunderstandings regarding myopia care for children among the public.



3/01/24

New survey shows what parents know about myopia. CooperVision. 2018. [https://www.cooperlenses.com/press-releases/new-survey-shows-what-parents-know-about-myopia](#). Accessed March 1, 2023.
New global myopia awareness coalition survey reveals parents need more information about myopia treatment options. Vision Monthly. Accessed February 5, 2020.

Parents Don't Know What They Don't Know



- According to one survey, 65% of responding parents claimed they were somewhat cognizant of myopia, but only 1 in 3 were able to correctly identify and define myopia as nearsightedness.
- Another survey, by The Global Myopia Awareness Coalition, found that eye exams are generally listed by parents as "less of a priority" for their children than visits to primary care providers and dentists.
- Nearly 88% of responding parents said that comprehensive eye exams for children are not needed until school age.

3/01/24

New survey shows what parents know about myopia. CooperVision. 2018. [https://www.cooperlenses.com/press-releases/new-survey-shows-what-parents-know-about-myopia](#). Accessed March 1, 2023.
New global myopia awareness coalition survey reveals parents need more information about myopia treatment options. Vision Monthly. Accessed February 5, 2020.

Parent Are The Gate Keepers

In order to be effective in addressing myopia in all of these children we have to educate the parents.

Easier Said Than Done...

NOT ALL PARENTS ARE CREATED EQUAL



3/01/24

Parenting Types

3/01/24

Parenting "Types"

The 4 Parenting Styles

<p>Permissive</p> <ul style="list-style-type: none"> Child-driven Rarely gives or enforces rules Overindulges child to avoid conflict 	<p>Authoritative</p> <ul style="list-style-type: none"> Solve problems together with child Sets clear rules and expectations Open communication and mutual consequences
<p>Neglectful</p> <ul style="list-style-type: none"> Uninvolved or absent Provides little nurturance or guidance Indifferent to child's social-emotional and behavioral needs 	<p>Authoritarian</p> <ul style="list-style-type: none"> Parent-driven Sets strict rules and punishment One-way communication, with little consideration of child's social-emotional and behavioral needs

RESPONSIVENESS ↑

↓ DEMANDINGNESS → **to make it**

Authoritarian Parenting Style is an adaptation of [Guilt-Free Discipline](#) (Chapter 4: A Closer Look at Parenting) by Liff & Koo (2019), licensed CC BY. © 2024 [Myopia Management](#) by Neil Thompson, licensed CC BY.

3/01/24

Permissive Parents

Common traits:

- **High responsiveness, low demandingness**
- Communicates openly and usually lets their kids decide for themselves
- Rules and expectations are either not set or rarely enforced
- Goes through great lengths to keep their kids happy, sometimes at their own expense

3/01/24

How Do You "Diagnose" The "Permissive" Parent?

- Parent does nothing when misbehaving during the exam
- Parent asks for the child's permission if you can put drops in their eye
- Parent may bribe the child to be compliant during the exam
- Asks the child's opinion about starting myopia management

3/01/24

How to pitch Myopia Management to.....

Permissive Parents

The Permissive Parent Within Myopia Management:

- **Conversation: YOU and CHILD**
- Do not want to waste too much time in education of the parent. This is not the person you need to convince.
- Go above and beyond ensuring the treatment experience is enjoyable for the child
- Speak directly to the child.
- Must make the child feel they are involved in the decision making process.
- BE CAREFUL - Parent will give up at the child's first sign of discomfort.

3/01/24

Authoritative Parents

Common traits:

- **High responsiveness, high demandingness**
- Sets clear rules and expectations for their kids
- Practice flexibility and understanding
- Communicates frequently; take into consideration their children's thoughts, feelings and opinions
- Nurturing, supportive and often in tune with their children's needs.

3/01/24

How Do You "Diagnose" The "Authoritative" Parent?



- Children generally well behaved during the exam
- Parent is monitoring every letter on the acuity chart
- Parent very involved in the case history portion of exam, often encouraging the child to answer for themselves
- Very nurturing during the discomfort of the dilation drops

3/01/24

How to pitch Myopia Management to.....

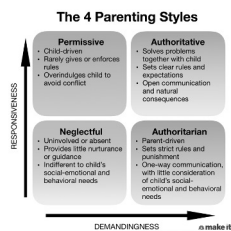
Authoritative Parents

The Authoritative Parents Within Myopia Management:

- **Conversation: YOU, PARENT and CHILD**
- Take your time and be very detailed with explanations. They are armed with smartphones and ask a lot of good and difficult questions, but underneath they are emotional, stressed, and worried.
- Parents are often shocked and upset when they learn that their child has myopia. These parents are very involved and are often upset they missed it
- Speak about the ancillary benefits. Discuss studies showing self-esteem benefits, (can make them feel better about peer interactions), their looks, and they feel more athletic.
- Emphasize safety of contact lenses

3/01/24

"Parent" Based Decision



3/01/24

Neglectful Parents

Common traits:

- **Low responsiveness, low demandingness**

- Let's their kids mostly fend for themselves
- Offers little nurturance, guidance and attention
- Sometimes referred to as uninvolved parenting
- Neglectful parents have limited engagement with their children and rarely implement rules.
- They can also be seen as cold and uncaring



3/01/24

How Do You "Diagnose" The "Neglectful" Parent?



- Parent not involved in any part of the exam
- Child speaks up for themselves during any questioning
- Parent is on phone or distracted
- Parent may seem bothered or in a rush to finish the exam

3/01/24

How to pitch Myopia Management to.....

Neglectful Parents

The Neglectful Parents Within Myopia Management:

- **Conversation: YOU and CHILD** (but get help)
- Consider yourself fortunate to even be having the conversation
- Attempt to connect with other family members
- Should attempt to educate the parent, but the patient education is vital and should be overemphasized
- Preparation is key with this group. They are looking for excuses to get out.
 - Many will have the feeling that "if there's no complaint, don't fix it."
 - Be prepared with the assumption that contact lenses weren't meant for children
 - Be prepared with pricing information.

3/01/24

Authoritarian Parents

Common traits:

- **High demandingness, low responsiveness**
- Often says "because I said so" when their kid questions the reasons behind a rule or consequence
- Communication is mostly one-way — from parent to child
- This rigid parenting style uses "tough love."
- Full control, talk to their children without wanting input or feedback.



3/01/24

How Do You "Diagnose" The "Authoritarian" Parent?



- Parent takes complete control over the case history portion
- Intently watching YOU and the patient
- Parent may threaten the child when complaining about dilation drops
- Parent may expect communication to be directed toward them

3/01/24

How to pitch Myopia Management to.....

Authoritarian Parents

The Authoritarian Parent Within Myopia Management:

- **Conversation: YOU and PARENT**
- Although you should be acknowledging the child, all communication needs to be with the parent
- Parent education is very important with this group. Parents are often shocked and upset when they learn that their child has myopia.
- Very detailed about your expectations (follow-ups, expectations, etc.)
- They are going to try and tell you what to do. It is not uncommon for parents to request that a prescription be reduced such that the full refractive error is not prescribed.

3/01/24

Parenting Types



3/01/24

Marketing Myopia Control

3/01/24

Types of Marketing

- **Internal Marketing**
 - Targeting patients that already exist in the practice
- **External Marketing**
 - Targeting patients that haven't worked with you before



3/01/24

Internal Marketing

- Front desk appointments
 - Script: "Are you scheduling for orthokeratology or a routine exam?"
- Signage within the office
 - What is your patient seeing, reading or listening to in the waiting room?
- Utilizing the information received at check-in
 - How are you using email addresses?
- Multiple advocates
 - Are you the only one presenting orthokeratology as an option?
- Are you an advocate
 - When are you presenting orthokeratology as an option?

3/01/24

External Marketing

- Traditional marketing
 - Radio and television advertising done correctly
- Billboards and Signage
 - Advertisements placed in high volume areas to get peoples attention
- Targeted Google Ads
 - LASIK alternative, Orthokeratology, No more glasses
- Retargeting Ads
 - Sending constant reminders to people that have come across your ads
- Social Media
 - Understanding how to use the different platforms

3/01/24

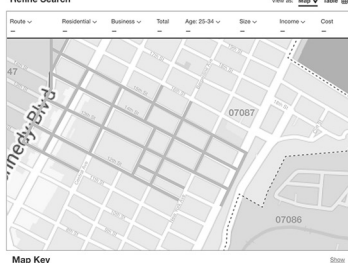
Traditional Media

TIP!



3/01/24

Refine Search



3/01/24



3/01/24

Conclusions

3/01/24

The Bottom Lines...

- Myopia management is no longer an elective, it is the standard of care
- Decisions we make today for children impact them tomorrow and for the rest of their lives



3/01/24