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1. Lam CSY, Tang WC, Tse DY, et al. Defocus Incorporated Multiple Segments (DIMS) spectacle lenses slow myopia progression: a 2-year randomised clinical trial. Br J Ophthalmol. 2020;104(3):363-368.
2. Lakkis C, Weidemann K. Evaluation of the performance of photochromic spectacle lenses in children and adolescents aged 10 to 15 years. Clin Exp Optom. 2006;89(4):246-252.
3. Renzi-Hammond LM, Hammond BR Jr. The effects of photochromic lenses on visual performance. Clin Exp Optom. 2016;99(6):568-574.
4. Wu PC, Kuo HK. Effect of photochromic spectacles on visual symptoms and contrast sensitivity of myopic schoolchildren treated with low dose concentration atropine. Invest Ophthalmol Vis Sci. 2016;57:2484.
5. HOYA data on file. Lens performance validation test for MiYOSMART photochromic lenses – activation and deactivation. 02/2023. Tests were conducted at room temperature (23 °C).

Looking back and gazing forward in myopia management

MYOPIA FEATURE ARTICLE

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It's hard to picture a field in optometry that has evolved as quickly as myopia management. Looking back is not just interesting but also shows how quickly evidence becomes practice.

Forty years ago, the first studies showed small impacts of bifocal spectacle lenses on slowing myopia progression.[1,2] Twenty years ago, the first studies measuring axial elongation showed minimal impacts of progressive addition lenses (PALs),[3] a reasonable effect from orthokeratology (ortho-k)[4] and a very strong effect of 1% atropine.[5] Ten years ago, we gained more knowledge on ortho-k[6] and the first explorations of lower concentrations of atropine.[7] Some early multifocal soft contact lens case studies and crossover trials also entered the field.[8,9]

Most of the effective, evidence-based treatments available today have only become known to us in the past 5 to 6 years, including multizone and multifocal soft contact lenses, spectacle lenses with lenslets and low concentrations of atropine.[10] But despite this growth in knowledge and treatment options, myopia still has more to explore. This article will highlight 4 areas where we are gazing forward, still learning about optimising treatment in myopia management.

Pre-myopia and myopia prevention

If we're going to be as proactive as possible in managing myopia, this means starting with a preventative approach. The clinical impact of delaying myopia onset by one year is the potential to reduce a patient's final level of myopia by around 0.75D, comparable to the impact of 2 to 3 years of treatment to slow down myopia progression after onset.[11] Reducing someone's final level of myopia by 1D reduces their lifelong risk of myopia-associated eye diseases significantly[12] – delaying myopia can have a powerful effect on that individual patient. →

Children at risk of developing myopia, known as pre-myopes, have risk factors that include family history, specific binocular vision disorders, and habits involving excessive near-work and limited outdoor time.[13] The most reliable predictor of pre-myopia is being less hyperopic than age norms. The CLEERE study identified less than +0.75D at ages 6–7 as a pre-myopia marker in a multi-ethnic North American cohort.[14] However, new studies from China indicate a higher threshold – between +1.50D and +2.00D for the same age group.[15,16] A new concept called the 'hyperopic reserve' denotes this protective amount of plus, which, when specified by current age, will reduce the likelihood of future myopia onset. It is not yet clear how East Asian ethnicity in children living outside China may influence this threshold, although treatment efficacy appears independent of race.[17]

Once identified, evidence on treatments to delay onset of myopia (aside from increasing time spent outdoors) include low-dose atropine,[18-20] repeated low-level red light (RLRL) therapy,[21] and plano spectacle lenses with highly aspherical lenslets.[22] All of these RCT studies have been published in the last 3 years, and all can generally be described as reducing the onset rates in the studied groups by about half. Atropine 0.01% has shown efficacy for older and/or non-Chinese children,[18,19] while Chinese children aged 4–9 years showed myopia onset delay with 0.05% but not 0.01% atropine in the LAMP2 study.[20] The newest data on plano spectacles with highly aspherical lenslets (Essilor Stellest) offers perhaps the most straightforward, evidence-based approach for proactive pre-myopia management – provided wearing time of at least 30 hours per week can be achieved.[22]

Boosting efficacy

Three methods to boost the efficacy of myopia control treatment have been explored, with more data emerging at each research conference. These include combining atropine with optical treatments,[10] altering orthokeratology (ortho-k) lens design[23] and combining RLRL therapy with ortho-k.[24]

There is the most data for the first of these, with a large volume of evidence for adding 0.01% atropine to ortho-k,[25] although the 'boost' effect is only significant in the first 6 months.[26] Early clinical studies show likely benefits of combining 0.01% atropine with defocus incorporated multiple segments (DIMS) spectacle lenses (HOYA MiYOSMART)[27] and dual-focus soft contact lenses (MiSight 1 day) with atropine 0.05%.[28] However, neither has an RCT level of evidence.

Altering ortho-k lens design to reduce the back optic zone diameter (BOZD) has been touted clinically for many years; the first RCT to back this up was published recently. Similarly observed in atropine combination, the increased myopia control efficacy was only measured in the first 6 months, with both standard and smaller BOZD wearing groups following the same progression patterns thereafter for 2 years.[23]

One paper has explored adding RLRL therapy to children deemed not responding to ortho-k treatment, defined as a progression of at least 0.5 mm a year. This showed a significant effect, effectively stabilising axial length changes for the next 12 months.[24]

Light therapies

RLRL therapy (650 nm) has proven highly effective in slowing myopia progression,[29] with promising results in extended populations such as those with high myopia[30] or, as aforementioned, fast progression in orthokeratology wear.[24] While combination treatments with other optical devices show potential, RLRL is not recommended alongside atropine.[31] Key questions remain about possible rebound effects after stopping therapy[29] and its long-term safety with specific devices,[32] although clinical trials thus far on certain devices show no significant impact on OCT outcomes.[21,29]

Other light therapies, like cyan light-emitting glasses (507 nm)[33] and bright (white) light desktop devices,[34] are also under investigation. A pre-commercial VR-like headset delivering targeted light to the optic nerve has shown comparable results to myopia control spectacles, with combination trials now under way.[35]

Long-term and young adult outcomes

Some of the first randomised controlled trials for myopia control spectacles (DIMS/HOYA MiYOSMART[36] and highly aspherical lenslets/Essilor Stellest[37]) and contact lenses (dual-focus/CooperVision MiSight 1 day[38]) have now reached a stage of maturity such that data for 5+ years is being reported, including populations to the late teenage years. This has some major benefits in first verifying long-term success and acceptance of these treatments from childhood through to early adulthood, and in the case of daily disposable contact lenses, enduring safety – indicated by no changes to ocular health markers or corneal endothelium over 10 years of full-time wear.[39]

These long-term studies show the benefit of starting and continuing myopia control treatment throughout childhood. Less data exists for newly commencing myopia management in this patient base, although research-minded clinicians may start to report their treatment observations. In the meantime, new research builds on the 2023 IMI Young Adult Myopia Report[40] to help further characterise the frequency of onset and typical progression of adult myopia – delineating the size of the problem, hopefully encouraging more treatment research.

Gazing forward

The wide range of myopia control treatments available today is complemented by an increasingly broad evidence base. This provides confidence in current treatments and further knowledge about efficacy and acceptance in populations extended from the original RCTs. Looking to emerging treatments, combinations and data in young adults helps to build the field of myopia management further, ensuring the best possible outcomes based on evidence for more and more of our young patients in practice. ●

About the author

Dr Kate Gifford is an internationally renowned clinician-scientist optometrist, Visiting Research Fellow at Queensland University of Technology, and co-founder of Myopia Profile, the world-leading educational platform for childhood myopia management. Kate holds a PhD in contact lenses and binocular vision in myopia, 4 professional fellowships, 100+ publications and has given over 250 lectures internationally. She has been the Chair of the International Myopia Institute Clinical Management Guidelines committee since 2017. After running her paediatric, contact lens and myopia-focussed independent practice in Brisbane for 13 years, Kate moved into full-time peer education through Myopia Profile in 2020.

1. Pärssinen O, Hemminki E. Spectacle-use, bifocals and prevention of myopic progression. The two-years results of a randomized trial among schoolchildren. Acta Ophthalmol Suppl (1985). 1988;185:156-61. doi: 10.1111/j.1755-3768.1988.tb02698.x
2. Goss DA. Effect of bifocal lenses on the rate of childhood myopia progression. Am J Optom Physiol Opt. 1986 Feb;63(2):135-41. doi: 10.1097/00006324-198602000-00009
3. Gwiazda J, Hyman L, Hussein M, et al. A randomized clinical trial of progressive addition lenses versus single vision lenses on the progression of myopia in children. Invest Ophthalmol Vis Sci. 2003 Apr;44(4):1492-500. doi: 10.1167/iovs.02-0816
4. Cho P, Cheung SW, Edwards M. The longitudinal orthokeratology research in children (LORIC) in Hong Kong: a pilot study on refractive changes and myopic control. Curr Eye Res. 2005 Jan;30(1):71-80. doi: 10.1080/02713680590907256
5. Chua WH, Balakrishnan V, Chan YH, Tong L, Ling Y, Quah BL, Tan D. Atropine for the treatment of childhood myopia. Ophthalmology. 2006 Dec;113(12):2285-91. doi: 10.1016/j.ophtha.2006.05.062
6. Santodomingo-Rubido J, Villa-Collar C, Gilmartin B, Gutiérrez-Ortega R. Myopia control with orthokeratology contact lenses in Spain: refractive and biometric changes. Invest Ophthalmol Vis Sci. 2012 Jul 31;53(8):5060-5. doi: 10.1167/iovs.11-8005
7. Chia A, Chua WH, Cheung YB, Wong WL, Lingham A, Fong A, Tan D. Atropine for the treatment of childhood myopia: safety and efficacy of 0.5%, 0.1%, and 0.01% doses (Atropine for the treatment of myopia 2). Ophthalmology. 2012 Feb;119(2):347-54. doi: 10.1016/j.ophtha.2011.07.031
8. Aller TA, Wildsoet C. Bifocal soft contact lenses as a possible myopia control treatment: a case report involving identical twins. Clin Exp Optom. 2008 Jul;91(4):394-9. doi: 10.1111/j.1444-0938.2007.00230.x
9. Anstice NS, Phillips JR. Effect of dual-focus soft contact lens wear on axial myopia progression in children. Ophthalmology. 2011 Jun;118(6):1152-61. doi: 10.1016/j.ophtha.2010.10.035. Epub 2011 Jan 26. PMID: 21276616. doi: 10.1016/j.ophtha.2010.10.035
10. Sankaridurg P, Berntsen DA, Bullimore MA, et al. IMI 2023 Digest. Invest Ophthalmol Vis Sci. 2023 May 1;64(6):7. doi: 10.1167/iovs.64.6.7. Erratum in: Invest Ophthalmol Vis Sci. 2023 Jul 3;64(10):34.
11. Bullimore MA, Brennan NA. Myopia: An ounce of prevention is worth a pound of cure. Ophthalmic Physiol Opt. 2023 Jan;43(1):116-121. doi: 10.1111/opo.13058
12. Bullimore MA, Brennan NA. Myopia control: why each diopter matters. Optom Vis Sci. 2019 Jun;96(6):463-465. doi: 10.1097/OPX.0000000000001367
13. Flitcroft DI, He M, Jonas JB, et al. IMI - Defining and classifying myopia: a proposed set of standards for clinical and epidemiologic studies. Invest Ophthalmol Vis Sci. 2019 Feb 28;60(3):M20-M30. doi: 10.1167/iovs.18-25957
14. Zadnik K, Sinnott LT, Cotter SA, et al. Collaborative longitudinal evaluation of E, Refractive Error Study Group. Prediction of juvenile-onset myopia. JAMA Ophthalmol. 2015;133:683-689. doi: 10.1001/jamaophthalmol.2015.0471
15. Chen Z, Gu D, Wang B, Kang P, Watt K, Yang Z, Zhou X. Significant myopic shift over time: Sixteen-year trends in overall refraction and age of myopia onset among Chinese children, with a focus on ages 4-6 years. J Glob Health. 2023 Nov 9;13:04144. doi: 10.7189/jogh.13.04144
16. Wang J, Qi Z, Feng Y, et al. Normative value of hyperopia reserve and myopic shift in Chinese children and adolescents aged 3-16 years. Br J Ophthalmol. 2024 Jun 20;108(7):1024-1029. doi: 10.1136/bjo-2023-323468
17. Bullimore MA, Brennan NA. Efficacy in myopia control: does race matter? Optom Vis Sci. 2023 Jan 1;100(1):5-8. doi: 10.1097/OPX.0000000000001977
18. Jethani J. Efficacy of low-concentration atropine (0.01%) eye drops for prevention of axial myopic progression in premyopes. Indian J Ophthalmol. 2022 Jan;70(1):238-240. doi: 10.4103/ijo.IJO_1462_21
19. Wang W, Zhang F, Yu S, et al. Prevention of myopia shift and myopia onset using 0.01% atropine in premyopic children - a prospective, randomized, double-masked, and crossover trial. Eur J Pediatr. 2023 Jun;182(6):2597-2606. doi: 10.1007/s00431-023-04921-5
20. Yam JC, Zhang XJ, Zhang Y, et al. Effect of low-concentration atropine eyedrops vs placebo on myopia incidence in children: The LAMP2 Randomized Clinical Trial. JAMA. 2023 Feb 14;329(6):472-481. doi: 10.1001/jama.2022.24162
21. He X, Wang J, Zhu Z, et al. Effect of repeated low-level red light on myopia prevention among children in China with premyopia: a randomized clinical trial. JAMA Netw Open. 2023 Apr 3;6(4):e239612. doi: 10.1001/jamanetworkopen.2023.9612
22. Zhang Z, Zeng L, Gu D, et al. Spectacle lenses with highly aspherical lenslets for slowing axial elongation and refractive change in low-hyperopic Chinese children: a randomized controlled trial. Am J Ophthalmol. 2024 Aug 27;269:60-68. doi: 10.1016/j.ajo.2024.08.020
23. Guo B, Cheung SW, Kojima R, Cho P. Variation of Orthokeratology Lens Treatment Zone (VOLTZ) Study: A 2-year randomised clinical trial. Ophthalmic Physiol Opt. 2023 Nov;43(6):1449-1461. doi: 10.1111/opo.13208
24. Xiong R, Wang W, Tang X, et al. Myopia control effect of repeated low-level red-light therapy combined with orthokeratology: a multicenter randomized controlled trial. Ophthalmology. 2024 May 17: S0161-6420(24)00308-7. doi: 10.1016/j.ophtha.2024.05.015
25. Tsai HR, Wang JH, Huang HK, Chen TL, Chen PW, Chiu CJ. Efficacy of atropine, orthokeratology, and combined atropine with orthokeratology for childhood myopia: A systematic review and network meta-analysis. J Formos Med Assoc. 2022 Dec;121(12):2490-2500. doi: 10.1016/j.jfma.2022.05.005
26. Tan Q, Ng AL, Cheng GP, Woo VC, Cho P. Combined 0.01% atropine with orthokeratology in childhood myopia control (AOK) study: A 2-year randomized clinical trial. Cont Lens Anterior Eye. 2023 Feb;46(1):101723. doi: 10.1016/j.clae.2022.101723
27. Nucci P, Lembo A, Schiavetti I, Shah R, Edgar DF, Evans BJW. A comparison of myopia control in European children and adolescents with defocus incorporated multiple segments (DIMS) spectacles, atropine, and combined DIMS/atropine. PLoS One. 2023 Feb 16;18(2):e0281816. doi: 10.1371/journal.pone.0281816
28. Yum HR, Han SY, Park SH, Shin SY. Synergistic effect of dual-focus soft contact lenses and 0.05% atropine on myopia control in children with rapidly progressing myopia. Eye Contact Lens. 2025 Feb 1;51(2):92-97. doi: 10.1097/ICL.0000000000001154
29. Xiong R, Zhu Z, Jiang Y, et al. Sustained and rebound effect of repeated low-level red-light therapy on myopia control: A 2-year post-trial follow-up study. Clin Exp Ophthalmol. 2022 Dec;50(9):1013-1024. doi: 10.1111/ceo.14149
30. Xu Y, Cui L, Kong M, et al. Repeated low-level red light therapy for myopia control in high myopia children and adolescents: a randomized clinical trial. Ophthalmology. 2024 Jun 6:S0161-6420(24)00318-X. doi: 10.1016/j.ophtha.2024.05.023
31. Eye Rising International. Frequently Asked Questions, Eyerising Myopia Management Device (AU). 2025. Available from: https://www.eyerisinginternational.com/eyerising-myopia-management-device-au
32. Ostrin LA, Schill AW. Red light instruments for myopia exceed safety limits. Ophthalmic Physiol Opt. 2024 Mar;44(2):241-248. doi: 10.1111/opo.13272
33. Chakraborty R, Baranton K, Pic E, et al. Axial length reduction and choroidal thickening with short-term exposure to cyan light in human subjects. Ophthalmic Physiol Opt. 2024 Nov;44(7):1414-1432. doi: 10.1111/opo.13390
34. Hon Y, Chun RKM, Cheung KK, et al. Bright light and combination of myopic defocus for myopia control: study design and demographic data. Invest Ophthalmol Vis Sci. 2024;65(7):128.
35. Flitcroft DI et al. MyopiaX-1 6-month safety and effect outcomes on the reduction of myopia progression: a randomized, controlled, multicentre trial. Presented at the 19th International Myopia Conference, Sanya, China; September 2024.
36. Lam CSY, Tang WC, Zhang HY, et al. Long-term myopia control effect and safety in children wearing DIMS spectacle lenses for 6 years. Sci Rep. 2023 Apr 4;13(1):5475. doi: 10.1038/s41598-023-32700-7
37. Li X, Huang Y, Liu C, et al. Myopia control efficacy of spectacle lenses with highly aspherical lenslets: results of a 5-year follow-up study. Eye Vis (Lond). 2025 Mar 5;12(1):10. doi: 10.1186/s40662-025-00427-3
38. Chamberlain P, Bradley A, Arumugam B, et al. Long-term effect of dual-focus contact lenses on myopia progression in children: a 6-year multicenter clinical trial. Optom Vis Sci. 2022 Mar 1;99(3):204-212. doi: 10.1097/OPX.0000000000001873
39. Lam HY, Jones S, Logan NS. Long-term impact of daily disposable hydrogel soft contact lens wear on corneal endothelium in children. Invest. Ophthalmol. Vis. Sci. 2024;65(7):6607.
40. Bullimore MA, Lee SS, Schmid KL, et al. IMI-onset and progression of myopia in young adults. Invest Ophthalmol Vis Sci. 2023 May 1;64(6):2. doi: 10.1167/iovs.64.6.2

Recommend MiSight® 1 day contact lenses for myopia management:

- **The first soft contact lens approved by the U.S. FDA**
  to slow the progression of myopia in children aged 8–12 years at the initiation of treatment[1*†]
- **The only soft contact lens proven by 7 years of clinical data**
  to significantly slow myopic progression with no rebound effect[1–4*‡]
- **Preferred by** 9/10 children to glasses[5,6§#]

Plastic neutral[¥]

*Compared to a single-vision, 1-day lens over a three-year period; rate of progression maintained out to 6 years. †US FDA Indications for Use: MiSight® 1 day (omafilcon A) Soft (Hydrophilic) Contact Lenses for daily wear are indicated for the correction of myopic ametropia and for slowing the progression of myopia in children with non-diseased eyes, who at the initiation of treatment are 8–12 years of age and have a refraction of -0.75 to -4.00 dioptres (spherical equivalent) with ≤0.75 dioptres of astigmatism. The lens is to be discarded after each removal. ‡On average, there was no indication that accumulated treatment effect gained following 3 or 6 years of MiSight® 1 day wear was lost during a 12-month cessation study in children aged 8-15 at initiation of treatment. Instead, eye growth reverted to expected, age average myopic progression rates. §95%–100% of children expressed a preference for contact lenses over glasses at each visit over 36 months. #'How much do you like wearing your contact lenses?' 87/97 (90%) Top box 'I like contact lenses the best' Subjective response at 60 months. ¥Plastic neutrality is established by purchasing credits from Plastic Bank. A credit represents the collection and conversion of one kilogram of plastic that may reach or be destined for waterways. CooperVision purchases credits equal to the weight of plastic in our contact lens orders in a specified time period. Contact lens plastic is determined by the weight of plastic in the blister, the lens and the secondary (outer carton) package, including laminates, adhesives, and auxiliary inputs (e.g. ink). References: 1. Chamberlain P *et al. Optom Vis Sci* 2019;96:556–567. 2. Chamberlain P *et al. Optom Vis Sci* 2022;99:204-212. 3. Chamberlain P *et al. Optom Vis Sci* 2021;98:E-abstract 210049. 4. Hammond D *et al. Optom Vis Sci* 2021;98:E-abstract 215130. 5. Sulley A *et al. Optom Vis Sci* 2019;96(E-abstract):195252. 6. CooperVision data on file, 2023. For instructions for use refer to https://coopervision.net.au/patient-instruction.

MYOPIA MANAGEMENT PRODUCT COMPENDIUM 2025

IN PARTNERSHIP WITH MYOPIA PROFILE

REVISED APRIL 2025

As outlined in Optometry Australia's Position Statement on Myopia Management, myopia management strategies broadly fall into 5 categories, specialised spectacles, specialised contact lenses, pharmaceutical agents, combination therapy and repeated low-level red light (RLRL) therapies, all of which are supported by peer-reviewed, published studies from randomised controlled trials. **Read the complete position statement on the Optometry Australia Advocacy page (https://www.optometry.org.au/advocacy/position-statements/) and visit Optometry Australia's Myopia Microsite (https://www.optometry.org.au/practice-professional-support/myopia/) for comprehensive tools to stay ahead in myopia management.**

A recent Cochrane review[1] found that all myopia interventions (except for under-correction with single-vision spectacle lenses, standard single-vision rigid gas permeable lenses and the adenosine antagonist 7-methylxanthine) were effective at slowing myopia progression in terms of both refractive error and axial length of the eye at 12 and 24 months.

Current evidence weighs in favour of prescribing active myopia management therapies to children with myopia.[2] It suggests no superior treatment modality with orthokeratology, multifocal and multizone soft contact lenses, myopia management spectacles and low-dose atropine all showing similar results.[3]

In partnership with Myopia Profile, this resource provides an overview of the myopia management products and instruments available in Australia at the time of writing. It is not intended as an exhaustive list, but rather an overview of the various myopia management products available.

For more information on myopia management products, as well as articles, case studies and science reviews, visit Myopia Profile at www.myopiaprofile.com or scan the QR code below.

Optometry AUSTRALIA

MyopiaProfile

1. Myopia management spectacle treatments

Product name	Product type	Product detail	Power range		Material	Parameters	Fitting information	Comments on evidence/research	Company
HOYA MiYOSMART	Spectacle lens for myopia correction and control with Defocus Incorporated Multiple Segments (DIMS) Technology	➔ Central optical zone (9.4 mmø) for correcting distance refractive error. ➔ The Treatment zone of 33 mm in diameter with a dense honeycomb array of DIMS (each 1.03 mmØ). ➔ Each Defocus segment has a relative positive power of +3.50D. ➔ Spaces between the DIMS provides single vision correction. ➔ The configuration of dense honeycomb pattern provides a constant 50:50 ratio of defocus and distance correction in all viewing directions.	**Clear lens:** Plano to -13.00 cylindrical correction up to 4.00D, prism up to 3PD per lens **Chameleon & Sunbird lens:** Plano to -10:00D, Cylindrical correct up to 4.00D, prism up to 3PD per lens		Polycarbonate 1.59. Also available in sun options: polarised and photochromic	Diameter (60ø, 65ø, 70ø, 75ø)	With full refraction, taking monocular pupillary distances and monocular heights.	➔ Two-year randomised controlled trial showing robust efficacy and acceptance in children.[4] ➔ Six-year follow up clinical study[5] has been published and found that: • The Myopia control effect of DIMS spectacle lens sustained over 6 years • Average cumulative myopia progression less than -1.00D and axial elongation 0.6 mm over 6 years in DIMS group • Children who stopped wearing DIMS spectacle lens show no rebound effect. **Over 50 publications from across the globe conducted on MiYOSMART technology.**	HOYA
Essilor® Stellest® lens	Spectacle lens to control myopia progression with Highly Aspherical Lenslet Target (H.A.L.T.) Technology	➔ Central optical zone (9 mmø) for correcting distance refractive error, with surrounding myopia control zone incorporating 1021 contiguous highly aspherical lenslets (each 1.12 mmø). ➔ Each lenslet does not have a single focal power, instead creating a 'volume of myopic defocus' as a slow-down signal for eye growth. ➔ Each of the 11 rings of lenslets features contiguous lenslets of similar asphericity, with successive rings having lenslets with different asphericities. ➔ Spaces between the rings of lenslets provide single-vision correction.	**Sphere:** +2.00* to -12.00D **Cylinder:** 0.00D to -4.00D Prism up to 2Δ per lens *Spherical Equivalent Refraction (SER) must be ≤0 for sphere (0.00; +2.00)		Polycarbonate material only, Crizal® Rock coating	Diameter (55ø, 60ø, 65ø, 70ø)	With full refraction, taking monocular pupillary distances and monocular heights.	➔ Two-year prospective, controlled, randomised, double-masked trial demonstrating efficacy and acceptance in children.[6,7] ➔ Five-year clinical study data has also been published indicating the lens is effective in simultaneously providing clear distance vision and slowing myopia progression.[8] The myopia control effect was shown to be more effective when the lenses are worn for at least 12 hours[7] per day every day for 2 consecutive years.	EssilorLuxottica
ZEISS MyoCare and MyoCare S	Spectacle lens for myopia correction and control, with Cylindrical Annular Refractive Elements (C.A.R.E.) technology	➔ First age-related design released for myopia management in children. ➔ Single-vision power in central zone, with alternating zones of correction and defocus in a ring-like pattern, expanding to the lens's periphery. Aimed to deliver a slow-down signal for eye growth.	MyoCare: central clear zone 7 mmø and average defocus power provided +4.6D MyoCare S: central clear zone 9 mmø and average defocus power provided +3.8D		N/A	N/A	With full refraction, taking monocular pupillary distances and monocular heights	➔ Data for a one-year randomised controlled trial (presumably utilising the MyoCare S) has been published, indicating a moderate myopia control effect.[9]	ZEISS
Rodenstock MyCon 2	Spectacle lens for myopia correction and control based on horizontal asymmetric peripheral defocus areas	➔ Improved imaging properties by customising the lens to fit the frame and thus to the child's unique face. Takes into account centration values (corneal vertex distance, wrap and tilt).	**Sphere:** 0.00 to -14.00D **Combined Cylinder:** 0.00D to -6.00D **Prism:** Up to 7D (prescription/Index dependent)		Available in index 1.5, 1.6, 1.67 and 1.74. Clear, tinted polarised & ColorMatic	Diameter (50ø, 55ø, 60ø, 65ø, 70ø, 75ø) (prescription/ Index dependent)	With full refraction, taking monocular pupillary distances and monocular heights. Optional: pantoscopic tilt, corneal vertex distance, face form angle (wrap) parameters.	➔ A five-year independent clinical study (not a randomised controlled trial) of a similar perifocal design (Note: MyCon lenses were not used in this study, therefore similar products may work differently) showed reduction of progression of myopia in Caucasian children aged 7-14 years.[10] ➔ New dynamic study pending for release in 2025.	Rodenstock

MYOPIA MANAGEMENT SPECTABLE TREATMENTS

2. Myopia management soft contact lenses

Product name	Product type	Product detail	Power range	Material	Parameters			Fitting information	Other comments	Company
					Diameter	Base curve				
CooperVision MiSight® 1 day	Daily disposable contact lens for myopia control	Soft contact lenses with a central correction zone surrounded by a series of treatment and correction zones producing 2.00D of simultaneous myopic retinal defocus.	-0.25D to -10.00D (spherical powers only, 0.50D steps after -6.00D)	Omafilcon A; non-ionic hydrogel (60% water), Dk/t 28	14.2 mm	8.7 mm		Fit on best vision spherical refraction.	➔ The longest dataset available of any myopia-controlling soft contact lens, with clinical study results published for up to seven years.[11] ➔ First and currently only myopia control intervention that has received USA FDA indication for myopia control.[+]	CooperVision
Menicon Bloom Day™	Daily disposable extended depth soft contact lens with Neurofocus Optics®	Centre-distance extended depth of focus design lens with catenary-curve-like power profile delivering up to +6.00/8.00D of relative myopia defocus across the therapeutic area.	Peripheral plus power of +8.00D across the entire therapeutic area at 6 mm pupil diameter	Etafilcon A; hydrogel (58% water)	14.5 mm	8.3 mm		Encompasses digital tools to support eyecare professionals (Menicon Bloom™ Easyfit professional software) and patients (Menicon Bloom™ app).	➔ Twelve-month randomised controlled trial for myopia progression,[12] with release of year 2 data from the 3-year trial in early 2025.	Menicon
Mark'ennovy MYLO	Monthly extended depth of focus (EDOF) soft contact lens	Individually crafted, extended depth of focus contact lens; concentric ring design with power profile designed to optimise 'global retinal image quality' and offering.	-0.25D to -15.00D in 0.25 steps. Spherical powers only.	Filcon 5B; silicone-hydrogel (75% water), class 1 UV filter, Dk 60	13.50 to 15.50 mm (0.50 steps)	Customisable base curve from 7.10 to 9.80 mm (0.30 steps)		Customisable lens parameters, allowing practitioners to optimise lens comfort and stability.	➔ Two-year randomised controlled trial for myopia progression.[13]	Mark'ennovy
ACUVUE® Abiliti® 1-Day	Daily disposable contact lens with novel ring focus technology for myopia control	Novel ring focus, soft contact lens containing a myopia correction zone and annular treatment zones producing a +7.00D non-coaxial plus power and a +10.00D zone co-axially.	-0.25D to -8.00D in 0.25 steps. Spherical powers only.	Senofilcon A; silicone-hydrogel (38% water), Class 1 UV blocker, Dk/t 121	13.8 mm	7.9 mm		Fit on best vision spherical refraction, allowing 10 minutes settling time.	➔ Six-month data currently published from an ongoing randomised clinical trial.[14] ➔ Two-year data available from manufacturer (awaiting publication).[15] ➔ First daily disposable silicone hydrogel soft contact lenses designed specifically for slowing the progression of myopia in children[16] and utilising a smaller lens diameter designed to fit the smaller anatomical features of a paediatric population (aged 7-12).[17]	Johnson & Johnson Vision
***Other relevant products** *Note: Not specifically designed for myopia management and/or do not have regulatory approval for the same.*										
CooperVision *Biofinity Multifocal	Monthly multifocal soft contact lens	Centre-distance multifocal soft contact lens, with spherical central and peripheral zones, and an aspheric intermediate zone. Daily wear is recommended for children.	+6.00 to -10.00D (0.50D steps after -6.00D) Toric powers available Add powers +1.00D to +2.50D (0.50D steps). Available in D-lens and N-lens design, only D-lens has been studied for myopia control.	Comfilcon A; silicone-hydrogel (48% water), Dk/t 142	14.0 mm	8.6 mm		Can be an option for children who don't fit or whose prescription is too high for other soft contact lens options.	➔ Originally designed for presbyopia and does not have any regulatory approvals for myopia control in children. ➔ A toric design is available, but it has not been studied for its efficacy in controlling myopia in the presence of astigmatism. ➔ One randomised controlled trial showed efficacy and tolerance of children wearing the +2.50D (centre-distance) design for slowing myopia progression. The +1.50D design was also trialled and was found not to be effective.[18]	CooperVision

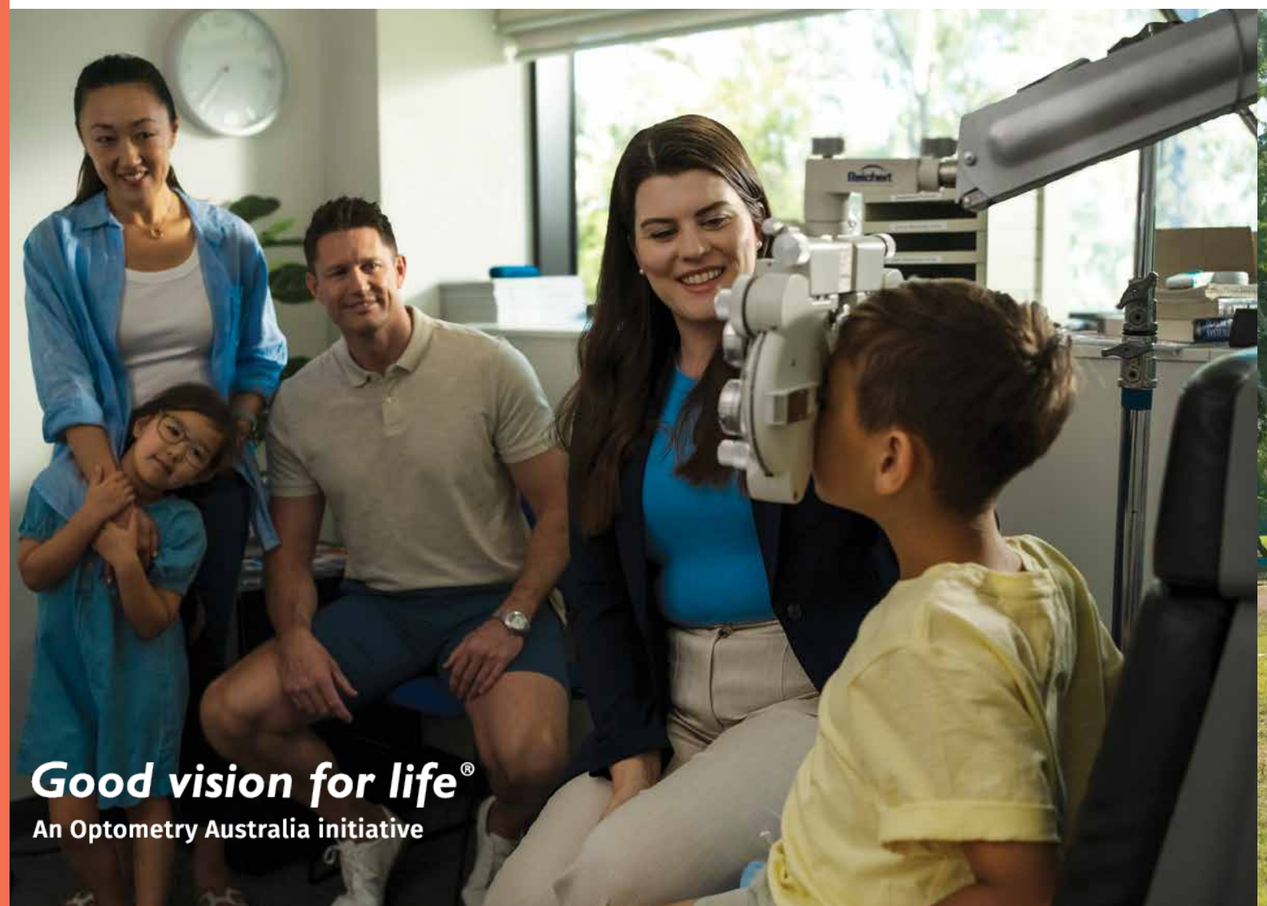
[+]FDA Indications for use (US only): MiSight® 1 day (omafilcon A) soft (hydrophilic) contact lenses for daily wear are indicated for the correction of myopic ametropia and for slowing the progression of myopia in children with non-diseased eyes, who at the initiation of treatment are 8-12 years of age and have a refraction of -0.75 to -4.00 diopters (spherical equivalent) with ≤0.75 diopters of astigmatism. The lens is to be discarded after each removal.

MYOPIA MANAGEMENT SOFT CONTACT LENSES

3. Orthokeratology for myopia management

Product name	Product detail	Power range	Material		Parameters		Fitting information	Other comments	Company
					Diameter	Base curve			
Menicon Bloom Night™	Orthokeratology contact lens for myopia correction and myopia management, with CE approval for myopia management in Europe **Variations:** Spherical, toric	**Spherical:** Suitable for myopes up to -4.00DS **Toric:** Menicon Bloom Night™ Toric provides additional options for eyes with higher corneal astigmatism levels.	Menicon Z (Tisilfocon A); hyper-Dk rigid gas permeable, Dk 163 ISO/189 Fatt		Customised	Customised	Menicon Bloom™ encompasses digital tools to support eyecare professionals (Menicon Bloom™ Easyfit professional software) and patients (Menicon Bloom™ app).	Menicon Bloom Care™ and Menicon Bloom Progent™ are the recommended solutions to maintain Menicon Bloom Night™ lenses. Two-year randomised clinical trial. Can be considered first-line treatment for children with myopia.[18-20]	Menicon

Note: There are a number of orthokeratology lenses which are not specifically designed for myopia management and/or do not have regulatory approval for the same, however there may be early research data supporting their efficacy in myopia management.



ORTHOKERATOLOGY FOR MYOPIA MANAGEMENT

4. Atropine eyedrops for myopia control

Product name	Active Ingredient	Available sizes	Therapeutic indications	Contraindications	PBS listing	Special warnings and precautions for use	Supplier
Aspen pharmaceutical ^EIKANCE 0.01%	atropine sulfate monohydrate 100 mcg/1 mL eye drops Preservative: None	single-dose ampoules in packs of 5, 30, 60, 90	Indicated as a treatment to slow the progression of myopia in children aged from 4 to 14. Atropine treatment may be initiated in children when myopia progresses ≥-1.0D per year.	➔ Presence of angle closure glaucoma or where angle closure glaucoma is suspected. If used in glaucoma-susceptible patients, an estimation of the depth of the angle of the anterior chamber should be performed prior to the initiation of therapy. ➔ Hypersensitivity to any of the ingredients of EIKANCE 0.01% eye drops.	No	Risk benefit should be considered when the following medical problems exist: ➔ Keratoconus ➔ Synechiae ➔ Not to be used in children who have previously had a severe systemic reaction to atropine. Should not be used in children less than 4 years of age ➔ Photophobia ➔ Poor visual acuity ➔ May lead to rebound myopia upon discontinuation	Aspen Pharmacare Australia Pty Ltd

For more information, visit the Australian Government Therapeutic Goods Administration website: www.tga.gov.au.

^This new product is subject to additional monitoring under the Black Triangle Scheme. Healthcare professionals are asked to report any suspected adverse events at www.tga.gov.au/reporting-problems.

The following is a summary of atropine eyedrops use from Optometry Australia's Myopia Management Position Statement

- Current evidence suggests the use of 0.05% atropine eye drops.[22-24] While the response to various concentrations of low-dose atropine varies with children's ethnicity, genetics and degree of myopia, recent evidence suggests that 0.01% atropine is likely to be ineffective or only slightly effective in controlling the axial elongation associated with myopia progression.[22-24]
- Other concentrations (0.025-0.05%) and other indications (children outside these age ranges or with less than 1.00D of myopia progression in a year), are considered an off-label use of atropine.

Combination therapy[25]

- A combination of orthokeratology contact lenses and low-dose (0.01%) atropine has the strongest evidence base. There is limited evidence for other combination therapies, with some early evidence suggesting reduced progression of spherical equivalent refractive error in European children using 0.01% atropine combined with defocus incorporated multiple segment spectacles lenses; however, there was no significant additive benefit for axial elongation of the eye.[26]
- Combining 0.01% atropine eye drops with soft multifocal contact lenses (Biofinity D lenses with a +2.50D add power) failed to demonstrate better myopia control than soft multifocal contact lenses alone in the Bifocal & Atropine in Myopia study.[27]

Note: prescribing low-concentration atropine

If you are prescribing low-concentration atropine, please clearly label the prescription with '**To Be Compounded**' to avoid confusion in the dispensing process. There have been incidents where prescriptions for low-concentration atropine have been incorrectly processed by pharmacists as Atropt (atropine sulphate 1%). Low-concentration atropine eye drops must be prepared by a compounding pharmacy that is equipped to compound eye drops.

Optometry Australia keeps an updated list of ophthalmic compounding pharmacists on our website: Ophthalmic compounding pharmacists - Optometry Australia. Please keep us updated if you know of a certified ophthalmic compounding pharmacist that is not on our list by emailing **national@optometry.org.au**.

Eikance 0.01% (atropine sulfate) eye drops are available through prescription. This new product is subject to additional monitoring under the Black Triangle Scheme. Healthcare professionals are asked to report any suspect adverse events at www.tga.gov.au/reporting-problems.

5. Repeated low-level red light therapy

Repeated low-level red light (RLRL) therapies,[28,29] an emerging area of myopia management treatment, has been shown to slow myopia progression through the emission of visible red light. Systematic reviews and meta-analyses have found RLRL to be an effective and safe short-term myopia management treatment;[30-33] however, further longer-term studies for efficacy, standardisation and safety remain ongoing, particularly compared to other myopia management options.[34] Currently, in Australia, a home-based RLRL instrument has been TGA registered as a Class IIa medical device.

Product name	Product detail	Therapeutic indications	Contraindications, special warnings and precautions for use	Additional features	Company
Eyerising Myopia Management Device	A home-use myopia management device that delivers repeated low-level red-light (RLRL) to the ocular fundus, slowing the axial elongation associated with myopia progression.	Indicated for slowing the progression of myopia in myopic children aged 3 to 16. Offers significant effect in slowing the progression of high myopia. Offers the opportunity to start treatment in children who are not compliant or not responding to eye drops or contact lenses. Increases choroidal blood flow and choroidal thickness, which may address the scleral hypoxia implicated in myopia progression. Can not only slow axial length elongation but also cause significant axial length shortening in a proportion of patients.	➔ Strabismus, binocular vision abnormalities, ocular or systemic abnormalities, paediatric retinal diseases, dilated pupil (mydriasis) or receiving drugs that can cause dilated pupil (e.g., atropine). ➔ Children on RLRL will still need to wear glasses in order to get corrected vision during the day. ➔ **Cannot be used in conjunction with atropine. Patients need to stop using atropine for 2 weeks prior to starting RLRL therapy.** ➔ RLRL can be used in conjunction with orthokeratology lenses, soft contact lenses (e.g., MiSight) and specially designed glasses (e.g., Miyosmart). Remove glasses/ contact lenses during the treatment session. ➔ Taper treatment gradually or consider starting on alternative treatments if myopia is progressing. ➔ **Common side effect:** Afterimage, disappearing within a few minutes, glare, flash blindness	➔ Patients take a red-light device home with them to use. ➔ Simple protocol (3 minutes, twice daily, 5 days a week). ➔ Securely shares patient compliance data with parents and practitioners to monitor treatment adherence and correlate with treatment efficacy. ➔ Two-year clinical trial results showed significant myopia control efficacy in terms of axial length and spherical equivalence of 75.0%.[35] ➔ One-year clinical trial results in high myopia have demonstrated significant clinical efficacy, with mean axial shortening and spherical equivalence improvement.[36,37] ➔ Compliant with international laser product safety standard IEC 60825-1:2014.	Eyerising International

Combination therapy

- The combination of RLRL and orthokeratology has shown stronger efficacy in slowing axial elongation than orthokeratology alone across two studies.[38,39]
- The combination of RLRL and DIMS has also shown clinical efficacy in two studies.[40,41]

6. Myopia management diagnostics

Product name	Product detail	Additional features	Company
OCULUS Myopia Master	3-in-1 integrated keratometer, auto-refractometer and axial biometer (using optical biometry) for myopia detection and management.	➔ Myopia Master® software with lifestyle and risk factors questionnaire ➔ Data analysis results interpreted based on Brien Holden Vision Institute (BHVI) growth curves. ➔ Evaluation-based treatment recommendations ➔ All results are clearly listed in the Myopia Report, which can be sent to the patient. ➔ Follow up with trend and growth analysis.	OCULUS Optikgeräte GmbH Ophthalmix 0418 618 025
Pentacam® AXL Wave	5-in-1 integrated device combining Scheimpflug tomography for contact lens fitting and keratoconus monitoring, wavefront aberrometry, autorefractor, retroillumination and optical biometry for comprehensive myopia detection and management.	➔ The Myopia Software now supports data from both the Pentacam® AXL Wave and Myopia Master®, allowing for a flexible setup where you can expand or switch devices without losing existing data. ➔ This integration ensures seamless tracking of key progression data essential for effective myopia management, increasing flexibility and efficiency in daily clinical workflows.	OCULUS Optikgeräte GmbH Ophthalmix 0418 618 025
Topcon MYAH	Multifunction ophthalmic measurement instrument, including axial biometry, corneal topography with contact lens fitting module, pupillometry, NIBUT, meibography and other dry eye assessment functions.	➔ Review software for installation in network environments, as well as connectivity to Eyespace for your customer contact lens ordering. Chair and stand compatible enabling effective and space conscious installation options for any practice.	Topcon MYAH - MYAH from Topcon Healthcare Device Technologies 1800 429 551
Haag Streit Lenstar Myopia	Optical biometer and combined keratometer, embracing ophthalmology pedigree to achieve highly repeatable and accurate axial length & keratometry measurements for myopia management.	➔ Latest automated positioning technology for a fully automated measurement capture process, combined with graphical data from Erasmus University to detect, track progression, and communicate treatment pathways effectively with patients and parents. Haag-Streit age matched myopia control software makes management easy by adding a 'traffic light' system to next required steps. Networkable with existing practice IT ecosystems, and chair and stand compatible, Lenstar Myopia is easily integrated into the practice, even for the space conscious.	Haag Streit HaagStreit | Ophthalmic Medical Equipment | Our Brands Device Technologies 1800 429 551

References

1. Lawrenson JG, Shah R, Huntjens B, et al. Interventions for myopia control in children: a living systematic review and network meta-analysis. Cochrane Database Syst Rev; 2023. Epub ahead of print 16 February 2023. doi: 10.1002/14651858.CD014758.pub2.
2. Sankaridurg P, Berntsen DA, Bullimore MA, et al. IMI 2023 Digest. Invest Ophthalmol Vis Sci. 2023;64(6):7. doi: 10.1167/iovs.64.6.7
3. Brennan NA, Toubouti YM, Cheng X, et al. Efficacy in myopia control. Prog Retin Eye Res. 2021;83:100923. doi: 10.1016/j.preteyeres.2020
4. Lam CSY, Tang WC, Tse DY, et al. Defocus Incorporated Multiple Segments (DIMS) spectacle lenses slow myopia progression: a 2-year randomised clinical trial. Br J Ophthalmol. 2020;104:363–368. doi: 10.1186/s40662-023-00356-z
5. Lam CSY, Tang WC, Zhang HY, et al. Long-term myopia control effect and safety in children wearing DIMS spectacle lenses for 6 years. Sci Rep. 2023;13:5475. doi: 10.1038/s41598-023-32700-7
6. Bao J, Yang A, Huang Y, et al. One-year myopia control efficacy of spectacle lenses with aspherical lenslets. Br J Ophthalmol. 2022 Aug;106(8):1171-1176. doi: 10.1136/bjophthalmol-2020-318367
7. Bao J, Huang Y, Li X, Yang A, Zhou F, Wu J, et al. Spectacle lenses with aspherical lenslets for myopia control vs single-vision spectacle lenses: A randomized clinical trial. JAMA Ophthalmol. 2022 Mar 31;140(5):472–8
8. Li X, Huang Y, Liu C, et al. Myopia control efficacy of spectacle lenses with highly aspherical lenslets: results of a 5-year follow-up study. Eye and Vis. 2025;12(10). doi 10.1186/s40662-025-00427-3
9. Chen X, Wu M, Yu C, et al. Slowing myopia progression with cylindrical annular refractive elements (CARE) spectacle lenses-Year 1 results from a 2-year prospective, multi-centre trial. Acta Ophthalmol. Published online November 15, 2024. doi:10.1111/aos.16795
10. Tarutta EP, Proskurina OV, Tarasova NA, Milash SV, Markosyan GA. Long-term results of perifocal defocus spectacle lens correction in children with progressive myopia. Vestn. Oftalmol. 2019 Jan 1;135:46-53. doi: 10.17116/oftalma201913505146
11. Chamberlain P, Hammond DS, Bradley A, et al. Eye growth and myopia progression following cessation of myopia control therapy with a dual-focus soft contact lens. Optom Vis Sci. Published online March 25, 2025. doi:10.1097/OPX.0000000000002244
12. Tuan KA, Dillehay SM. A randomized controlled trial for myopia progression control using catenary power profile contact lenses: 12-month effectiveness and safety. Invest Ophthalmol Vis Sci. 2024;65(7):2697
13. Sankaridurg P, Bakaraju RC, Naduvilath T, et al. Myopia control with novel central and peripheral plus contact lenses and extended depth of focus contact lenses: 2 year results from a randomised clinical trial. Ophthalmic Physiol Opt. 2019 Jul;39(4):294-307. doi: 10.1111/opo.12621
14. Cheng X, Xu J, Brennan NA. Randomized trial of soft contact lenses with novel ring focus for controlling myopia progression. Ophthalmol Sci. 2022 Oct 18;3(1):100232. doi: 10.1016/j.xops.2022.100232
15. Johnson & Johnson Vision. Efficacy of ACUVUE® Abiliti™ 1-Day soft therapeutic lenses for myopia management: comparative claims vs. single vision and dual focus lenses. JJV data on file; 2021.
16. Johnson & Johnson Vision. Development of optical design of ACUVUE Abiliti 1-Day soft therapeutic lenses for myopia management. JJV data on file; 2021.
17. Johnson & Johnson Vision. Mechanical design of ACUVUE Abiliti 1-Day soft therapeutic lenses for myopia management - Effect on fit and handling. JJV data on file; 2021.
18. Walline JJ, Walker MK, Mutti DO, et al. Effect of high add power, medium add power, or single-vision contact lenses on myopia progression in children: The BLINK Randomized Clinical Trial. JAMA 2020; 324: 571–580. doi: 10.1001/jama.2020.10834
19. Cho P, Cheung SW. Retardation of myopia in Orthokeratology (ROMIO) study: a 2-year randomized clinical trial. Invest Ophthalmol Vis Sci [Internet]. 2012;53(11):7077–85. doi: 10.1167/iovs.12-10565
20. Chen C, Cheung SW, Cho P. Myopia control using toric orthokeratology (TO-SEE study). Invest Ophthalmol Vis Sci [Internet]. 2013;54(10):6510–7. doi: 10.1167/iovs.13-12527
21. Santodomingo-Rubido J, Villa-Collar C, Gilmartin B, Gutierrez-Ortega R. Orthokeratology vs. spectacles: adverse events and discontinuations. Optom Vis Sci. 2012 Aug;89(8):1133-9. doi: 10.1097/OPX.0b013e318263c5af
22. Repka MX, Weise KK, Chandler DL, et al. Low-Dose 0.01% Atropine Eye Drops vs Placebo for Myopia Control: A Randomized Clinical Trial. JAMA Ophthalmol. 2023;141(8):756. 67. doi: 10.1001/jamaophthalmol.2023.2855
23. Yam JC, Jiang Y, Tang SM, et al. 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. Ophthalmology. 2019;126(1):113–124. 68. doi: 10.1016/j.ophtha.2018.05.029
24. Yam JC, Zhang XJ, Zhang Y, et al. Three-year clinical trial of Low-Concentration Atropine for Myopia Progression (LAMP) study: Continued versus washout: Phase 3 report. Ophthalmology. 2022;129(3):308–321. doi: 10.1016/j.ophtha.2021.10.002
25. Zhang G, Jiang J, Qu C. Myopia prevention and control in children: a systematic review and network meta-analysis. Eye. 2023;37(16):3461–3469. doi: 10.1038/ s41433-023-02534-8
26. Nucci P, Lembo A, Schiavetti I, et al. A comparison of myopia control in European children and adolescents with defocus incorporated multiple segments (DIMS) spectacles, atropine, and combined DIMS/atropine. PLOS ONE. 2023;18:e0281816. doi: 10.1371/journal.pone.0281816
27. Jones JH, Mutti DO, Jones-Jordan LA, Walline JJ. Effect of combining 0.01% atropine with soft multifocal contact lenses on myopia progression in children. Optom Vis Sci. 2022;99:434. doi: 10.1097/OPX.0000000000001884
28. Jiang Y, Zhu Z, Tan X, et al. Effect of repeated low-level red-light therapy for myopia control in children: A multicenter randomized controlled trial. Ophthalmology. 2022;129:509–519. doi: 10.1016/j.ophtha.2021.11.023
29. Zaabaar E, Zhang XJ, Zhang Y, et al. Light exposure therapy for myopia control: a systematic review and Bayesian network meta-analysis. Br J Ophthalmol. 2024 Jul 23;108(8):1053-1059. doi: 10.1136/bjo-2023-323798.
30. Lawrenson JG, Huntjens B, Virgili G, et al. Interventions for myopia control in children: a living systematic review and network meta-analysis. Cochrane Database Syst Rev. 2025;2(2):CD014758. Published 2025 Feb 13. doi: 10.1002/14651858.CD014758.pub3
31. Chen Y, Xiong R, Yang S, et al. Safety of repeated low-level red-light therapy for myopia: A systematic review. Asia Pac J Ophthalmol (Phila). 2024;13(6):100124. doi: 10.1016/j.apjo.2024.100124
32. Schmidt DC, Hvid-Hansen A, Jacobsen N, et al. Efficacy of interventions for myopia control in children: A systematic review with network meta-analyses. Acta Ophthalmol. Published online April 11, 2025. doi: 10.1111/aos.17496
33. Ullah S, Umer MF, Chandran SP. Long-term effect of repeated low-level red light therapy on myopia control: A systematic review and meta-analysis. Eur J Ophthalmol. Published online February 21, 2025. doi: 10.1177/11206721251314541
34. Amaral DC, Batista S, Dos Santos-Neto E, et al. Low-level red-light therapy for myopia control in children: A systematic review and meta-analysis. Clinics 2024; 79: 100375. doi: 10.1016/j.clinsp.2024.100375
35. Xiong R, Zhu Z, Jiang Y, et al. Sustained and rebound effect of repeated low-level red-light therapy on myopia control: A 2-year post-trial follow-up study. Clin Exp Ophthalmol. 2022 Dec;50(9):1013-1024. doi: 10.1111/ceo.14149
36. Xu Y, Cui L, Kong M, et al. Repeated low-level red light therapy for myopia control in high myopia children and adolescents: a randomized clinical trial. Ophthalmology. 2024;131(11):1314-1323. doi: 10.1016/j.ophtha.2024.05.023
37. 37. Liu G, Liu L, Rong H, et al. Axial shortening effects of repeated low-level red-light therapy in children with high myopia: a multicenter randomized controlled trial. Am J Ophthalmol. 2025;270:203-215. doi: 10.1016/j.ajo.2024.10.011
38. Yu M, Tang X, Jiang J, et al. Axial length shortening after combined repeated low-level red-light therapy in poor responders of orthokeratology in myopic children. J Ophthalmol. 2024;2024:4133686. doi: 10.1155/2024/4133686
39. Xiong R, Wang W, Tang X, et al. Myopia control effect of repeated low-level red-light therapy combined with orthokeratology: a multicenter randomized controlled trial. Ophthalmology. 2024;131(11):1304-1313. doi: 10.1016/j.ophtha.2024.05.015
40. Wu G, Dai X, Tian J, Sun J. Efficacy of repeated low-level red-light therapy combined with optical lenses for myopia control in children and adolescents. Am J Transl Res. 2024;16(9):4903-4911. doi: 10.62347/DTLF6342
41. Yang Y, Liu S, Gao W, et al. Synergistic effect of defocus incorporated multiple segment glasses and repeated low level red light therapy against myopia progression. Sci Rep. 2025;15:3996. doi: 10.1038/s41598-024-81363-5

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The value of robust clinical evidence in myopia management

Myopia management has recently transformed from a niche area to mainstream practice. This sparked the development of numerous treatment options as companies strive to meet the needs of this growing category. Expanding available solutions necessitates discussing evidence-based practice, as robust clinical evidence must support myopia management.

The significance of evidence-based solutions is crucial as myopia is a degenerative condition rather than simply a refractive error requiring correction. While a significant number of myopic children continue to progress into adulthood,[1] the primary demographic for myopia management remains children and young teenagers. Research indicates that younger children require a more proactive approach due to their tendency to progress faster.[2–4]

Understanding individual variation in myopia progression

Myopia progression varies significantly among children, with influences, including age, gender and ethnicity, reported as some of the factors, making outcome prediction challenging without reliable clinical data. Research shows that while some children may exhibit rapid progression, others remain stable for extended periods (**Figure 1**),[2,5] underscoring the importance of selecting scientifically validated treatment options.

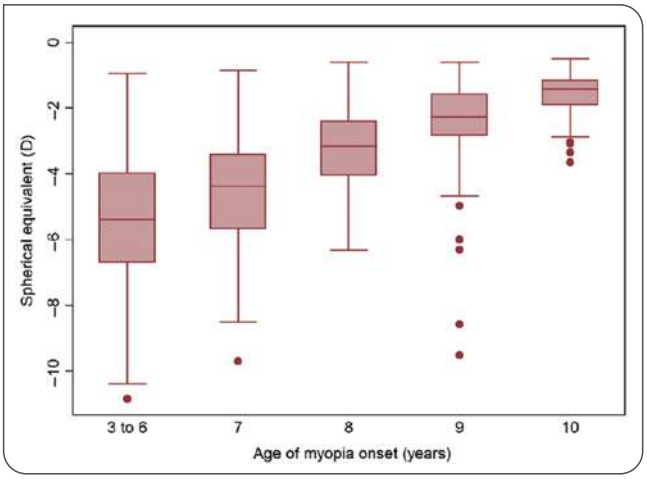

Figure 1. Boxplots of refractive error (D) among myopic children at age 11, stratified by age of onset.[5]

The hierarchy of clinical evidence

Practitioners must recognise that not all evidence carries equal weight.[7] Randomised Controlled Trials (RCTs) represent the highest level of clinical evidence, offering the most credible data due to their rigorous design and ability to minimise bias (**Figure 2**).[7] The International Myopia Institute (IMI) recommends that only RCTs be considered when evaluating myopia management.[8]

Characteristics of robust evidence in myopia management

1. Scientific foundation – Implementation of widely accepted myopia control theories endorsed by leading researchers, such as the peripheral hyperopic defocus theory.[8,9]

2. Credible evidence base – Clinical studies published in peer-reviewed scientific journals as well as recognition that new technology does not automatically translate to efficacy or effectiveness.

3. Randomised clinical trial results – Consider factors impacting RCT results, including age, ethnicity, progression rate and study duration. Ensuring proper randomisation and masking to minimise bias.[10]

4. High efficacy and sustained effectiveness – High efficacy (>50% from 2-year RCT) measured across multiple parameters (SER, AL, %, absolute amount, etc.). Sustained treatment effect over multiple years and the absence of rebound effect.

The MiYOSMART example: long-term clinical validation

The MiYOSMART spectacle lenses with Defocus Incorporated Multiple Segments (DIMS) technology exemplify evidence-based myopia management. Built on the established peripheral hyperopic defocus theory,[8,9] these lenses have impressive clinical outcomes. The 2-year randomised clinical trial[11] showed that all participants experienced an average 60% reduction in myopia progression, with spherical equivalent refraction slowed by 59% and axial elongation decreased by 60% compared to single vision lenses.

A 6-year follow-up study[13] demonstrated sustained effectiveness with average cumulative myopia progression of less than -1.00D (-0.92D or -0.15D/year) and average axial elongation of 0.60 mm (0.10 mm/year), with no rebound effect. Studies also confirm high patient acceptance and tolerability,[13] and easy adaptation[14] across various groups.[11–15]

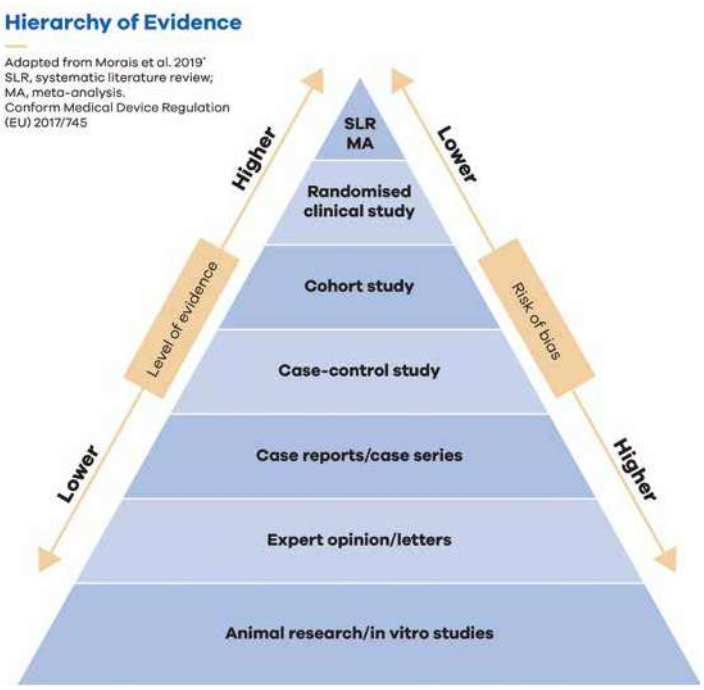

Figure 2. Hierarchy of evidence.[7]

Figure 3. MiYOSMART variants assist to reduce photophobia symptoms in children.

For children identified as high-risk for fast progression, research has shown MiYOSMART's effectiveness in combination with low-dose atropine.[16–18] This compatibility with combination therapy is among the most effective approaches to managing myopia progression.[19] The availability of MiYOSMART Chameleon (photochromic) and MiYOSMART Sunbird (polarised) variants provides additional benefits, reducing photophobia symptoms children may experience when using atropine (**Figure 3**). These alternative solutions contribute to maintaining treatment compliance, supporting the effectiveness of combination therapy.

Enhancing decision making when discussing treatment options

When discussing treatment options, optometrists can enhance decision making by sharing specific clinical evidence supporting their recommendations.

- **Present data on long-term effectiveness**, such as the sustained reduction in myopia progression demonstrated through multi-year studies, comprehensive safety profiles and documented patient outcomes.
- **Communicate evidence-based outcomes** to help families understand the long-term benefit of choosing clinically validated solutions. While initial costs may vary, the focus should remain on the documented treatment effectiveness of clinical outcomes.
- **Prioritise clinically validated interventions** and maintain a critical approach to products lacking robust evidence.

This evidence-based approach allows optometrists to demonstrate how investing in clinically proven solutions can contribute to better management of myopia progression over time; hence, benefiting patients and reinforcing the credibility of optometric practice.

Conclusion

Myopia management is a long-term commitment. Optometrists must ensure that every recommendation is backed by sound clinical evidence to confidently guide patients and families towards a future with healthier vision and that children receive the most effective interventions to slow myopia progression. As the field evolves and new treatments emerge, the fundamental principle remains unchanged: trust in science. ●

1. Bullimore MA, Lee SSY, Schmid KL, et al. IMI—Onset and progression of myopia in young adults. Invest Ophthalmol Vis Sci. 2023;64(6):2. doi: 10.1167/iovs.64.6.2
2. Brennan NA, Toubouti YM, Cheng X, Bullimore MA. Efficacy in myopia control. Progress in Retinal and Eye Research 83 (2021) 100923. https://doi.org/10.1016/j.preteyeres.2020.100923 doi: 10.1016/j.preteyeres.2020.100923
3. Jones LA, Mitchell GL, Mutti DO, Hayes JR, Moeschberger ML, Zadnik K. Comparison of ocular component growth curves among refractive error groups in children. Invest Ophthalmol Vis Sci 2005; 46: 2317–2327. doi: 10.1167/iovs.04-0945
4. Wong HB, Machin D, Tan SB, Wong TY, Saw SM. Ocular component growth curves among Singaporean children with different refractive error status. Invest Ophthalmol Vis Sci 2010; 51: 1341–1347. doi: 10.1167/iovs.09-3431
5. Chua SY, Sabanayagam C, Cheung YB, et al. Age of onset of myopia predicts risk of high myopia in later childhood in myopic Singapore children. Ophthal Physiol Opt 2016;36:388-941. doi: 10.1111/opo.12305
6. Morais F, Arantes T, Melo G, Muccioli C. Levels of evidence: What should ophthalmologists know? Rev Bras Oftalmol. 2019;78(6):413-7
7. Gifford KL, Richdale K, Kang P, et al. IMI - Clinical Management Guidelines Report. Invest. Ophthalmol. Vis. Sci. 2019; 60, M184–M203. doi: 10.1167/iovs.18-25977
8. Németh J, Tapasztó B, Aclimandos WA, et al. Update and guidance on management of myopia. European Society of Ophthalmology in cooperation with International Myopia Institute. Eur J Ophthalmol. 2021;31(3):853-83. doi: 10.1177/1120672121998960
9. Troilo D, Smith EL 3rd, Nickla DL, et al. IMI - Report on Experimental Models of Emmetropization and Myopia. Invest Ophthalmol Vis Sci. 2019;60(3):M31-M88. doi: 10.1167/iovs.18-25967
10. Wolffsohn JS, Kollbaum PS, Berntsen DA, et al. IMI – Clinical Myopia Control Trials and Instrumentation Report. Invest Ophthalmol Vis Sci. 2019;60:M132–M160. doi: 10.1167/iovs.18-259551167
11. Lam CSY, Tang WC, Tse DY, Lee RPK, Chun RKM, Hasegawa K, Qi H, Hatanaka T, To CH. Defocus Incorporated Multiple Segments (DIMS) spectacle lenses slow myopia progression: a 2-year randomized clinical trial. Br J Ophthalmol. Published Online First: 29 May 2019. doi: 10.1136/bjophthalmol-2018-313739
12. Lam CS, Tang WC, Lee PH, Zhang HY, Qi H, Hasegawa K, To CH. Myopia control effect of defocus incorporated multiple segments (DIMS) spectacle lens in Chinese children: results of a 3-year follow-up study. Br J Ophthalmol [Online]. 2021 March 17; 106(8):1110–1114. doi: 10.1136/bjophthalmol-2020-317664
13. Lam CSY, Tang WC, Zhang HY, et al. Long-term myopia control effect and safety in children wearing DIMS spectacle lenses for 6 years. Sci Rep. 2023;135475. doi: 10.1038/s41598-023-32700-7
14. Lu Y, Lin Z, Wen L, et al. The adaptation and acceptance of defocus incorporated multiple segment lens for Chinese children. Am J Ophthalmol. 2020;211:207-16. doi: 10.1016/j.ajo.2019.12.002
15. McCullough S, Barr H, Fulton J, et al. 2-year multi-site observational study of MiYOSMART myopia control spectacle lenses in UK children: 1-year results [Abstract]. Invest. Ophthalmol. Vis. Sci. 2023;64(8):4945.
16. Nucci P, Lembo A, Schiavetti I, Shah R, Edgar DF, Evans BJW. A comparison of myopia control in European children and adolescents with defocus incorporated multiple segments (DIMS) spectacles, atropine, and combined DIMS/atropine. PLoS One. 2023;18(2):e0281816. doi: 10.1371/journal.pone.0281816
17. Guemes Villahoz N. Talavero-Gonzales P., Bella-Gala R. et al. Defocus incorporated multiple segment lenses and 0.025% atropine for myopia control in European children: 12-month results of a randomized clinical trial. HOYA. 2024. Available from: www.hoyavision.com/visionary-knowlegde/blogs-and-article/conference-imc-2024
18. Huang Z, Chen XF, He T, Tang Y, Du CX. Synergistic effects of defocus-incorporated multiple segments and atropine in slowing the progression of myopia. Sci Rep. 2022;12(1):22311. doi: 10.1038/s41598-022-25599-z
19. Wolffsohn JS, Whayeb Y, Logan NS, et al. IMI—Global trends in myopia management attitudes and strategies in clinical practice—2022 update. Invest Ophthalmol Vis Sci. 2023;64(6):6. doi: 10.1167/iovs.64.6.6

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Meri Galoyan
BOptom(Hons) BSc
Senior Staff Optometrist, Centre for Eye Health

Focus on challenges – Navigating the depths of pathologic myopia

Pathologic myopia is an excessive axial elongation, often associated with posterior staphyloma in high myopic eyes.[1] This often leads to structural changes in the posterior eye segment, including myopic maculopathy and myopic optic neuropathy, which potentially result in irreversible loss of vision.[2]

This article explores a few key clinical challenges clinicians may face when seeing patients with pathologic myopia. It also provides a supplementary chairside reference highlighting different types of myopic maculopathies.

Unveiling myopic maculopathy: risks and red flags

Myopic maculopathy (MM) is a spectrum of progressive anatomical macular changes with the potential to cause significant vision impairment. While historically, the definitions and terminology have been variable in the literature, the classification proposed by Ruiz-Medrano et al. has been widely accepted in recent years.[1] The classification encompasses atrophic, tractional and neovascular components, each with further subcategories as included in the chairside reference. These components frequently coexist in the same patient, and utilising this classification provides a systematic and thorough approach to clinical diagnosis. Below are some important clinical questions that optometrists may encounter in their daily practice.

My high myopia patient has reduced best-corrected vision – what should I do?

If a high myopia patient presents with reduced best-corrected vision, and anterior/lenticular causes have been excluded, a thorough assessment of the posterior segment using appropriate imaging tools can help determine the cause.

Atrophic maculopathy. Colour fundus photography (CFP) and fundus autofluorescence (FAF) imaging, in conjunction with funduscopy, can be used in clinical practice to detect and record signs of atrophic component,[3] if optical coherence tomography (OCT) is not accessible. Visual impairment may result from enlargement and fusion of atrophies once these include the foveal centre.[4] Unfortunately, low vision and rehabilitation services would be the only intervention at this stage.

Tractional maculopathy. It can be challenging to diagnose myopic foveoschisis with funduscopy or with CFP; hence, OCT examination is essential to establish the correct diagnosis when suspicious. It would also allow appropriate grading and monitoring for any progression. While myopic foveoschisis may remain stable in most patients, those patients who display structural progression or decline in visual acuity would require an onward referral. A more substantial decrease in vision can be secondary to full-thickness macular hole and foveal detachment, requiring a more urgent referral.[1]

Neovascular maculopathy. Myopic choroidal neovascularisation (mCNV) remains one of the most sight-threatening complications in pathologic myopia, and can present both in an active phase and as a scaring or Fuch's spot.[5] On fundus examination and CFP, active mCNVs may appear as grey lesions, although not always present with associated exudation and haemorrhages frequently observed with macular neovascularisation secondary to age-related macular degeneration. A similar presentation is seen in **Figure 1**. Hence, given the subtle funduscopy appearance, OCT would be a necessary tool for confidently detecting mCNV, which shows a dome-shaped hyperreflectivity above RPE with indistinct margins and loss of external limiting membrane.

OCT angiography can also be beneficial if available, although not necessary. Some studies have shown excellent sensitivity for OCT angiography compared to fluorescein angiography (gold standard).[6] However, OCT angiography can be severely impaired by the frequent fixation instability, the high axial length and the fundus abnormalities, leading to low-quality and incorrectly segmented images.[5] Hence, regardless of OCT angiography results, any suspicion of active mCNV would warrant a prompt referral to an ophthalmologist within one week. →

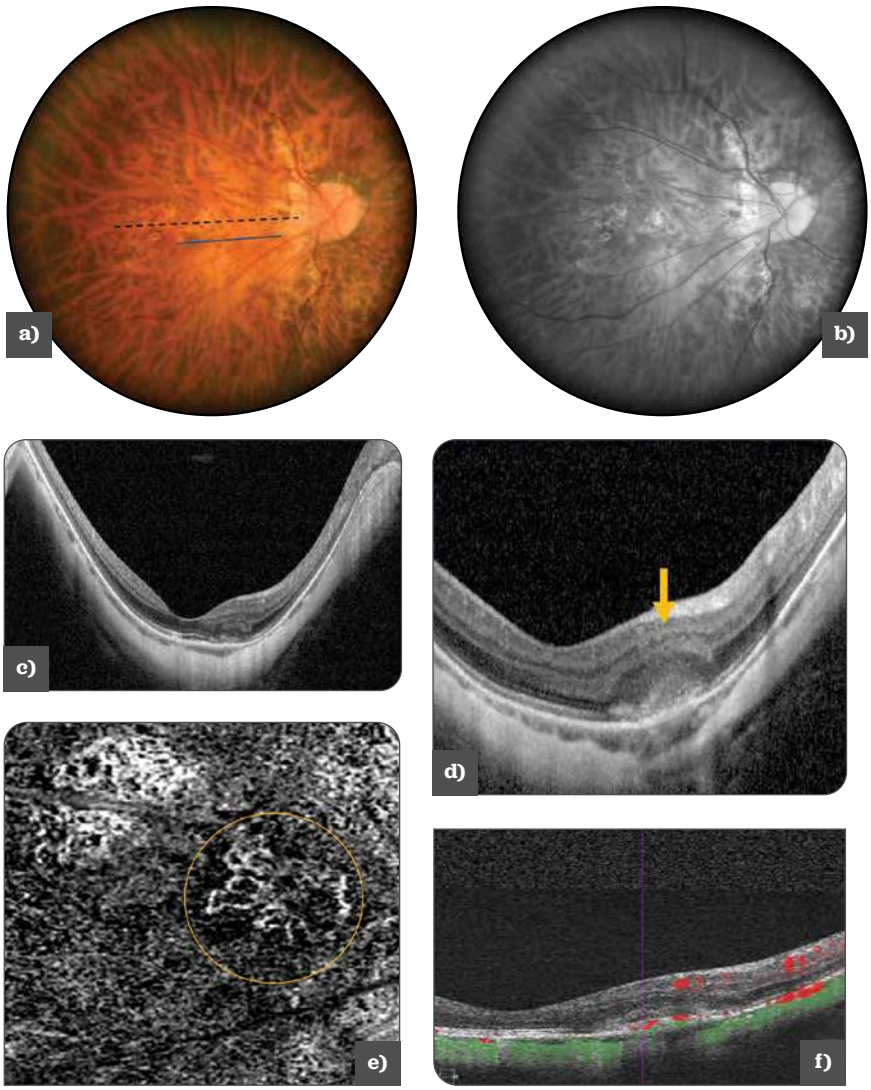

Figure 1. Asymptomatic 54-year-old male with -15D myopia in right eye and best-corrected visual acuity of 6/9.5. **a)** CFP displays diffuse atrophy and prominent lacquer cracks, **b)** with no signs of haemorrhage or exudation observed on red-free imaging. **c)** High-definition raster OCT B-scans show posterior staphyloma, and **d)** a focal area of dome-shaped disorganisation of outer retinal layers with indistinct borders, subretinal hyperreflective material (yellow arrow) and no subretinal fluid. **e)** OCT angiography outer retina- choriocapillaris slab shows an entangled network of hyperreflective vessels suggestive of choroidal neovascularisation (yellow circle), **f)** displaying minimal flow (red signal).

Referral to an ophthalmologist was arranged within a week, with a leakage found on fluorescein angiography and anti-VEGF treatment was initiated.

Which myopic patients are at risk of progression?

While factors like age, axial length, gender and myopia severity are commonly linked to MM progression, a recent study highlights that posterior staphyloma could be the key risk factor in progression, particularly in eyes that involve the macular area.[7] More precisely, the patients with posterior staphyloma have an almost 4 times higher likelihood of developing progression and poorer vision than patients with similar axial length measurements but without any staphyloma.

Additionally, longitudinal studies have shown lacquer cracks and patchy atrophy carry a high risk of progression to mCNV and must be carefully monitored.[7] Patients with mCNV in one eye have a higher risk of developing CNV in the other eye. Studies have shown that 35% of mCNV patients developed mCNV in the fellow eye within an average period of 8 years, requiring ongoing and vigilant monitored.[5]

Does the presence of a macular haemorrhage indicate mCNV?

While macular haemorrhages may be a sign of mCNV, their presence alone is not definitive for mCNV. Another common cause of haemorrhage can be the formation of a new lacquer crack and rupture of choriocapillaris, often referred to as simple haemorrhages or idiopathic macular haemorrhages in the literature.[6] Once confirmed, these often require observation to full absorption without intervention. However, differentiating these in an optometry clinic can often be clinically challenging, particularly without access to OCT angiography.

On OCT, similar to mCNV, these haemorrhages can appear within the subretinal space as a homogenous hyperreflective material, as observed in **Figure 2a**. A recent study suggested an OCT sign, known as myopic 2 binary reflective sign, might have a high specificity and sensitivity to differentiate between the 2, as shown in **Figure 2**.[8]

However, while further research confirms this finding, in the context of poor visual outcomes associated with untreated mCNV, clinicians may consider having a low threshold for referral of any detected retinal haemorrhages. Notably, the gold standard for identifying the cause of a haemorrhage in a myopic eye remains fluorescein angiography.[8]

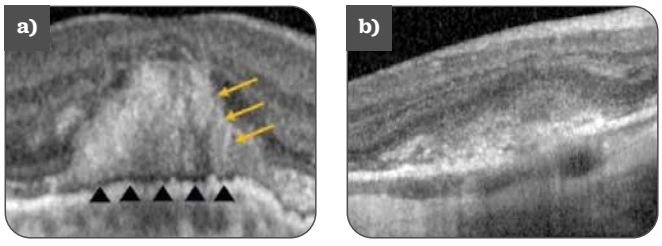

Figure 2. OCT scans **a)** showing through a significant idiopathic macular haemorrhage displaying the myopic 2 binary reflective sign, homogenous hyperreflective lesion in outer retina (yellow arrows) and hyporeflective line (black triangles) that separates the haemorrhage from the RPE.[9] **b)** OCT scans through mCNV showing lack of clear separation from RPE with a hyporeflective line.

Glaucoma vs myopia: a diagnostic balancing act

High myopia causes structural abnormalities in the optic nerve head, which can often be coupled with corresponding visual field defects, mimicking glaucomatous optic neuropathy (GON). The aetiology of these defects can vary, and several theories have been proposed.[9] A mechanical strain on optic nerve head fibres due to axial elongation, staphyloma and deformation of lamina cribrosa, could play a role in visual field defects.[10] However, this could also be influenced by a refractive scotoma due to staphyloma, as seen in tilted disc syndrome.[11]

Hence, in clinical practice, it is challenging to differentiate myopic optic neuropathy from GON. Additionally, it is well established that myopic eyes are at an increased risk of developing glaucoma, with the risk escalating in a dose-dependent manner as the degree of myopia increases.[12] This adds another layer of complexity in clinical decision making, potentially resulting in over or undertreatment.

Case study, clinical considerations and approach

This section, supported by a clinical case, will provide a step-by-step approach for clinical considerations involved in diagnosing and managing myopic patients suspected of having glaucomatous optic neuropathy.

70 year-old-male with -10D myopia in left eye, best-corrected visual acuity of 6/7.5. IOPs of 16 mmHg in each eye with pachymetry value of 568 microns. The patient's glaucoma risk profile was notable for age and myopia (**Figure 3**).

During follow-up, a water drinking test was also performed showing no IOP fluctuations. The patient was diagnosed with myopic optic neuropathy (**Figure 4**).

Step 1: Critically analyse imaging results and obtain longitudinal data

One of the key characteristics of GON is focal neuroretinal rim thinning/notching, most commonly in superotemporal and inferotemporal locations with a corresponding deepening of optic cup and/or retinal nerve fibre layer defects. These can be challenging to identify in myopic eyes due to tilted and obliquely inserted optic nerve head appearance and tessellated fundus.[13,14] Given the progressive nature of GON, clinicians may prioritise the long-term comparative analysis of the disc images to detect any subtle changes in conjunction with OCT imaging when reliable.[13]

While OCT has become an indispensable tool in glaucoma management, its utility in myopic eyes can be limited in some circumstances. There is a lack of robust normative data for these anatomically unique eyes as well as a high level of variability due to imaging artefacts, as observed in **Figure 3**. Clinicians should interpret the results cautiously and look for any segmentation errors in the peripapillary and macular regions, truncation artefacts and errors in mapping optic nerve heads.[14] Progression over time remains the most critical factor in facilitating the detection of early glaucomatous changes. Thus, obtaining baseline images and careful longitudinal analysis of OCT findings, provided the artefacts are minimal, can be crucial in management. Alternatively, practitioners may consider acquiring previous clinical records/imaging if available.

Step 2: Take considerations for perimetry assessment

Myopic optic neuropathy often presents with visual field defects similar to those seen in glaucoma, such as paracentral scotomas, nasal step and arcuate defects.[15,16] These visual field defects must be carefully interpreted with structural findings, including any peripapillary changes, such as atrophy, staphyloma and intrachoroidal cavitations that can cause defects.[17] When possible, monitoring the progression or trend of visual field function can provide valuable insights into the nature of the visual field defect. As known, myopic visual field defects tend to remain relatively stable over time,[8] as demonstrated in the Case study. Additionally, some studies also suggest adding a negative lens and observing visual field defect improvements, in an attempt to neutralise any possible refractive scotoma due to retinal bowing and staphyloma.[11]

Patients with reduced ganglion cell analysis on OCT may also benefit from baseline 10-2 central visual field testing, which has been shown to help with earlier diagnosis of GON and should be cautiously managed.[13] However, these need to be interpreted in conjunction with the macula's structural findings, as myopic macular degeneration may also cause central visual field loss.[9] Another important consideration is the effect of high negative trial lenses while performing visual fields, which may induce minification of the stimulus. Some studies have shown that wearing contact lenses instead of trial lenses can influence the results.[18] →

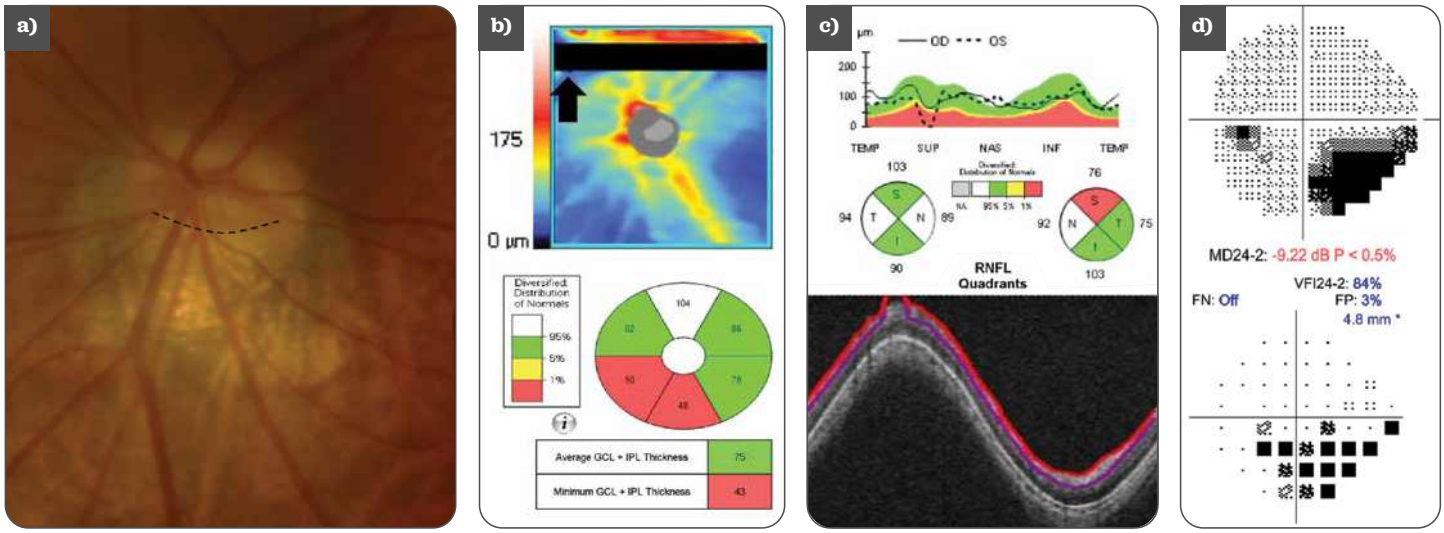

Figure 3. a) Disc photograph shows obliquely inserted, tilted myopic disc with peripapillary atrophy and an apparent thin inferior rim (although difficult to judge due to disc insertion). **b, upper)** RNFL thickness map shows possible superotemporal thin RNFL, although the scan was affected by truncation artefact due to staphyloma (black arrow) and a) incorrectly delineated disc area compared to disc area on photograph (dotted line). **b, lower)** Ganglion cell analysis shows inferonasal reduction, affected by segmentation errors due to staphyloma (not shown). **c, upper)** RNFL thickness analysis shows an apparent reduced superior RNFL for the left eye compared to right; however, upon closer inspection of tomogram, **c, lower)** there is segmentation artefact in the corresponding area. **d)** Visual fields showed inferior arcuate defect.

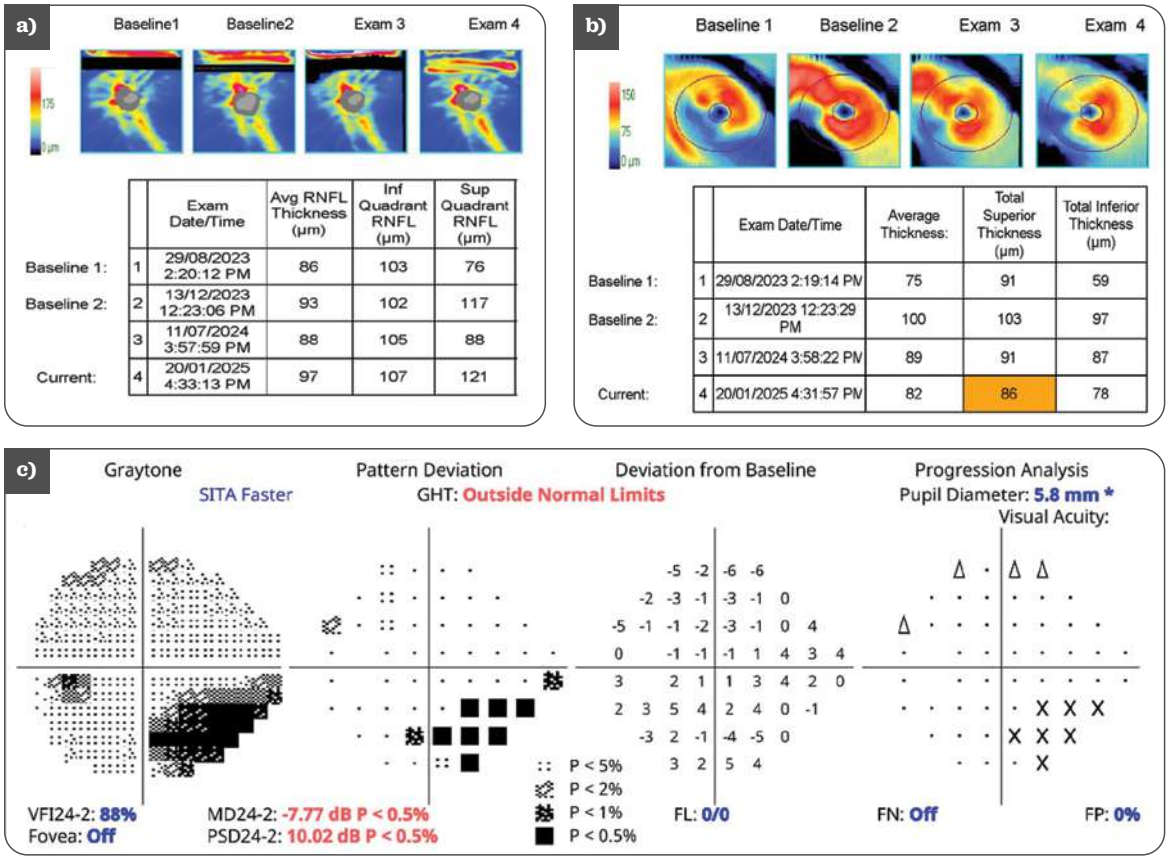

Figure 4.
a) Further follow-up structural scans showed no conclusive evidence of RNFL progression and **b)** variable ganglion cell analysis progression due to segmentation variability. Overall there was no glaucomatous. **c)** Visual field results remained stable as well.

Step 3: Assess patient's risk profile and the need for additional supplementary testing

Assessing a patient's historical risk profile can be valuable in evaluating their risk for glaucoma development. Well-established risk factors, including age, African ethnicity and a positive immediate family history of glaucoma, can be taken into account for overall clinical risk.[19] Additionally, supplementary testing, such as intraocular pressure (IOP) profiling IOP profiling can also help assess the potential risk of glaucoma onset. Studies have shown that eyes with higher IOP peaks or deviations from baseline are at a greater risk for developing glaucoma.[20] One option is to perform a water drinking test used in the Case study, which measures the outflow facility reserve and intraocular pressure peak.

Overall, in many cases, differentiating between myopic optic neuropathy and GON can be challenging. Clinicians often face a decision regarding the risks and benefits of initiating topical treatment, which requires careful evaluation of clinical data on a case-by-case basis.

A more conservative approach may be appropriate for patients with a high-risk profile, ambiguous optic nerve head or imaging findings, and central visual field defects. In contrast, patients with a lower risk profile, no definitive signs of glaucomatous optic nerve head changes and no central visual field defects can often be closely and vigilantly monitored, with longitudinal data collected to inform future management decisions. ●

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1. Ruiz-Medrano J, Montero JA, Flores-Moreno I, Arias L, García-Layana A, Ruiz-Moreno JM. Myopic maculopathy: Current status and proposal for a new classification and grading system (ATN). Prog Retin Eye Res. 2019;69:80-115. doi: 10.1016/j.preteyeres.2018.10.005
2. Li Y, Foo LL, Wong CW, Li J, Hoang QV, Schmetterer L, et al. Pathologic myopia: advances in imaging and the potential role of artificial intelligence. Br J Ophthalmol. 2023;107(5):600-6. doi: 10.1136/bjophthalmol-2021-320926
3. Ohno-Matsui K, Kawasaki R, Jonas JB, Cheung CM, Saw SM, Verhoeven VJ, et al. International photographic classification and grading system for myopic maculopathy. Am J Ophthalmol. 2015;159(5):877-83.e7. doi: 10.1016/j.ajo.2015.01.022
4. Yokoi T, Ohno-Matsui K. Diagnosis and treatment of myopic maculopathy. Asia Pac J Ophthalmol. 2018;7(6):415-21. doi: 10.22608/APO.2018290
5. Ohno-Matsui K, Ikuno Y, Lai TYY, Gemmy Cheung CM. Diagnosis and treatment guideline for myopic choroidal neovascularization due to pathologic myopia. Prog Retin Eye Res. 2018;63:92-106. doi: 10.1016/j.preteyeres.2017.10.005
6. Feo A, De Simone L, Cimino L, Angi M, Romano MR. Differential diagnosis of myopic choroidal neovascularization (mCNV): insights from multimodal imaging and treatment implications. Graefes Arch Clin Exp Ophthalmol. 2024;262(7):2005-26. doi: 10.1007/s00417-023-06320-w
7. Flores-Moreno I, Puertas M, Fernández-Jiménez M, Franco LC, Terrón-Vilalta M, Eslava B, et al. Myopic Maculopathy Progression: Insights Into Posterior Staphyloma and Macular Involvement. Am J Ophthalmol. 2025;270:164-71. doi: 10.1016/j.ajo.2024.09.035
8. Mularoni C, Servillo A, Sacconi R, Battista M, Crincoli E, Crepaldi A, et al. 'Structural OCT changes distinguishing between myopic macular haemorrhages due to choroidal neovascularization and spontaneous Bruch's membrane rupture: the "myopic 2 binary reflective sign". Eye. 2024;38(4):792-7. doi: 10.1038/s41433-023-02780
9. Ohno-Matsui K, Shimada N, Yasuzumi K, Hayashi K, Yoshida T, Kojima A, et al. Long-term development of significant visual field defects in highly myopic eyes. Am J Ophthalmol. 2011;152(2):256-65.e1. doi: 10.1016/j.ajo.2011.01.052
10. Hayashi K, Ohno-Matsui K, Shimada N, Moriyama M, Kojima A, Hayashi W, et al. Long-term pattern of progression of myopic maculopathy: a natural history study. Ophthalmology. 2010;117(8):1595-611, 611.e1-4. doi: 10.1016/j.ophtha.2009.11.003
11. Phu J, Wang H, Miao S, Zhou L, Khuu SK, Kalloniatis M. Neutralizing Peripheral Refraction Eliminates Refractive Scotomata in Tilted Disc Syndrome. Optom Vis Sci. 2018;95(10):959-70. doi: 10.1097/OPX.0000000000001286
12. Ha A, Kim CY, Shim SR, Chang IB, Kim YK. Degree of Myopia and Glaucoma Risk: A Dose-Response Meta-analysis. Am J Ophthalmol. 2022;236:107-19. doi: 10.1016/j.ajo.2021.10.007
13. Zhang X, Jiang J, Kong K, Li F, Chen S, Wang P, et al. Optic neuropathy in high myopia: Glaucoma or high myopia or both? Prog Retin Eye Res. 2024;99:101246. doi: 10.1016/j.preteyeres.2024.101246
14. Jiravarnsirikul A, Belghith A, Rezapour J, Bowd C, Moghimi S, Jonas JB, et al. Evaluating glaucoma in myopic eyes: Challenges and opportunities. Surv Ophthalmol. 2024;17:S0039-6257. doi: 10.1016/j.survophthal.2024.12.003
15. Ding X, Chang RT, Guo X, Liu X, Johnson CA, Holden BA, et al. Visual field defect classification in the Zhongshan Ophthalmic Center-Brien Holden Vision Institute High Myopia Registry Study. Br J Ophthalmol. 2016;100(12):1697-702. doi: 10.1136/bjophthalmol-2015-307942
16. Lin F, Chen S, Song Y, Li F, Wang W, Zhao Z, et al. Classification of Visual Field Abnormalities in Highly Myopic Eyes without Pathologic Change. Ophthalmology. 2022;129(7):803-12. doi: 10.1016/j.ophtha.2022.03.001
17. Ehongo A, Dugauquier A, Kisma N, De Maertelaer V, Nana Wandji B, Tchatchou Tomy W, et al. Myopic (peri)papillary changes and visual field defects. Clin Ophthalmol (Auckland, NZ). 2023;17:3295-306. doi: 10.2147/OPTH.S404167
18. Tan NYQ, Sng CCA, Jonas JB, Wong TY, Jansonius NM, Ang M. Glaucoma in myopia: diagnostic dilemmas. The British journal of ophthalmology. 2019;103(10):1347-55. doi: 10.1136/bjophthalmol-2018-313530
19. Jonas JB, Aung T, Bourne RR, Bron AM, Ritch R, Panda-Jonas S. Glaucoma. Lancet. 2017;390(10108):2183-93. doi: 10.1016/S0140-6736(17)31469-1
20. Susanna Jr R, Clement C, Goldberg I, Hatanaka M. Applications of the water drinking test in glaucoma management. Clin Exp Ophthalmol. 2017;45(6):625-31. doi: 10.1111/ceo.12925

Centre for Eye Health

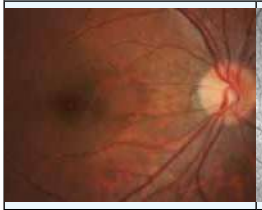
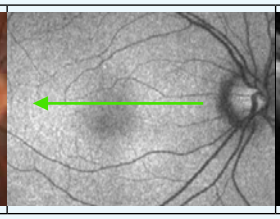
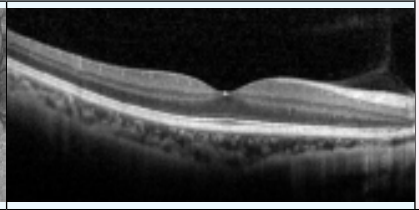
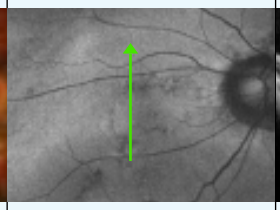
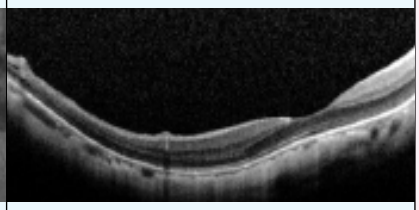
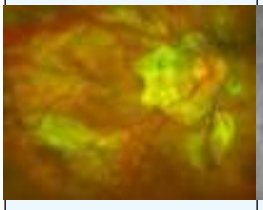
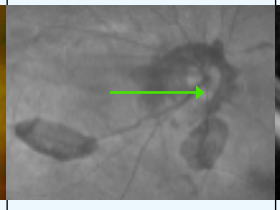
Chairside reference

Myopic maculopathy

From Centre For Eye Health

Myopic maculopathy refers to structural changes at the macula induced by high myopia (refractive error >-6.00DS), in which an excessive axial length (>26 mm) and/or posterior staphyloma is the main common factor in conjunction with other factors. While several classification systems have been proposed, Ruiz-Medrano et al.[1] have suggested categorising the spectrum of myopic maculopathy into **atrophic**, **tractional** and **neovascular** components.

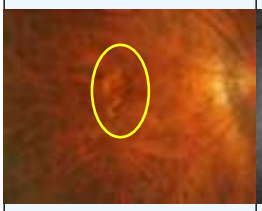
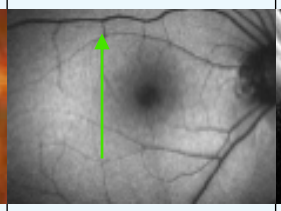
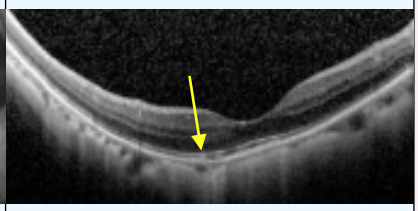
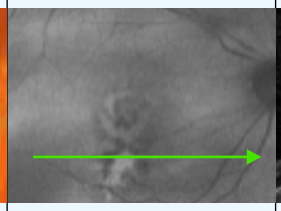
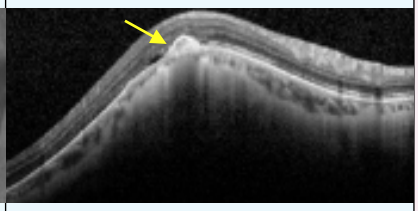
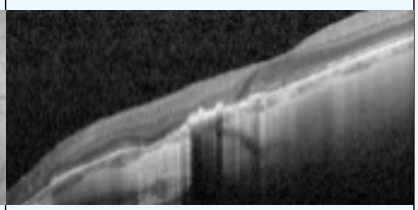
This chairside reference depicts the various manifestations of myopic maculopathy using multimodal imaging techniques. For peripheral myopic changes, please refer to the Centre's chair-side reference on peripheral retinal lesions. All management recommendations below are based on the assumption that other coexisting pathologies requiring more urgent follow-up are absent.

Atrophic alterations in myopic maculopathy			
Optomap/ photograph	**Fundus autofluorescence**	**OCT**	**Description**
Tessellated fundus			• **Fundus appearance:** increased visibility of choroidal vasculature secondary to attenuation of RPE. • **OCT:** an intact retinal profile with no associated retinal atrophy. *Routine review required.*
			
Diffuse chorioretinal atrophy			• **Fundus appearance:** yellowish-white appearance to the posterior pole, starting at the optic disc and macula and spreading to involve the entire staphyloma. • **OCT:** an intact retinal profile with no associated retinal atrophy, thin choroid. • Associated with development of patchy atrophy, lacquer cracks or choroidal neovascularisation. *Annual review required.*
			
Patchy (multifocal) chorioretinal atrophy			• **Fundus appearance:** well-defined greyish-white areas of atrophy in the macular area and around the disc, and choroidal vessels are visible within these areas. In advanced cases, the sclera is visible within areas of atrophy. • **OCT:** complete loss of the choriocapillaris and over time can develop to loss of the outer retina and RPE. • Associated with an increased risk of developing myopic neovascularisation. • Round, atrophic areas at the central fovea are classified as macular atrophy. *6-12 monthly review required.* *Advise patient to perform Amsler grid self-monitoring.* *Consider referral to ophthalmology to rule out CNV.*
			

This chairside reference provides general information only and may not be applicable to atypical cases.

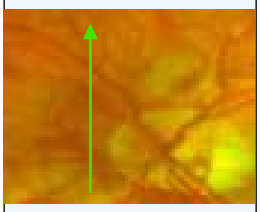
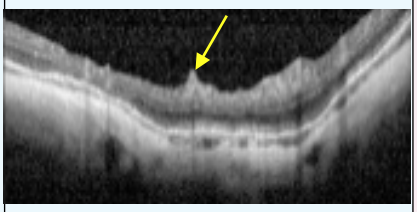
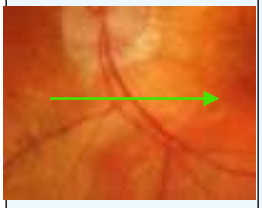
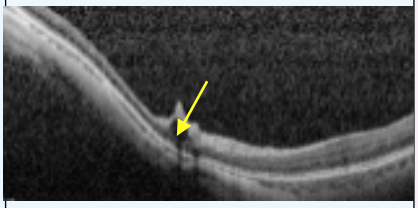
Ref: Ruiz-Medrano J, Montero JA, Flores-Moreno I et al. Myopic maculopathy: Current status and proposal for a new classification and grading system (ATN). Prog Ret Eye Res. 2019;69:80-115. doi: 10.1016/j.preteyeres.2018.10.005

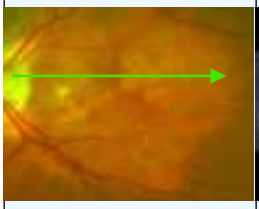
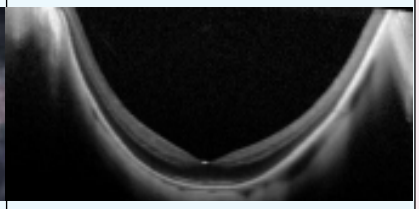
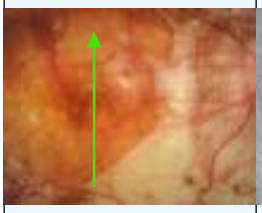
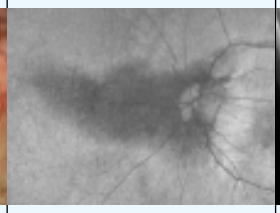
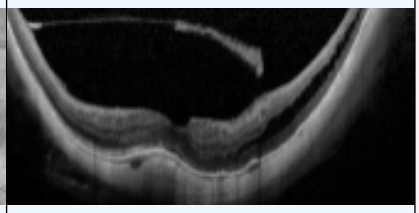
Tractional alterations in myopic maculopathy			
Optomap/ photograph	**Fundus autofluorescence**	**OCT**	**Description**
Tractional myopic maculopathy with outer foveoschisis			• **OCT:** separation of intraretinal layers affecting the outer retinal layers. The separation may involve the fovea or non-foveal area. • Associated with axial length >31 mm and chorioretinal atrophy and vitreoretinal interface disorders. • Slowly progressive and may lead to foveal detachment or full thickness macular hole (FTMH). *Annual review required.* *Advise patient to perform Amsler grid self-monitoring.* *Reduced VA and/or structural progression: referral is indicated.*
Tractional myopic maculopathy with inner and outer foveoschisis			• **OCT:** separation of intraretinal layers, affecting both the inner retinal layer (red arrow) and outer retinal layer (blue arrows). • Slowly progressive and may lead to foveal detachment or FTMH. *Annual review required.* *Reduced VA and/or structural progression: referral is indicated.*
Tractional myopic maculopathy with foveal detachment			• **OCT:** separation of the neurosensory retina from the RPE, which is typically shallow. • Associations with axial length >31 mm, chorioretinal atrophy and vitreoretinal interface disorders. *Referral is indicated.*
Tractional myopic maculopathy with full-thickness macular hole			• **OCT:** a defect involving all layers of the retina up to the retinal pigment epithelium. • Risk factors for long-term progression of myopic macular holes include the absence of dome-shaped macula and more severe posterior staphyloma. *Referral is indicated.*

Neovascular alterations in myopic maculopathy			
Optomap/ photograph	**Fundus autofluorescence**	**OCT**	**Description**
Lacquer cracks			• Ruptures in RPE-Bruch's membrane-choriocapillaris complex caused by stretching of ocular tissue with axial elongation. • **Fundus appearance:** multiple yellow-white lines within the macula. These are usually horizontal and can be linear, stellate, branching or crisscrossing. • **FAF:** hypo-FAF • **OCT:** discontinuities of the RPE layers with increased hyper transmission into deeper tissues. • Strong association with patchy chorioretinal atrophy and myopic choroidal neovascularisation which forms along the cracks. *Annual review required.* *Advise patient to perform Amsler grid self-monitoring.* *Reduced VA or neovascularisation: referral is indicated.*
			
Myopic choroidal neovascularisation (CNV)			• **Symptoms:** decreased vision, metamorphopsia and central scotoma if located close to the fovea. • **Fundus appearance:** an area of grey discolouration, sometimes with a pigmented border if chronic or recurrent. Retinal haemorrhage and exudates are often minimal. • **FAF:** FAF patterns vary and change over time. • **OCT:** a hyper-reflective lesion above the level of the RPE with intra-retinal or sub-retinal fluid (hypo-reflective spaces within or beneath the retinal layers). *May require fluorescein angiography to aid diagnosis. Referral is indicated.*
			
Foster-Fuch's spot			• Pigmented scar formation following regression of CNV. • **Fundus appearance:** a raised round or oval-shaped pigmented lesion, often found adjacent to a focal region of chorioretinal atrophy • **FAF:** hypo-FAF • **OCT:** flattened, well-defined hyper-reflective lesion above the RPE. *Annual review required.* *Advise patient to perform Amsler grid self-monitoring.* *Consider referral to ophthalmology to rule out CNV.*
			

Chairside reference

Structural changes in myopia

<table>
<tr><th colspan="4">Myopic vascular alterations</th></tr>
<tr><th>Optomap/ photograph</th><th>Fundus autofluorescence</th><th>OCT</th><th>Description</th></tr>
<tr><td colspan="3">Vascular microfolds</td><td rowspan="2">• OCT: peaks of increased retinal thickness corresponding to retinal vasculature.
• Seen in up to 44% of those with pathological myopia using OCT imaging.
• In eye with paravascular cysts, the incidence of retinoschisis at the vessels is much higher than if cysts alone are present.
Routine review required.</td></tr>
<tr><td>  </td><td>FAF unavailable</td><td>  </td></tr>
<tr><td colspan="3">Paravascular cysts</td><td rowspan="2">• OCT: small hollow spaces adjacent to large retinal vessels.
• Detected in 50% of high myopes when examined with OCT imaging.
• Increased occurrence with age, axial length, degree of myopia and presence of posterior staphyloma.
• Associated with paravascular lamellar holes (if cysts rupture) and retinoschisis, particularly when seen with vascular microfolds.
Routine review required.</td></tr>
<tr><td>  </td><td>FAF unavailable</td><td>  </td></tr>
</table>

Alterations to globe morphology (scleral changes)			
Optomap/ photograph	**Fundus autofluorescence**	**OCT**	**Description**
Staphyloma			• Posterior protrusion of the globe that is accompanied by a stretching of the posterior fundus. • Present in up to 90% of high myopes. Prevalence increases with age. • **Fundus appearance:** tessellated fundus and/ or horizontal ellipse-shaped fundus pallor, typically extending from the nasal side of the disc towards the macula. • **B-scan:** useful to visualise the posterior extent of the staphyloma. • **OCT:** posterior bowing of the sclera, choroid and retinal layers. *Annual review required.*
			
Dome-Shaped Macula (DSM)			• **Fundus appearance:** no specific abnormality associated with DSM. • **OCT:** convex elevation of the macula within an area of posterior staphyloma in different orientations. Often require both vertical and horizontal scans or radial scanning. • May present with reduced vision and metamorphopsia. • Associated with development of SRF, myopic CNV, full-thickness macular hole formation and extrafoveal retinoschisis. *Annual review required.* *Advise patient to perform Amsler grid self-monitoring.* *Reduced VA, subretinal fluid or neovascularisation: referral is indicated.*
			

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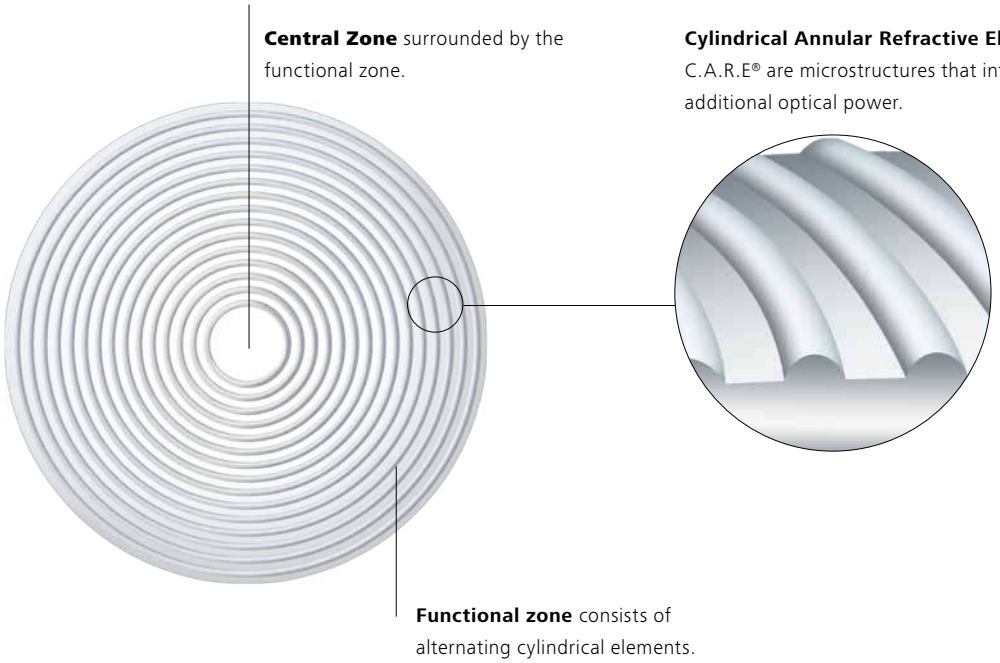

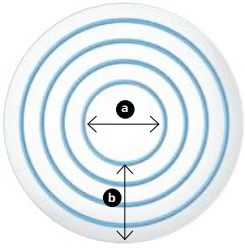

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Quality use of medicines for optometrists: a case study approach

The Quality Use of Medicines (QUM) principles are essential in optometry to ensure patients receive the safest and most effective care.[1,2] These principles involve careful prescribing, patient education and interprofessional collaboration. This article will use a real-world case study involving a young patient, Luna, to illustrate QUM principles in myopia management.

Key principles of QUM

This case example demonstrates the application of the Prescribing Competencies Framework[3] and the following key principles of QUM:

- **Ensuring safe and effective prescribing**, including consideration of brand and generic medications to minimise the risk of selection errors.
- **Ensuring clear communication** with patients, caregivers and other healthcare providers to optimise patient outcomes.
- **Supporting adherence** to treatment through patient education and follow-up.

Case study: Luna and the Prescribing Competencies Framework

Step 1: Information gathering

Luna, a 7-year-old girl in grade one at primary school, lives with her parents who have myopia, and a younger brother. She has no significant medical history, and her development has been normal.

Luna attends for an eye examination with her father and younger brother. She was last seen 13 months ago when she had a mild hyperopic prescription (+0.25DS in both eyes). However, she is now experiencing difficulty seeing the whiteboard at school. Cycloplegic refraction reveals a shift to -0.75DS in both eyes.

QUM Principle: Identifying risk factors and considering early intervention

Early myopia onset is associated with a higher risk of progression.[4] Given Luna's young age and the presence of 2 parents with myopia, she is at an increased risk of progressive myopia.[5,6] Early intervention is key to managing her myopia effectively.[7]

Step 2: Decision making

Luna's myopia progression risk factors are discussed with her and her father, and various myopia management options are presented, including optical and pharmaceutical interventions. After an informed discussion, Luna and her father decide on a combined treatment approach with orthokeratology (OK) and low-dose atropine.[8] Low-dose atropine is defined as a concentration below 1%.[9]

QUM Principle: Safe prescribing practices and patient education

Prescribing atropine for myopia management requires ensuring appropriate use, storage and understanding of potential side effects. It is confirmed that Luna has no contraindications for atropine, and she and her father are educated on proper drop instillation, possible side effects and storage requirements.

Step 3: Prescribing and communication

To ensure safe prescribing:

- Atropine is commercially available in 2 different strengths. Atropine 1% is brand name Atropt or Minims Atropine. Atropine 0.01% is brand name Eikance. Clearly specify the medication on the prescription, including the brand name and concentration (Eikance – Atropine 0.01%), underline the brand name and concentration to minimise selection errors.
- Explain the medication details to Luna and her father, ensuring they understand the brand and generic names, and the importance of consistency in medication use.
- With consent, write a report to Luna's GP outlining her treatment plan to facilitate coordinated care.
- Schedule a one-week follow-up appointment to assess medication tolerance and fit Luna's OK lenses.

QUM Principle: Reducing medication errors through clear prescribing and interprofessional communication

Using the brand name and underlining the concentration helps avoid prescribing errors, particularly when multiple strengths of atropine are available.[10,11] Informing other healthcare providers ensures a collaborative approach to patient care.

→

Step 4: Monitoring and review

One week later, Luna returns for review. She and her father report that she has had no issues with atropine use, and she is tolerating the medication well. The OK lenses are successfully fitted, and she is instructed on their care and handling. Luna is advised to continue the use of the Eikance and reminded of potential side effects.

QUM Principle: Ongoing monitoring to ensure adherence and efficacy

Regular follow-up ensures that Luna is using the medication correctly and that there are no adverse effects. Monitoring allows timely adjustments to treatment if necessary.

Key takeaways for practice

This case study illustrates the application of several QUM key principles in optometry:

- **Precise prescribing:** Ensuring correct medication selection by specifying brand and concentration when a medication has the same active ingredient as another medication, minimising the risk of errors.
- **Patient and caregiver communication:** Clear education on medication use, storage and side effects supports adherence and safety, especially when prescribing a medicine where there is a high risk of selection error.
- I**nterprofessional collaboration:** Informing the patient's GP about their treatment plan fosters coordinated care and reduces medication risks.

Conclusion

Applying QUM principles in optometry supports safe, effective and patient-centred care. Luna's case highlights the importance of precise prescribing, patient education and interprofessional communication in managing myopia progression.

Resources for further learning:

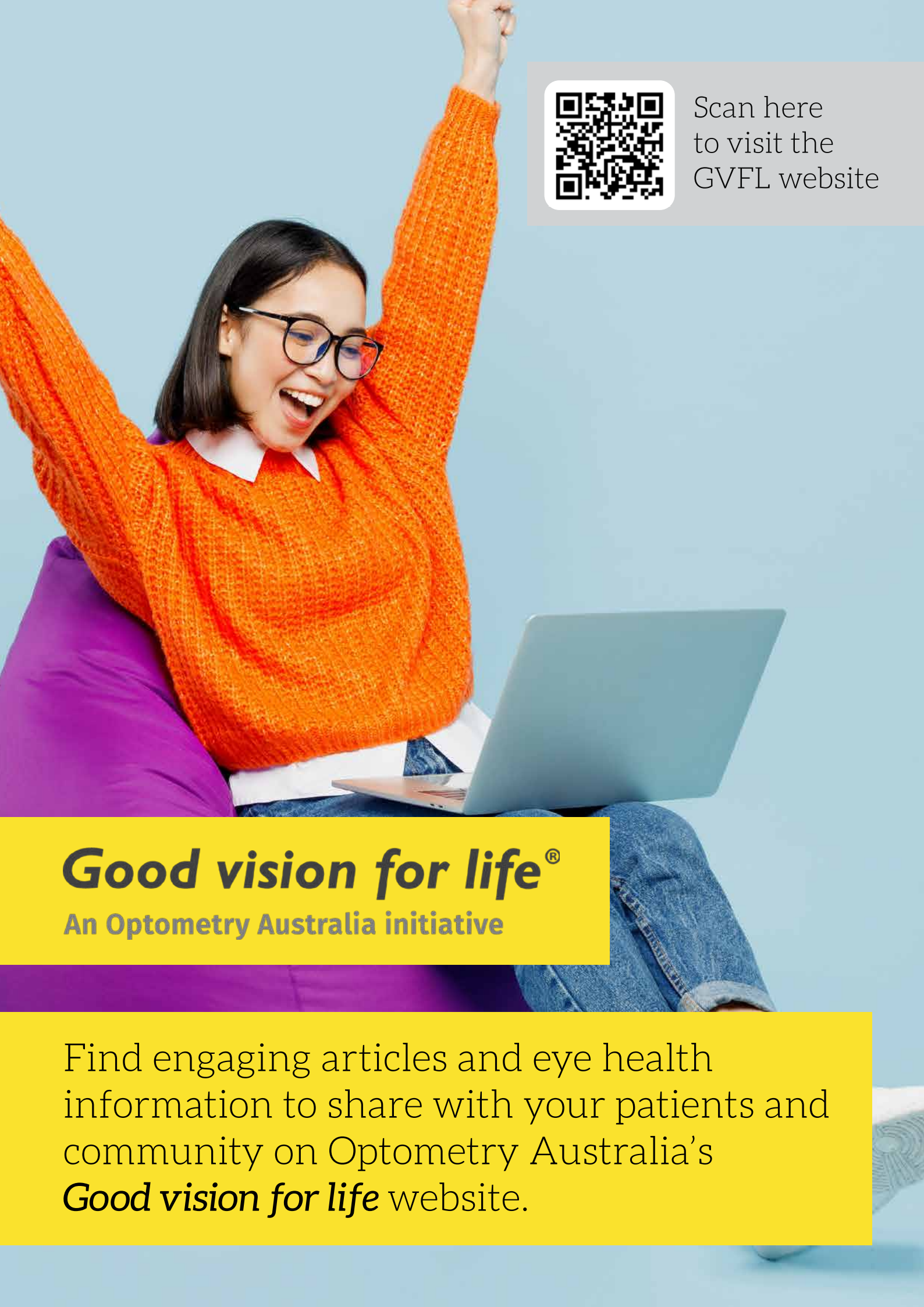
- Prescribing Competencies Framework: www.nps.org.au/assets/NPS/pdf/NPS-MedicineWise_Prescribing_Competencies_Framework.pdf
- Australian Commission on Safety and Quality in Health Care: www.safetyandquality.gov.au
- National Prescribing Service (NPS) MedicineWise: www.nps.org.au
- Active Ingredient Prescribing – User Guide for Australian Health Practitioners: www.health.gov.au/sites/default/files/2024-05/user-guide-active-ingredient-prescribing.pdf

Optometrists are encouraged to reflect on their practices, identifying areas of strength and opportunities for improvement. By applying these principles, we can continue to enhance the quality of care for our patients and ensure better health outcomes.

Optometry Australia (OA) has published a *Quality use of medicines for optometrists* Clinical Practice Guide. This Guide is one of many documents provided for our OA members and is located on the Optometry Australia website, Clinical Practice Guide page: www.optometry.org.au/practice-professional-support/patient-practice-management/clinical-practice-guides

Comments or questions about the new Clinical Practice Guide can be directed to Kerryn Hart, OA National Clinical Policy Manager (k.hart@optometry.org.au).

1. Department of Health and Aged Care. The National Strategy for Quality Use of Medicines. Commonwealth of Australia 2022.
2. NPS MedicineWise. Quality Use of Medicines (QUM) Framework: Working with primary health networks. In: Healthcare ACoSaQi. NPS MedicineWise; 2022.
3. NPS MedicineWise. Prescribing Competencies Framework. 2021.
4. Hu Y, Ding X, Guo X, Chen Y, Zhang J, He M. Association of Age at Myopia Onset With Risk of High Myopia in Adulthood in a 12-year follow-up of a Chinese cohort. JAMA Ophthalmol. 2020;138(11):1129-34. doi: 10.1001/jamaophthalmol.2020.3451
5. Kurtz D, Hyman L, Gwiazda JE, et al. Role of parental myopia in the progression of myopia and its interaction with treatment in COMET children. Invest Ophthalmol Vis Sci. 2007;48(2):562-70. doi: 10.1167/iovs.06-0408
6. Loh K-L, Lu Q, Tan D, Chia A. Risk factors for progressive myopia in the atropine therapy for myopia study. American Journal of Ophthalmology. 2015;159(5):945-9. doi: 10.1016/j.ajo.2015.01.029
7. Bullimore MA, Brennan NA. Myopia Control: Why Each Diopter Matters. Optometry and Vision Science. 2019;96(6):463-465. doi: 10.1097/OPX.0000000000001367
8. Sánchez-González JM, De-Hita-Cantalejo C, Baustita-Llamas MJ, Sánchez-González MC, Capote-Puente R. The Combined Effect of Low-dose Atropine with Orthokeratology in Pediatric Myopia Control: Review of the Current Treatment Status for Myopia. J Clin Med. 2020;9(8):2371. doi: 10.3390/jcm9082371
9. Khanal S, Phillips JR. Which low-dose atropine for myopia control? Clin Exp Optom. 2020;103(2):230-2. doi: 10.1111/cxo.12967
10. Australian Commission on Safety and Quality in Health Care. Active Ingredient Prescribing. Australian Commission on Safety and Quality in Health Care; 2022.
11. Australian Commission on Safety and Quality in Health Care. Active Ingredient Prescribing. List of Medicines for Brand Consideration. Australian Commission on Safety and Quality in Health Care; 2022.



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Alex Rigby
BSc(Hons) MCOptom FBDO
Professional Services Manager, Rodenstock

Individualisation of myopia control

Myopia is here to stay. Several studies have documented the increasing prevalence of myopia[1] and the potential trajectory over the next 25 years.[2] The World Health Organisation now classifies myopia as a serious public health issue, considering it a global pandemic of the 21st century.

The need for early detection and intervention

The consequences of myopia are well documented, with the level of refractive error correlating to the risk of various eye diseases. A myopic error of -6.00D can increase the risk of glaucoma by up to 3.3 times, a myopic error of -4.00 can lead to an increased risk of retinal detachment by up to 9 times, while a -7.00D refractive error raises the risk of myopic maculopathy by as much as 126.8 times.[3]

This significant rise in myopia and its devastating consequences highlights the urgent need for early detection and intervention. Slowing myopia progression by just one dioptre during childhood can reduce the risk of maculopathy by 40%.[4] As a result, various treatment options have been explored, with innovations continually emerging. Spectacle lenses remain one of the least invasive and easiest-to-adopt options. In particular, single-vision lenses have shown advantages over traditional progressive addition lenses, as supported by previous studies.[5]

Optimising usability in myopia control lenses

Although no conclusive study compares the direct efficacy of various designs, this question could become a central discussion point among optometrists. The widespread nature of axial elongation raises the question: are lens design and patient compliance evolving in a way that focuses on usability and individualisation?

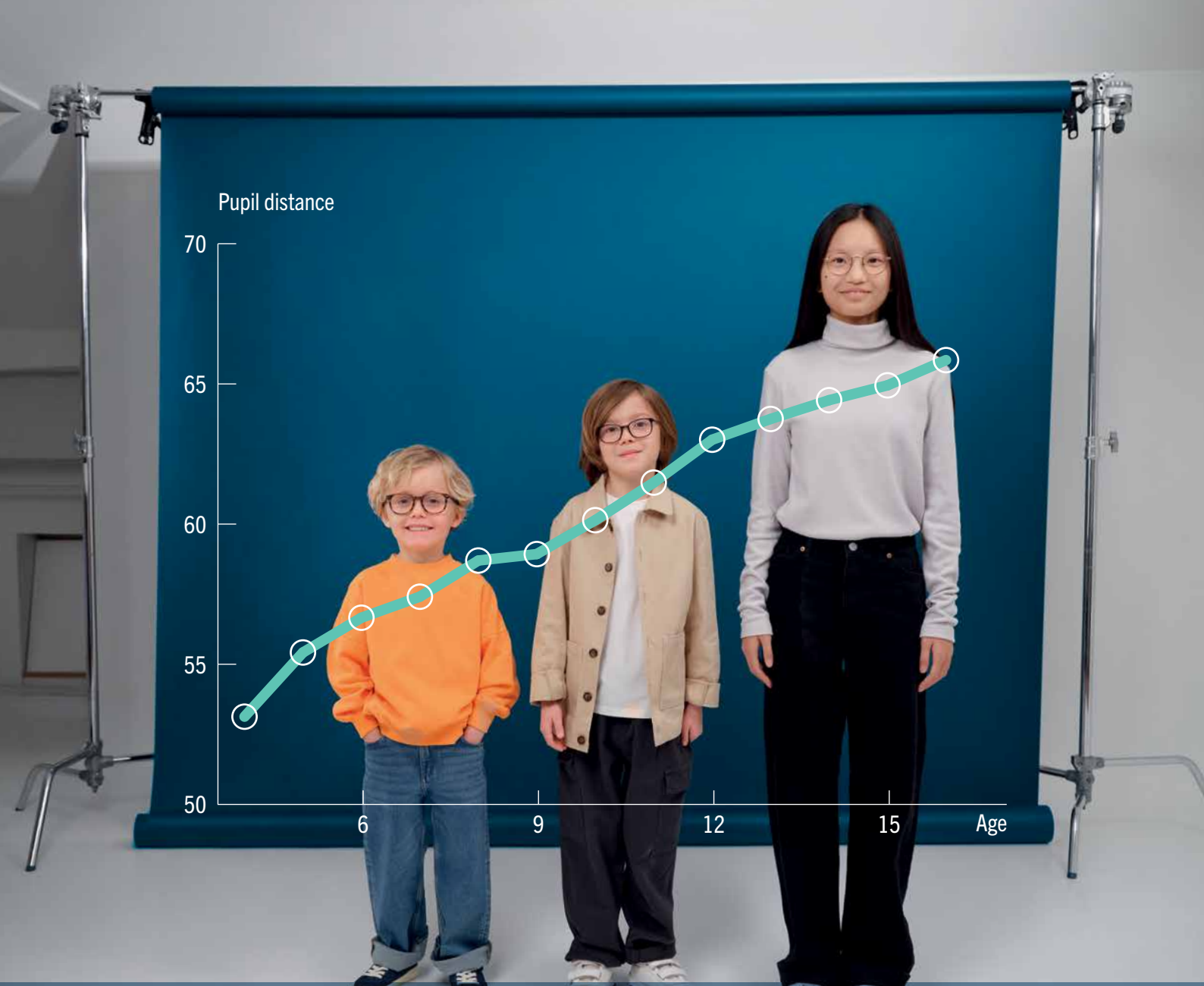
Several factors in lens design could play a role in optimising the usability of myopia control lenses.

- **Focal treatment areas.** Focal treatment areas are specific positions of blur locations within the lens. The aetiology and growth mechanisms have been extensively researched, particularly nasal-temporal asymmetry and neurofunctional dominance.[6,7] This has led to the development of lenses with focal treatment areas within the lens, such as Perifocal-M designs. It is also important to consider the impacts of the treatment zones and their relevance to overall outcomes.
- **A clear corridor area.** When we talk about usability, we are inevitably addressing patient compliance. For example, when comparing DIMS (Defocus Incorporated Multiple Segments) and Perifocal-M approaches, could leaving a more accessible corridor in the lens improve adaptation to off-axis discomfort?
- **Peripheral defocus.** These are areas blurred in the periphery of the lens for myopic control. Regarding the position and extent of peripheral defocus, research has shown that lenses based on the Perifocal-M design make peripheral refraction more myopic and reduce hyperopic defocus in myopic eyes. This mechanism helps to reduce myopia progression by altering the peripheral refraction. As expected, the myopic defocus is most pronounced in the nasal retina, induced by the temporal side of the lens.[8,9]

As we look to the future of myopia control, could other factors for optimising the usable, clear portions of the lens be addressed? If factors like corneal vertex distance, frame wrap and pantoscopic tilt are considered and the lens is optimised accordingly, this level of individualisation could potentially improve visual clarity in the non-treatment areas. This allows for better control of effective power variations, minimises unwanted induced astigmatism and reduces prismatic effects caused by variances in position of wear.

Although this would not directly affect the myopia control aspect, this approach is common for many other lens types, so why not consider it for myopia control lenses? ●

1. Sankaridurg P, Holden B, Smith E, et al. IMI Impact of myopia. Invest Ophthalmol Vis Sci. 2021;62(4):M1-M19. doi: 10.1167/iovs.62.4.M1.
2. Holden BA, Fricke TR, Wilson DA, et al. Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050. Ophthalmology. 2016;123(5):1036-42. doi: 10.1016/j.ophtha.2016.01.006.
3. Flitcroft DI. The complex interactions of retinal, optical and environmental factors in myopia aetiology. Prog Retin Eye Res. 2012;31(6):622-60. doi: 10.1016/j.preteyeres.2012.06.004.
4. Bullimore MA, Brennan NA. Myopia control: why each diopter matters. Optom Vis Sci. 2019;96(6):463-5. doi:10.1097/OPX.0000000000001367.
5. Gwiazda J, Hyman L, Hussein M, et al. A randomized clinical trial of progressive addition lenses versus single vision lenses on the progression of myopia in children. Invest Ophthalmol Vis Sci. 2003;44(4):1492-500. doi: 10.1167/iovs.02-0816.
6. Curcio CA, Sloan KR, Kalina RE, Hendrickson AE. Human photoreceptor topography. J Comp Neurol. 1990;292(4):497-523. doi: 10.1002/cne.902920402.
7. Curcio CA, Allen KA. Topography of ganglion cells in human retina. J Comp Neurol. 1990;300(1):5-25. doi: 10.1002/cne.903000103.
8. Faria-Ribeiro M, Queirós A, Lopes-Ferreira D, Jorge J, González-Méijome JM. Peripheral refraction and retinal contour in stable and progressive myopia. Optom Vis Sci. 2013;90(1):9-15. doi: 10.1097/OPX.0b013e318278153c.
9. Silva-Leite S, Amorim-de-Sousa A, Queirós A, González-Méijome JM, Fernandes P. Peripheral refraction and visual function of novel perifocal ophthalmic lens for the control of myopia progression. J Clin Med. 2023;12(4):1435. doi: 10.3390/jcm12041435.



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Lenses customised to each child's individual position of wear parameters to improve visual performance and help control myopia.

Source: Wei, N., Qian, X., Bi, H. et al. Pseudoesotropia in Chinese Children: A Triphasic Development of the Interepicanthal Folds Distance-to-Interpupillary Distance Ratio and Its Changing Perception. Aesth Plast Surg 43, 420–427 (2019).

RODENSTOCK

Philip Cheng
BOptom GCOT IACMM FIAOMC

Putting the magic of OrthoK into your practice: a practical guide to implementing orthokeratology for myopia management

'This is amazing! I woke up and could see clearly again without my glasses', says a young patient who just started her orthokeratology (OK) treatment.

These 'wow' moments are a rewarding part of myopia management with OK. By simply wearing a lens in their eye during sleep, clear daytime vision can be temporarily restored. For many children and their parents, this sounds like magic. OK is a fantastic vision correction option for patients seeking the freedom not needing to wear glasses, motivated by cosmetic reasons and sporting activities, especially for patients who enjoy water sports and swimming. For children with myopia, OK has the additional benefit of being an effective, evidence-based method of slowing myopia progression,[1] reducing the lifetime risks of myopia-related ocular complications later in life.

An OK lens is a reverse geometry rigid contact lens with a series of special curves to flatten the central cornea: a central base curve flatter than the corneal curvature to induce the desired myopia correction, connected by a steeper reverse curve to the alignment curve controlling lens centration and movement, and a peripheral curve providing edge lift and tear exchange. The sagittal height of the lens precisely controls the amount of central clearance over the corneal apex, keeping a thin tear film between the lens and the cornea. This unique lens geometry creates a pressure gradient using the hydraulic forces of the tear layer to redirect fluid within the corneal epithelial cells away from the centre of the cornea towards the mid-periphery.

The science behind OK was first discovered in the 1960s. However, technical innovations in the past 15–20 years in corneal topography, software-assisted lens design, and advances in lens materials and manufacturing techniques have greatly improved the precision of OK fitting, correcting a wider range of refractive errors and corneal shapes.

The mechanism of how OK slows the progression of myopia involves a complex cascade pathway. Current theories suggest that eye growth is modulated by retinal image quality, driven by local optical signals the eye receives.[2] By altering the corneal shape, OK creates a central area of clear vision surrounded by a zone of myopic defocus signals around the macula. It also generates positive spherical aberrations that reduce contrast.[3] These visual signals trigger a biochemical event that increases choroidal blood flow, thickens the choroid and stiffens the collagen structure of the sclera,[4] thus resisting axial elongation.

OK treatment is considered a safe vision correction modality. A 2021 study found an estimated annual incidence of microbial keratitis (MK) in children wearing OK of just 4.9 per 10,000 patient-years, comparable to rates associated with daily wear soft contact lenses.[5] Proper fitting and care processes reduce the risk of serious adverse events from OK. Key to minimising risks is patient education. This includes ensuring good hygiene, proper lens care, disinfection and adherence to regular follow-ups to monitor corneal health throughout the treatment.

Patient selection

Selecting the right candidates for OK treatment is important for success and patient satisfaction. OK is generally suitable for correction of myopia between -1.00D and -6.00D, and moderate astigmatism of up to -2.00D. For experienced OK practitioners, it is possible to correct high myopia above -6.00D, using customised OK lenses as an off-label treatment for patients with suitable corneas; however, high myopia cases are more challenging to fit. It is recommended to begin with simpler cases for practitioners starting their journey in OK fitting. As an at-home treatment worn during sleep, even children as young as 5 can successfully wear OK with parental supervision and assistance. Myopia management should be initiated as soon as possible to keep a child's myopia at a lower level, not only for ocular health reasons but also to open more treatment options.

Patient suitability for OK is evaluated at the initial consultation, following an assessment of their refraction, corneal topography, binocular vision status and ocular health, and considering the patient's lifestyle needs, sleep patterns, personal hygiene, motivation and expectations. Setting appropriate expectations is crucial to ensure patients understand the nature of OK treatment and their responsibilities to maintain optimal treatment outcomes.

With OK, unlike glasses or daytime lenses, some slight variation in vision from day to day is expected due to factors such as quality and duration of sleep, lens deposits, lens positioning and seasonal allergies. OK aims to provide functional glasses-free vision, not necessarily 6/6 vision at all times. Mild lens awareness and haloes in dim light are also expected for a new wearer that will settle over time. How quickly OK lenses work to improve vision also ranges from a few days to several weeks, depending on the level of myopia correction required, corneal shape and lens design. As practitioners gain confidence through experience in fitting various cases, communicating patient expectations becomes easier.

Getting started in OK fitting

A corneal topographer is an essential instrument for OK fitting and monitoring. Speed of capture, corneal coverage, ease of use of the instrument and analysis software, and lab compatibility are important factors when considering purchasing a device. Capturing corneal topography well is a skill that takes time and experience to develop. It is crucial to capture a series of good quality and repeatable baseline maps, free from distortion and artefacts. Patients with tight lids, deep-set eyes and short attention spans can be more challenging to measure.

Important indices to examine when analysing corneal maps in relation to the possibility of fitting OK are the flat and steep keratometry 'K' readings, the corneal eccentricity 'e' values and the corneal sag differential between the steep and flat meridians at the 8 mm chord, approximately where alignment curve meets the cornea. When the elevation difference between the meridians in this lens landing zone is greater than 30 microns, such as in the case of moderate limbus-to-limbus astigmatism, a toric peripheral lens design is usually required to create a good hydraulic seal in the peripheral cornea.

Take care to assess the ocular surface and record any irregularities. Patients with significant dry eye and corneal staining should first be treated for their dry eye syndrome. Unstable tear film can significantly affect the quality of baseline topography maps, leading to potential lens design issues. Persistent superficial punctate keratitis (SPK) from trichiasis can increase the risk of MK; these patients may be better suited in myopia management glasses or daytime soft contact lenses that can provide a protective barrier for the ocular surface.

OK lenses can be ordered empirically by sending topography maps to a lens lab, by trial lens fitting using an inventory of trial lenses or by computer-aided design with software. Custom-designed OK lenses give practitioners more control in adjusting individual lens curves and parameters. Recent studies have shown that OK lenses with smaller back optic zone diameters (BOZD)[6] were more effective in slowing axial elongation than lenses with larger BOZD, suggesting the benefit of customising OK lenses for myopia management to enhance efficacy.

Orthokeratology requires more ongoing reviews than other myopia management interventions, particularly in the first 6 months. Following lens design, fitting and delivery, a new OK patient is usually reviewed after one night of wear, one week, one month, 3 months and so on. More frequent visits are typical for high myopia and other challenging fits. Corneal topography is performed at each visit, measuring and monitoring corneal shape changes as the treatment settles. Axial and tangential power difference maps show how much refractive change has occurred, as well as the centration of the lens in the closed eye during sleep. This information helps troubleshoot and modify the lens parameters to optimise the lens fit if required.

After the fitting process, OK patients should return for reviews every 6 months to monitor their treatment, lens condition and corneal health. Patients are reminded to report any instances of painful or red eyes without delay and to cease wear temporarily if there are symptoms of concern. Lenses should also be replaced regularly, around every 12–18 months. Lens warpage may occur with age, adversely affecting the lens fit and treatment effect. As with other contact lens wearers, long-time OK patients can sometimes become complacent and less compliant over time. As a duty of care, recalls are necessary to follow up on missed reviews and patients who become lost to follow-ups.

Measurement of axial length using an optical biometer is the most sensitive and reliable metric for tracking myopia progression, by directly measuring the elongation of the eye and comparing this to normative growth curves. When fitting OK for myopia management, biometry should be considered a necessary tool as the true refractive state of an OK patient cannot be readily measured at any visit without a full washout. Unaided visual acuity alone must never be relied on for assessing progression. This can vary between visits, and the small overcorrection factor commonly incorporated into an OK lens design can easily mask progression. Without biometry, measuring vision and over-refraction lens-on-eye may be used as a guide with lower accuracy.

Across all myopia management interventions, there are differences in response between individuals, and no 2 children are the same; such is the complex, multifactorial nature of myopia. In most cases, OK is highly effective in slowing myopia progression; however, some children who are fast progressors may require additional treatment. A systematic literature review and meta-analysis found a synergistic effect when combining OK with 0.01% atropine.[7] Children with above-average pupil sizes appear to have slower axial growth with OK than those with smaller pupils.[8] More recently, research combining repeated low-level red-light therapy (RLRL) with OK showed promising results in significantly slowing axial elongation[9] and even axial length shortening in poor responders of OK when RLRL treatment was added.[10]

A dual treatment approach should be considered for children on OK monotherapy who still show significant, sustained axial elongation well beyond normal expected eye growth for their age and ethnicity over 12 months. Other indications include children presenting with high myopia, long axial length and those with a history of fast progression. Statistically, the lifetime risk of visual impairment associated with myopia increases from 3.8% to 25% when axial length exceeds 26 mm,[11] and earlier age of myopia onset is linked to a higher final level of myopia.[12] Hence, it is crucial to consider using a more aggressive treatment strategy when managing children who fall into these high-risk categories.

Orthokeratology is one of the most exciting and rewarding areas of optometry for practitioners. It is unique in being the only vision correction modality that allows our patients to see clearly when they are not wearing their lenses. Offering OK and doing it well will impress your patients and help grow your practice, as well as make a difference in the lives of children with myopia. With myopia management now a standard of care, is it time you sprinkled a bit of magic into your practice? →

Case example

A 10-year-old female of mixed Chinese-European descent attended for assessment after noticing distance blur. Her older brother had been treated with OK for several years to help stabilise his high myopia at -5.50D. With a strong family history of myopia, she had previously been monitored closely for signs of myopia onset; however, for 2 years during the COVID-19 pandemic, she did not return for reviews.

Previously emmetropic, her cycloplegic refraction was now R -2.25D L -2.75D. Her axial length, measuring R 23.75 mm L 24.09 mm, had jumped by R 1.42 mm L 1.52 mm in 2 years, representing an annualised axial elongation rate of about 3 times faster than normal eye growth for her age. With this fast progression, we decided to initiate dual therapy without delay. Her family was already familiar with OK, and she was happy to proceed with this option, plus atropine eye drops at 0.05%. Her OK lenses were customised for myopia management with small BOZD of 5.3 mm.

Her axial length chart (**Figure 1**) clearly illustrates that in the 18 months of treatment her axial elongation has stabilised remarkably well, dramatically altering the trajectory of her myopia progression. Corneal topography maps (**Figure 2**) show that full correction is achieved with well-centred lenses in an ideal bullseye-fitting pattern (**Figure 3**). She is also pleased to be glasses-free, reporting no issues with her lenses or atropine eye drops, and her corneas are healthy. As progression may still occur in future, she will need to attend regular myopia reviews every 6 months and ensure she maintains good compliance with her treatments and lens care regime. ●

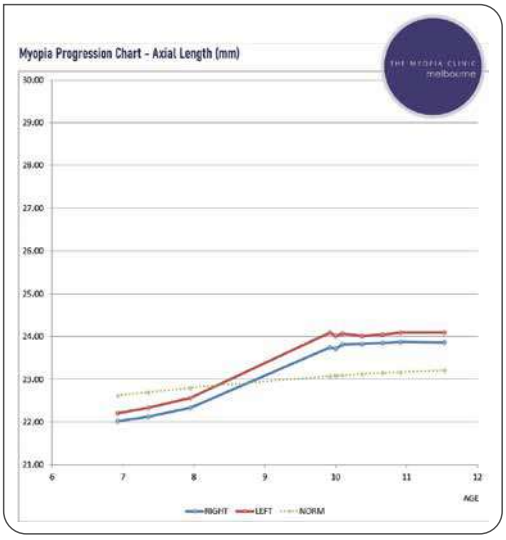


Figure 1. Axial length chart illustrating stabilisation of axial elongation in 18 months of OK treatment.

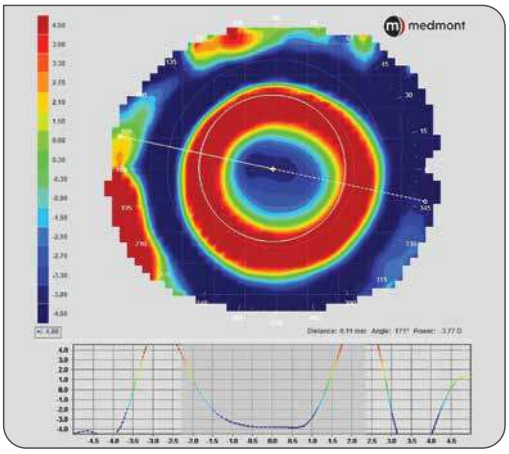


Figure 2. Corneal topography map showing achievement of full correction with OK.

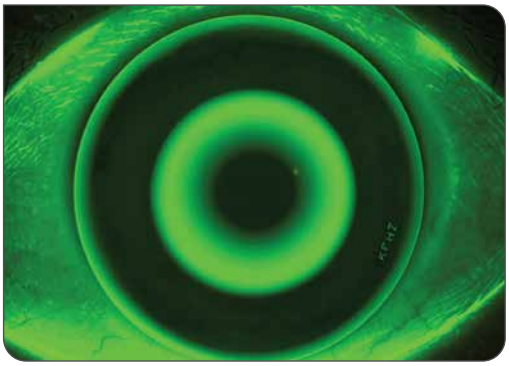


Figure 3. Well-centred OK lens in an ideal bullseye-fitting pattern.

About the author

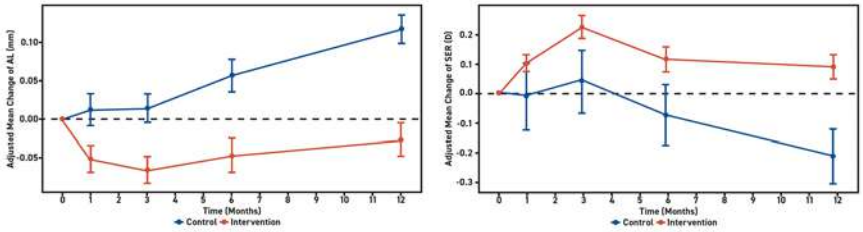
Philip Cheng is a clinical optometrist in Melbourne and an internationally recognised expert in myopia management and orthokeratology. He has presented globally and written extensively for industry publications. He is a key opinion leader for major vision care companies and a Orthokeratology Society of Oceania board member. He graduated from the University of Melbourne in 2003 and has attained the International Academy Certification in Myopia Management (IACMM) and Fellowship of the International Academy of Orthokeratology and Myopia Control (FIAOMC).

1. Li X, Xu M, San S, Bian L, Li H. Orthokeratology in controlling myopia of children: a meta-analysis of randomized controlled trials. BMC Ophthalmol. 2023 Oct 31;23(1):441. doi: 10.1186/s12886-023-03175-x
2. Flitcroft DI. The complex interactions of retinal, optical and environmental factors in myopia aetiology. Prog Retin Eye Res. 2012 Nov;31(6):622-60. doi: 10.1016/j.preteyeres.2012.06.004
3. Lau JK, Vincent SJ, Cheung SW, Cho P. Higher-order aberrations and axial elongation in myopic children treated with orthokeratology. Invest Ophthalmol Vis Sci. 2020 Feb 7;61(2):22. doi: 10.1167/iovs.61.2.22
4. Harper AR, Summers JA. The dynamic sclera: extracellular matrix remodeling in normal ocular growth and myopia development. Exp Eye Res. 2015 Apr;133:100-11. doi: 10.1016/j.exer.2014.07.015
5. Bullimore MA, Mirsayafov DS, Khurai AR, et al. Pediatric microbial keratitis with overnight orthokeratology in Russia. Eye Contact Lens. 2021 Jul 1;47(7):420-425. doi: 10.1097/ICL.0000000000000801
6. Gu Z, Yang R, Wang C, et al. Impact of back optic zone diameter (BOZD) in orthokeratology on axial length elongation: a meta-analysis and systematic review. Cont Lens Anterior Eye. 2025;48(1):102316. doi: 10.1016/j.clae.2024.102316
7. Tsai HR, Wang JH, Huang HK, Chen TL, Chen PW, Chiu CJ. Efficacy of atropine, orthokeratology, and combined atropine with orthokeratology for childhood myopia: A systematic review and network meta-analysis. J Formos Med Assoc. 2022 Dec;121(12):2490-2500. doi: 10.1016/j.jfma.2022.05.005
8. Chen Z, Niu L, Xue F, Qu X, Zhou Z, Zhou X, Chu R. Impact of pupil diameter on axial growth in orthokeratology. Optom Vis Sci. 2012 Nov;89(11):1636-40. doi: 10.1097/OPX.0b013e31826c1831
9. Xiong R, Wang W, Tang X, et al. Myopia control effect of repeated low-level red-light therapy combined with orthokeratology: a multicenter randomized controlled trial. Ophthalmology. 2024 Nov;131(11):1304-1313. doi: 10.1016/j.ophtha.2024.05.015
10. Yu M, Tang X, Jiang J, et al. Axial length shortening after combined repeated low-level red-light therapy in poor responders of orthokeratology in myopic children. J Ophthalmol. 2024 Aug 10;2024:4133686. doi: 10.1155/2024/4133686
11. Tideman JW, Snabel MC, Tedja MS, et al. Association of axial length with risk of uncorrectable visual impairment for Europeans with myopia. JAMA Ophthalmol. 2016 Dec 1;134(12):1355-1363. doi: 10.1001/jamaophthalmol.2016.4009
12. Bullimore MA, Brennan NA. Myopia: an ounce of prevention is worth a pound of cure. Ophthalmic Physiol Opt. 2023 Jan;43(1):116-121. doi: 10.1111/opo.13058

First international evidence for RLRL!

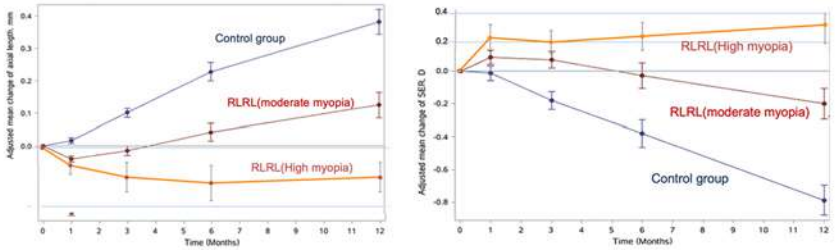
Australia: First completed multi-ethnic study[1]

- 12-month RCT at the ACO
- 34 children recruited
- RLRL: **-0.03mm, +0.08D**
- SVS: **0.12mm, -0.20D**
- Significant AL shortening and SER reversion at 12 months



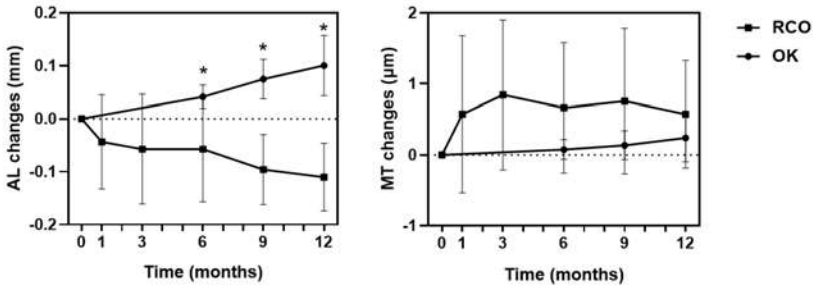
Japan: >100% clinical efficacy in high myopia[2]

- 12-month single-arm trial in Tokyo
- 30 children recruited, mean **-9.7D**
- RLRL: **-0.05mm, +0.32D**
- 2X the incidence of AL shortening and SER reversion in high versus previously published moderate myopia[3]



Spain: >100% clinical efficacy with orthokeratology[4]

- 12-month RCT in Madrid
- 26 children recruited to either RLRL+OK or OK alone
- RLRL+OK: **-0.11mm**
- OK only: **0.10mm**
- Significant AL shortening at 12 months in combination



References:
1. Deen N, et al. APSPOS. 2025 Jun; 2. Ohno-Matsui K, et al. APAO. 2025 Apr;
3. Jiang Y, et al. Ophthalmology. 2022 May;129(5):509-519; 5; 4. Fernandez F, et al. EVER. 2024 Nov.

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1. AL changes of ≥0.3mm in 6 months or ≥0.5mm in 12 months (2 readings required)
2. Minimum treatment compliance of 80%
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Jia Jia Lek
BOptom PhD
Senior Lecturer, University of Melbourne

A collaborative effort towards myopia prevention

Myopia is an increasing cause of visual impairment globally and is the second most commonly reported long-term condition in younger Australians.[1] In 2022, 40% of Australians have myopia,[2] with the prevalence of myopia predicted to be almost 50% in 2050.[3] The onset of myopia is becoming younger, resulting in elevated degrees of high myopia over time.[4,5] Ten per cent of the global population is predicted to have high myopia by 2050,[3] increasing the risk of glaucoma, cataract, retinal detachment and myopic maculopathy. Uncorrectable visual impairment resulting from myopia is projected to increase 7 to 13 times by 2055.[6] The myopia public health burden includes costs of optical aids,[7] socioeconomic impacts and diminished quality of life.[8] Australia is not spared from the effects of the myopia pandemic; myopia is a major public health concern.

Despite the availability of effective strategies backed by scientific evidence, there is a lack of uptake by parents, who are the key influencers of children's behaviour. A large percentage (~91%) of Australians are unaware of the negative impact of excessive screen time related to myopia.[9] More than 50% of Australian adults were unaware that a lack of exposure to outdoor light during childhood can contribute to myopia.[2] Low awareness of risk factors and symptoms of myopia[10] can leave myopia environmental factors unmitigated and prevent or delay children from receiving formal eye examinations and interventions.

Poor implementation of myopia control by eye care practitioners who play key roles in myopia control presents another barrier to mitigating the impact of myopia. An Australian study reported 50% of respondents regularly prescribed single-vision lenses for myopia control,[11] consistent with global trends.[12] Key barriers to prescribing myopia intervention include cost and inadequate education and information about modalities.[13] This is despite the availability of myopia public education resources and myopia clinical recommendations.[14] Other factors that contribute to poor myopia prevention in Australia include a lack of myopia public health policies and non-standardised school screening approaches.[15] Altogether, these findings suggest that there is a need for effective collaboration across all relevant stakeholders, including eye care practitioners, caregivers, children, researchers, health agencies and government bodies to mitigate the negative impacts of myopia.

Singapore is one of the most myopic nations globally, with a myopic prevalence of 81.6% and high myopia prevalence of 13.1% in young adults.[16] Recognising myopia as a significant public health concern, the National Committee on Myopia was formed in the late 1990s to formulate strategies to prevent and control myopia and centrally plan myopia research in Singapore. In 2001, the National Myopia Prevention Programme (NMPP) was launched.[17] This concerted effort across various stakeholders in Singapore has seen a 5% reduction in myopia prevalence in primary school children within 6 years.[18] Between 2013 and 2023, the prevalence of low myopia was stable, with a slight decrease in the prevalence of moderate and high myopia in school children.[19] Additionally, Singapore-based parents demonstrated good overall myopia knowledge and awareness, with 87.7% indicating awareness of the protective role of outdoor activity in myopia development and progression.[20] Although it is unclear how parental awareness translates to practice, positive parental behaviour could plausibly result in timely myopia control interventions.

Optometry Australia's Looking Outward on Optometric Knowledge (LOOK) international scholarship program facilitated the opportunity to visit Singapore to gain a more comprehensive understanding of how effective myopia prevention can be achieved through successful collaborations. Consultation was undertaken in July 2024 with the Singapore Health Promotion Board, Singapore Optometric Association, Singapore Polytechnic, Ngee Ann Polytechnic, National University of Singapore, practising optometrists and caregivers.

The objectives of the LOOK Scholarship were for recipients to:

- Outline the importance of the observed optometric advancement to optometry, including how the advanced care model enhanced patient diagnosis and management and the overall healthcare system.
- Outline plans to apply their newfound knowledge and experience to the benefit of patients and optometrists.

Key observations supporting effective myopia prevention based on literature and consultation include:

1. Forming a committee comprising key stakeholders with a shared goal

The NMPP committee comprised representatives from the Ministry of Education, Singapore Armed Forces, Ministry of Social and Family Development, National University of Singapore, Singapore Eye Research Institute, Optometrists and Opticians Board, Ministry of Health, and Singapore optometric and professional groups.[17] Representatives were key stakeholders who could influence public health behaviours and were responsible for nationwide coordinated efforts in reducing myopia prevalence.

2. Increasing public awareness and education

Public health campaigns inform, educate and motivate individuals to adopt evidenced-based interventions to mitigate the negative impacts of myopia. The NMPP adopted several education strategies for myopia prevention by promoting good eye care habits, such as decreased near work and increased outdoor time to target stakeholders.[21] Age-appropriate activities and resources such as school talks that included jingles, drama and dance, and activity cards (**Figure 1**) were used to convey vision care messages to preschool, primary and high school children. School teachers underwent training programs that provided in-depth understanding of myopia, contributing to the reinforcement of good eye care habits in students. Parents and caregivers were invited to school-based group counselling sessions, seminars and public forums, which highlighted the risk of myopia and the importance of encouraging good vision habits in childhood. Additionally, mass media, including television commercials, radio, popular parents' magazines and the Health Promotion Board's website, were used to spread the message of good eye care habits and the importance of regular eye tests among the general public.

3. School screening with appropriate follow-through procedures

Annual school-based vision screening (5- to 10-year-olds) identified school children with defective vision, including myopia. Depending on the child's age, children received myopic evaluations by ophthalmologists and/or optometrists. This was followed by appropriate pharmacological and/or optical interventions.[21] Government funding and support from community optometrists and opticians ensured that students from poorer socioeconomic backgrounds received appropriate optical aids. School-based vision screening also allowed myopia prevalence levels and the effectiveness of current interventions to be monitored.

4. Introducing public health policies

Introducing public health policies, including essential outdoor hours in preschools,[22] contributes to myopia prevention efforts. →

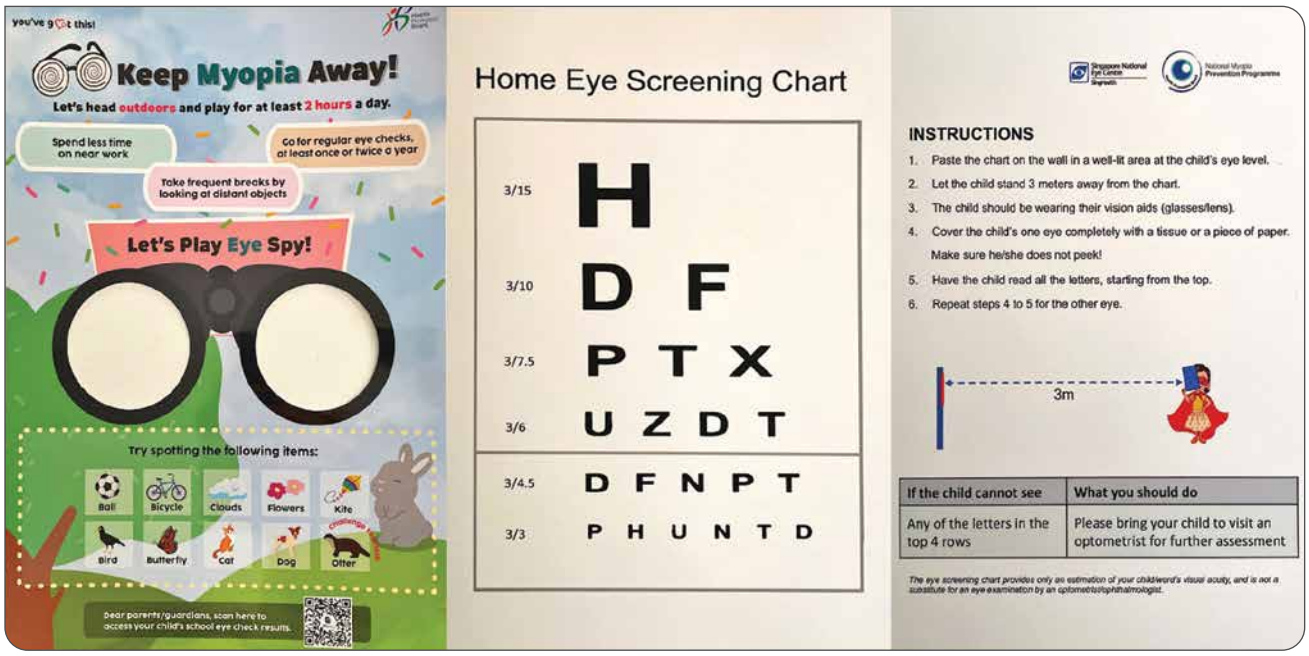

Figure 1. Examples of activity cards used to promote good vision habits in mitigating the negative impact of myopia.

5. Establishing centres of research and clinical excellence

Active myopia research and establishing centres of research and clinical excellence were key strategies in preventing the onset and progression of myopia. The Singapore National Eye Centre, a national eye centre within the public sector healthcare network, has a dedicated research arm, the Singapore Eye Research Institute, which ranks first globally in terms of eye publications per capita. The Myopia Centre was recently established to consolidate myopia prevention, public and clinician education efforts, and clinical services.

6. Training for optometry students and practising optometrists

Community optometrists play a pivotal role in combating myopia; hence, equipping optometry students with the necessary knowledge and skills is a priority in teaching institutions. Additionally, continuing education conferences highlighting current advancements in myopia ensures that optometrists stay current and are confident in myopia management.

7. Effective partnership with industry stakeholders

Partnering with industry stakeholders can enhance research outcomes, expand public education and improve patient access to the best possible treatments. Teaching institutions have partnered with industry stakeholders to set up myopia management facilities and conduct educative sessions, enhancing the myopia curriculum (**Figure 2**).[23]

Effective collaboration with industry between the Health Promotion Board and optometry professional association has also supported the creation of printed myopia prevention educative materials (**Figure 3**).

In summary, a multipronged and collective approach is required to manage the myopia pandemic, and stakeholders need to work effectively with a common goal – to prevent and delay the onset of myopia and its progression. ●

Figure 2. Myopia management suite, a partnership between teaching institutions and industry partners.

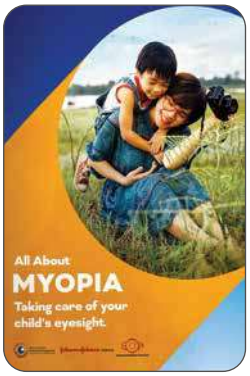

Figure 3. An example of educative material produced from a collaboration between Singapore Optometric Association, NMPP and an industry partner.

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1 Australian Institute of Health and Welfare. Australia's Health 2016. Australia's health series no. 15. Cat. no. AUS 199. Canberra: AIHW. 2016

2 Optometry Australia. Vision index report. 2022. Available from: https://www.optometry.org.au/wp-content/uploads/GVFL/Vision_Index/2022-Vision-Index-Report

3 Holden BA, Fricke TR, Wilson DA, et al. Global prevalence of myopia and high myopia and temporal trends from 2000 through 2050. Ophthalmology. 2016;123(5):1036-1042. DOI: 10.1016/j.ophtha.2016.01.006

4 Foster PJ, Jiang Y. Epidemiology of myopia. Eye (Lond). 2014;28(2): 202-208. DOI: 10.1038/eye.2013.280

5 Saw SM, Gazzard G, Shih-Yen EC, Chua WH. Myopia and associated pathological complications. Ophthalmic Physiol Opt. 2005;25(5):381-391. DOI: 10.1111/j.1475-1313.2005.00298.x

6 Tideman JW, Snabel MC, Tedja MS, et al. Association of axial length with risk of uncorrectable visual impairment for Europeans with myopia. JAMA Ophthalmol. 2016; 134: 1355-1363. DOI: 10.1001/jamaophthalmol.2016.4009

7 Foo LL, Lanca C, Wong CW, et al. Cost of Myopia Correction: A Systematic Review. Front Med (Lausanne). 2021;8:718724. DOI: 10.3389/fmed.2021.718724

8 Sankaridurg P, Tahhan N, Kandel H, et al. IMI impact of myopia. Invest Ophthalmol Vis Sci. 2021;62(5):2. DOI: 10.1167/iovs.62.5.2

9 Australia and New Zealand Child Myopia Working Group. The Australia and New Zealand Child Myopia Report – A Focus on Future Management. n.d. Available from: https://www.childmyopia.com/wp-content/uploads/COO0678-Myopia-Report_FA-WEB-SINGLES.pdf.

10 McCrann S, Flitcroft I, Lalor K, Butler J, Bush A, Loughman J. Parental attitudes to myopia: a key agent of change for myopia control? Ophthalmic Physiol Opt. 2018;38(3):298-308. DOI: 10.1111/opo.12455

11 Douglass A, Keller PR, He M, Downie LE. Knowledge, perspectives and clinical practices of Australian optometrists in relation to childhood myopia. Clin Exp Optom. 2020;103(2):155-166. DOI: 10.1111/cxo.12936

12 Wolffsohn JS, Calossi A, Cho P, et al. Global trends in myopia management attitudes and strategies in clinical practice - 2019 Update. Cont Lens Anterior Eye. 2020;43(1):9-17. DOI: 10.1016/j.clae.2019.11.002

13 Yang A, Pang BY, Vasudevan P, Drobe B. Eye care practitioners are key influencer for the use of myopia control intervention. Front Public Health. 2022;10:854654. DOI: 10.3389/fpubh.2022.854654

14 International Myopia Institute. IMI white papers & clinical summaries. 2025. Available from: https://myopiainstitute.org/imi-white-papers-clinical-summaries

15 Crippa J, Flaherty M, Silveira S. Towards a national pre-school vision screening programme. J Paediatr Child Health. 2022;58(6):948-952. DOI: 10.1111/jpc.15971

16 Koh V, Yang A, Saw SM, et al. Differences in prevalence of refractive errors in young Asian males in Singapore between 1996-1997 and 2009-2010. Ophthalmic Epidemiol. 2014;21(4):247-255. DOI: 10.3109/09286586.2014.928824

17 Seet B, Wong TY, Tan DT, et al. Myopia in Singapore: taking a public health approach. Br J Ophthalmol. 2001;85(5):521-526. DOI: 10.1136/bjo.85.5.521

18 Health Promotions Board. Singapore achieves breakthrough in reducing prevalence of myopia by almost 5%. 2011. Available from: https://www.hpb.gov.sg/newsroom/article/singapore-achieves-breakthrough-in-reducing-prevalence-of-myopia-by-almost-5

19 Ministry of Health Singapore. Effectiveness of national myopia prevention programme's strategies for primary school students. 2024. Available from: https://www.moh.gov.sg/newsroom/effectiveness-of-national-myopia-prevention-programme-s-strategies-for-primary-school-students.

20 Salim AT, Keel S, Foreman J, Dirani M. Awareness of myopia: A survey among parents residing in Singapore. Research Square. 2019. DOI:10.21203/rs.2.10314/v4

21 Karuppiah V, Wong L, Tay V, Ge X, Kang LL. School-based programme to address childhood myopia in Singapore. Singapore Med J. 2021;62(2):63-68. DOI: 10.11622/smedj.2019144

22 Ministry of Health Singapore. Myopia-related eye disorders. 2021. Available from: https://www.moh.gov.sg/newsroom/myopia-related-eye-disorders

23 Ngee Ann Polytechnic & ZEISS. Ngee Ann Polytechnic partners ZEISS to address growing myopia challenge through innovative technology-integrated curriculum 2024. Available from: https://www.np.edu.sg/docs/default-source/np-articles/media-releases/hs-x-carl-zeiss-media-release.pdf?sfvrsn=b6033902_1

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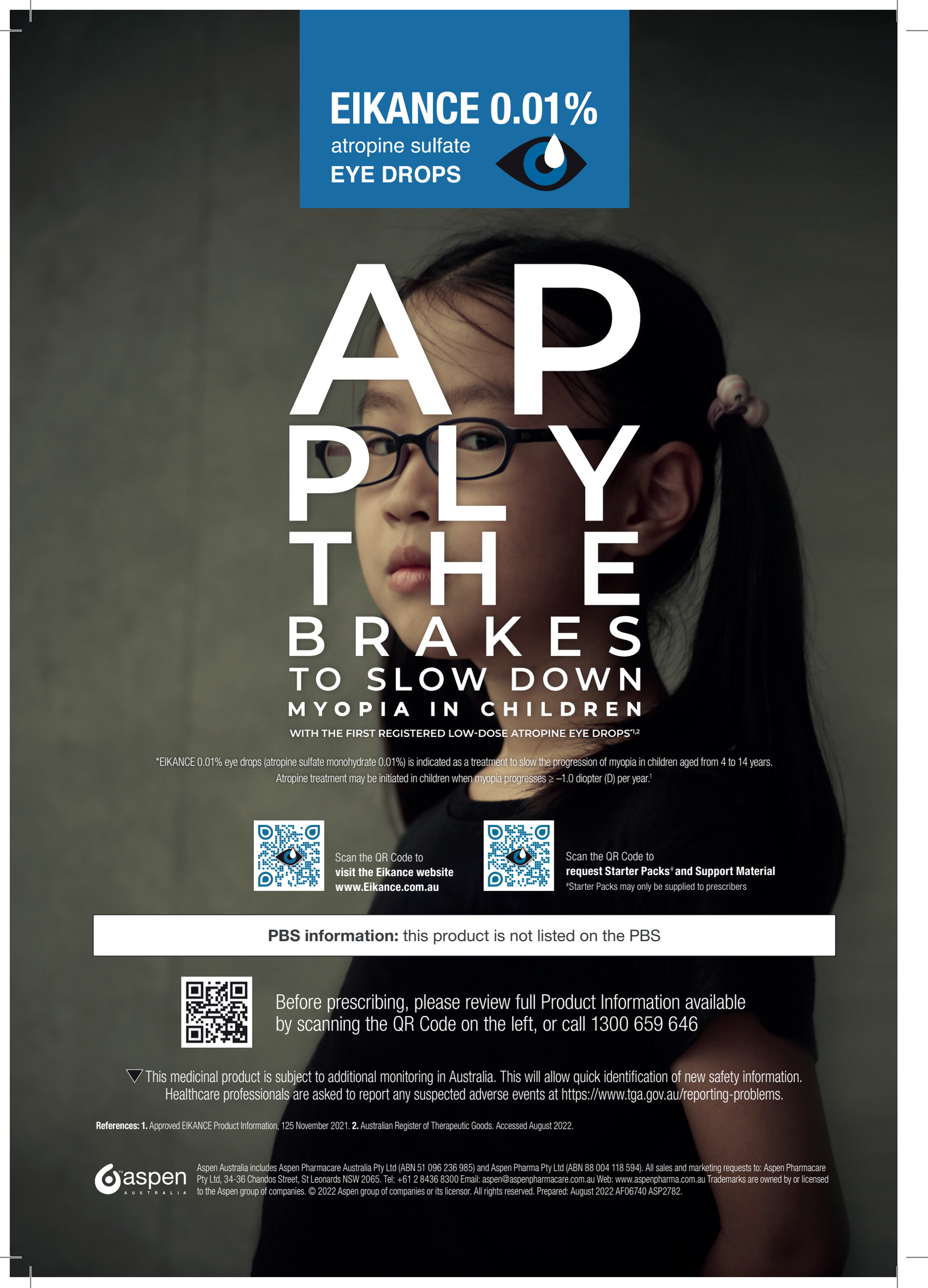

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References: 1. Approved EIKANCE Product Information, 125 November 2021. **2.** Australian Register of Therapeutic Goods. Accessed August 2022.