



LEARNING DOMAINS



CLINICAL
PRACTICE

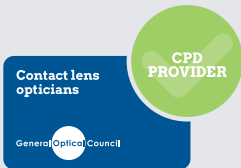
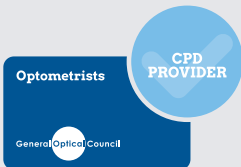


SPECIALTY:
CONTACT LENS
OPTICIANS



COMMUNICATION

PROFESSIONAL GROUPS



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MCQs AVAILABLE ONLINE: 1 March 2023

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This CPD session is open to all FBDO members and associate member optometrists. Successful completion of this CPD session will provide you with a certificate of completion of one non-interactive CPD point. The multiple-choice questions (MCQs) are available online only from Wednesday 1 March 2023. Visit www.abdo.org.uk. After member login, scroll down and you will find CPD Online within your personalised dashboard. Six questions will be presented in a random order. Please ensure that your email address and GOC number are up-to-date. The pass mark is 60 per cent.

CPD CODE: C-104703

Using evidence-based practice to communicate myopia management

By Keith Tempany FBDO CL FBCLA

Myopia management – or myopia control – is the latest hot topic in optics, yet for decades, or arguably centuries, eyecare professionals (ECPs) have sought ways to slow myopic progression. Whilst the first evidence-based review to make clinical recommendations seems to be in 2002¹, it's interesting to note that the International Myopia Conference has been taking place since 1964, so it is hardly a recent trend. Why then all this recent sharpening of focus?

In view of the concern about the current and future impact of myopia, seven years ago in 2015, the World Health Organisation (WHO) met with the Brien Holden Vision Institute (BHVI), a leading myopia research facility, and thrashed out the 'Impact of myopia and high myopia: a global scientific meeting'². It concluded that: "...the documented increases in the prevalence of myopia and high myopia worldwide are a serious public health concern" and that "data to inform research, clinical practice and public health policy must be produced urgently".

Later that year, Professor Brien Holden elaborated on these conclusions when summing up the British Contact Lens Association's Clinical Conference Myopia Management session by stating: "We know a lot more about myopia than we ever have done. We don't know everything, however, we know too much to sit back and do nothing".

Following the WHO/BHVI meeting, the International Myopia Institute (IMI) was formed to address all major aspects of myopia. This move saw 85 global experts in their field come together to publish the IMI white papers on all aspects of myopia definitions, research, trials, interventions and risks.

IMPACT OF MYOPIA

What makes myopia a serious public health concern? It is predicted that by 2050, approximately half the world will be myopic – of which around one billion people will be highly myopic³. High myopia was classified at the WHO meeting as being $\leq -5.00D$, which equates to an uncorrected visual acuity (VA) of 6/172; this is much worse than the International Classification of Diseases (v11 2018) threshold for blindness ($<3/60$ in the better eye).

Is this relevant for the UK? The prediction from Holden's group for the prevalence of myopia in Western Europe is that it will increase from 22.9 per cent in 2000 to 56.2 per cent in 2050³. We already know that in the UK, the prevalence has doubled since the 1960s: children in the UK are becoming myopic at a younger age than we previously thought, and the younger they become myopic, usually the more myopic they will end up⁴. So, yes, it is particularly relevant for the UK.

With myopia management, it is essential to understand that even having $-1.00D$ of myopia brings with it increased lifelong risks of glaucoma, cataract, retinal detachment (RD) and myopic maculopathy (MM), a form of macular degeneration due to the stretching of the myopic eye. In his 2012 paper, Professor Flitcroft states that: "The calculated risks from myopia are comparable to those between hypertension, smoking and cardiovascular disease. In the case of myopic maculopathy and retinal detachment the risks are an order of magnitude greater"⁵.

Flitcroft argues that the long-standing concept of dividing myopia into physiological or 'safe myopia', which is merely an inconvenience, and pathological myopia is incorrect. He goes

on to demonstrate that there is no safe level of myopia as previously accepted, as there is significant disease association in the physiological myopia group of up to -6.00D. **Table 1** uses data from that paper and looks at the odds ratios, which describe the increased risk over a reference of one, being the risk of an emmetrope.

It is interesting to see that having -1.00D of myopia has a three times greater risk of RD and more than twice as great a risk for developing MM, glaucoma and posterior subcapsular cataract (PSCC) when compared with emmetropia. In addition, the -6.00D myope has 21.5x risk for RD and over 40x the risk for MM. These are eye-watering statistics.



FIGURE 1: The elements that make up evidence-based practice

Due to differing classifications and terms, the impact of MM is difficult to discern. This condition is the fourth most common cause of visual impairment in the UK ahead of diabetic eye disease – and the only one of the top five that remains entirely untreatable⁶.

Fricke *et al* estimated that 10 million people had visual impairment (VI) from MM – of which 3.3 million were blind⁷.

If we carry on with current strategies, by 2050 those estimates will increase to 55.7 million with VI and 18.5 million blind⁷. Not only does the overall increase stand out, but the number of working aged people affected is of serious socio-economic concern.

There are now several options available to help slow myopia progression, which in turn can slow down the growth of the eye and reduce those risk factors that we have seen. Any slowing down of axial elongation of the eye will lower the risk of pathology, and should therefore be an essential part of any eyecare practice⁸.

EVIDENCE-BASED INTERVENTIONS

It has been strongly suggested that if we are recommending a myopia management intervention, we are committing that family to a significant financial burden, especially if siblings follow suit. Therefore, it is essential to ensure that our advice and guidance is evidence-based.

Evidence-based medicine originated in the 1990s to enable medical students to make clinical decisions using the most appropriate evidence⁹. From this, evidence-based practice has developed, using a trifold approach to healthcare decisions involving: 1) the strongest research evidence, from scientific, peer reviewed journals; 2) clinical judgment from the experience and expertise of the clinician; and 3) the individual patients’ values, preferences and environment (**Figure 1**).

For some of us, understanding what constitutes strong scientific data is new and can be confusing. Randomised controlled trials (RCTs) and the meta-analysis of them arguably offer the highest quality of evidence, whilst

editorials and expert opinion offer the lowest. Case reports and case studies sit somewhere in between. The IMI report on Clinical Myopia Control Trials and Instrumentation¹⁰ sets about defining what makes a robust scientific study and its recommendations are laid out in **Figure 2**.

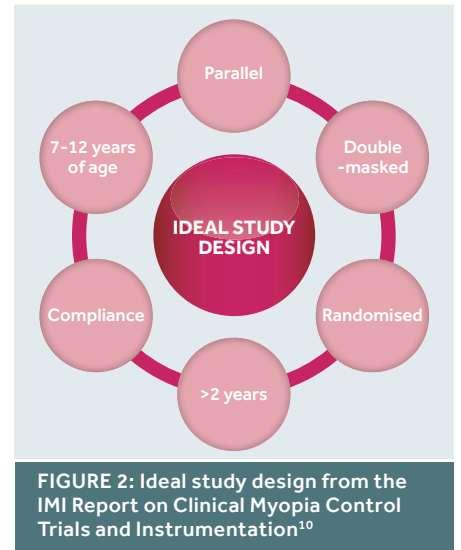


FIGURE 2: Ideal study design from the IMI Report on Clinical Myopia Control Trials and Instrumentation¹⁰

To reduce or eliminate any unconscious bias, which can affect the clinical data, the study should have two elements. Firstly, it should ideally be double-masked, so that neither the practitioner nor the patient knows if they have the control or the test product. Secondly, it should be randomised, which removes human choice of product/control.

The fact that most myopia interventions are less effective after the first year, and that myopia develops over several years, suggests that the study should preferably be conducted over a number of years to assess the product’s safety and effectiveness. This is especially important if the efficacy is reported in percentage terms, as a short study may exaggerate the overall effect.

Myopia	Odds ratio for retinal detachment	Myopia	Odds ratio for myopic maculopathy	Odds ratio for glaucoma	Odds ratio for cataract (PSCC)
-0.75 to -2.75	3.1	-1.00 to -3.00	2.2	2.3	2.1
-3.00 to -5.75	9	-3.00 to -5.00	9.7	3.3	3.1
-6.00 to -8.75	21.5	-5.00 to -7.00	40.6	3.3	-5.5
-9.00 to -14.75	44.2	-7.00 to -9.00	126.8	-	-
<= -15	88.2	<= -9.00	348.6	-	-

TABLE 1: Pathology risks and myopia⁵

Also, as rebound effects have been experienced when ceasing some treatments, a one-year follow-up period, on completion of the study, is recommended¹¹⁻¹³.

Treatment, that is wearing times for both test and control groups, and visit compliance are important as they can affect the validity of the trial's conclusion. The latter can also be affected by the age of the study population as the disease prevalence changes across this demographic factor. The age group six to 12 years is used by most studies as this is typically when juvenile onset myopia occurs¹⁴⁻¹⁸; a recent large study carried out in France showed the highest proportion of progression between seven and nine years¹⁹. It is also important that the children in both groups are at the same level of myopic development throughout the study in order to calculate the efficacy accurately.

There is some discussion that current reporting methods using a percentage effect are at best misleading and could suggest an overall treatment effect of 3-4D (1-1.5mm AL) when there is only evidence for a maximum of approximately 1D or 0.5mm AL, so far. Therefore, to enable consistency in reporting and to making it easier for practitioners to understand the most efficacious treatment for their patient, a cumulative absolute reduction in elongation (CARE) is suggested as a logical metric to express efficacy and compare treatments²⁰.

ONSET OF MYOPIA

A myopia management strategy doesn't necessarily start once a child becomes myopic, it begins with identifying the child who is not yet myopic – but at risk of becoming myopic at a young age. This can be identified with a high degree of certainty as early as six years old²¹. Those children with less than age-normal hyperopia are those at high risk of becoming myopic (Table 2).

Other risk factors to consider can be parental myopia, limited time spent outdoors and binocular vision anomalies. Management at this stage will consist of:

1. Communication of the risks of becoming myopic and that the longer we can delay onset, the less myopic the child will become.

2. Discussions regarding time outdoors. Outdoor time has been shown to delay the onset of myopia. Several studies have shown that spending between 90-120 minutes outdoors per day can delay the onset of myopia, whereas there is less evidence to suggest it can regulate the progression of an existing myope; although reported seasonal trends in myopic progression perhaps suggest otherwise^{22,23} the evidence is certainly mixed.

3. Advice on limiting leisure close work/screen time to two hours for five to 12-year-olds as the intensity of this activity is understood to accelerate the progression; however, no causal relationship is proven to date. The greatest risk seems to be the intensity of the close work at less than 30cm and several national and international organisations suggest the 20/20/20 rule, every 20 minutes look away for 20 seconds and hold the near work at least 20cm away^{24,25}.

A paper presented at the 2022 ARVO meeting by Bullimore and Brennan demonstrated that if we can delay onset by just one year, this can achieve a similar benefit to several years of myopia management²⁶. A recent paper looking at predictive factors for myopia in white European children found that the quickest change in refraction and axial length occurred up to three years prior to onset, and that once myopia was established a younger age of onset was associated with a more rapid rate of progression²⁷.

CLEERE PRESCRIPTION / AGE THRESHOLDS	
Age 6	< +0.75
Age 7 to 8	≤ + 0.50
Age 9 to 10	≤ + 0.25
Age 11	< 0.00

TABLE 2: Age and prescription thresholds for myopia as produced by the CLEERE study²¹

Conversely, it was also established that older age onset was linked with slower progression. This underlines the need for regular annual eye examinations for young children. It also urges those without access to axial length

measurement to use cycloplegic exams in order to rule out over-estimation of the presence and magnitude of myopia in childhood²⁷.

TAKING THE NEXT STEP

Once a child becomes myopic, our decision whether to recommend myopia management should be based on the age of onset or the refraction at a given age. Despite the limited efficacy of our current options, treatment should nonetheless be considered for all children with myopia who are less than 12 years of age²⁰.

Before committing the family to the extra costs of a myopia management intervention, it is worth remembering that the Ulster University group found that the rate of progression of myopia and AL elongation was approximately two to three times slower between the 12- and 22-year-old cohort, compared to that seen between the six and 16-year-old cohort. So, in cases involving older children, monitoring might be the first step.

Useful advice about what to do and when can be found in the Ulster University PreMo guide²⁸, an evidence-based risk indicator which is a very useful tool when discussing the risks with parents and patients.

There are several interventions available, which have been subject to rigorous trials. However, atropine eye drops are not licensed for myopia management use in the UK at present, therefore, in the UK the options distil into dual/multifocal soft contact lenses, orthokeratology contact lenses, and myopia management spectacle lenses.

We have already reviewed the IMI recommendations of what constitutes a strong study leading to strong evidence, and the MiSight 1 day contact lens is the only myopia management option so far to tick all the boxes. Table 3 provides a list of the licensed products available to eyecare practitioners in the UK with a summary of the current published research behind them.

COMMUNICATION

In the author's opinion one of the most challenging aspects of myopia management, besides trying to keep up-to-date with the fast-moving research, is the when, how and what of

communicating myopia and myopia management to parents and patients.

THE WHEN

Encourage your patients with myopia who are parents to have their children tested early and explain why. Explain that because of their myopia, there is a higher risk of their children developing myopia. Explain that we can detect that risk at a very early age and give advice, which could delay the onset, and why that would be a good idea.

THE HOW

The General Optical Council's standards of practice for optometrists and dispensing opticians³⁹ advise us to use our judgement to provide both the patients and parents information in a way that they can understand, adapting our language and communication approach as appropriate. The guidelines go on to say that we should be alert to unspoken signals, which could indicate a patient's lack of understanding, discomfort or lack of consent.

We are also instructed to listen to our patients and ensure that they are at the heart of the decisions made about their care and to show compassion and empathy; this includes the parents of our patients. When discussing the risks of myopia, be careful to use appropriate language and avoid any distressing terminology. Your myopic patient may well have a myopic parent who will be considering the implications for their own ocular health; they may also hold irrational guilty feelings about their child's myopia.

Any communication should be a three-way conversation between yourself, the patient and the parent(s)/carer. During the appointment, you will need to assess the Gillick competency of the child, that is whether or not they are able to consent to their own medical treatment and constantly check for understanding from the patient and parents. Be mindful that non-myopic parents may not understand how myopia affects vision. Plus lenses in a trial frame could be used on the parent to demonstrate the child's visual impairment or using the CooperVision myopia simulator (see resources section for link).

At this point, it would be good to help

SOFT CONTACT LENSES	
<p>MiSight 1 day CooperVision</p>	<p>This is a daily disposable hydrogel, dual-focus contact lens with six-year study data published, and with seventh year data recently presented but awaiting publication. The first three years was a double-masked and parallel RCT. For the next three years the control group were switched into MiSight and the progression compared between the established product wearers and this new group recently introduced to MiSight. For the final year both groups were switched to a single vision soft contact lens and monitored for any rebound effect^{29,30,31}.</p>
<p>Naturalvue VTI</p> <p>Bloom Day Menicon</p>	<p>This is a daily disposable, hydrogel, centre-distance extended depth of focus contact lens. The published scientific data is currently limited to retrospective case series analysis of pre-fit progression versus post-fit progression; however, it is not randomised, nor parallel, nor masked³². They have, however, recently enrolled subjects for a three-year, double masked, multinational RCT. First year data should be presented in mid-2023.</p>
<p>Mylo Mark'ennovy</p>	<p>This is a monthly silicone hydrogel customisable lens. Although no academic studies have been published to date, it is a design licensed from the Brien Holden Vision Institute used in a prospective two-year RCT³³. As four novel designs were used in this study it is unclear as to the efficacy of the Mylo. This design is also found on the SEED EDOF one day lens and SynergEyes ID EDOF but neither of these yet has an EU licence for myopia management.</p>
ORTHOKERATOLOGY	
<p>Bloom Night Menicon</p> <p>Eyedream No.7/CooperVision</p>	<p>Both Bloom Night and Eyedream are licensed for myopia management. There are numerous well-designed studies of two to seven years using various designs that show that orthokeratology is effective for myopia management. Meta-analysis showed a reduction in axial elongation by 0.27mm³⁴.</p>
SPECTACLES	
<p>MIYOSMART Hoya</p>	<p>Using peripheral defocus incorporated multiple segments technology (DIMS), the original two-year double-masked RCT resulted in 52 per cent reduction in myopia progression and 62 per cent reduction in axial length elongation in 160 Hong Kong Chinese school children. There was a greater slowing effect for 10 to 13-year-olds than those eight to nine-year olds, and most of the children who showed continuing progression were in this latter category, which may help practitioners when deciding what treatment to recommend for whom³⁵.</p> <p>In the second phase of the DIMS study, the control group commenced wearing DIMS in addition to the DIMS-wearing participant group. When compared to an age-matched historical group both groups had statistically significant reduction in myopia progression and AL elongation. The results show that the treatment effect is sustained over the three-year period. There is no data as yet on any rebound effect. As all the schoolchildren in this study were Chinese, this raises the question as to whether it will be as effective for myopic children of different ethnicities or living in different countries.</p>
<p>Diffusion Optics Technology DOT 0.2 SightGlass Vision / EssilorLuxottica / CooperVision</p>	<p>These lenses use a unique design of thousands of micro-dots that softly scatter light to reduce contrast on the retina. This is an ongoing three-year double masked, multi-centre, multi-ethnicity RCT which has published interim 12-month results showing 0.15 mm and 0.40D reduction compared to single vision control³⁷.</p>
<p>Stellest Essilor</p>	<p>Spectacle lenses with concentric rings of contiguous aspherical lenslets were investigated in a two-year RCT on 170 Chinese children with a reduction of 0.99D and 0.41mm for those children wearing them at least 12 hours a day seven days a week³⁸.</p>

TABLE 3: UK licenced myopia management options

INFORM	REASON
On all myopia options even if your practice does not offer all of them	This should include atropine, with the caveat that it is not currently licensed in the UK for treatment. There is no data nor science, yet which tells us what will be most efficacious for the patient sat in our chair.
The aim is to slow down progression not to stop it	There is no cause for alarm as we expect small amounts of change between eye exams.
There is a chance of no response or low response to treatment	The studies report an average effect; by its very nature an average will mean some have responded better and some less well than average. Most studies report a percentage of children who did not respond to treatment; this depends on the type of treatment and the age of the child but usually varies between 14% to 20 per cent. An outlier to this group is the medium add power in the BLINK study with 37 per cent ⁴⁵ .
There is no scientific data available for the untypical patient	Most myopia management studies are undertaken on children aged six to 12 years of age with myopia of -1.00 to -5.00 and less than -1.00D of astigmatism on enrolment. If the patient in your chair falls outside these criteria, then there will be no scientific evidence to back up your myopia management strategy.
The risk of myopia management spectacle lenses	There is no reported increase of risks with myopia management spectacle lenses versus ordinary spectacles ⁴⁶ .
The risk of contact lenses for myopia management	Any contact lens wear will increase the risk of an eye infection, but the risk is very low with proper hygiene and handling. There are several papers that conclude the minimal risk of wearing contact lenses is far outweighed by the preventative ocular health benefits ⁴⁶⁻⁴⁸ . There is a suggestion that eight to 11-year-olds pose less risk than adults or teenagers ⁴⁹ .
The possible side effects of orthokeratology	A recent study concluded that the risk of infection with orthokeratology lenses is about the same as daily wear lenses ⁵⁰ .

TABLE 4: Essential communication by eyecare practitioners

them all understand the difference between myopia correction and myopia management. You could use sentences such as: "Myopia management can help maintain the child's eye health and give a more stable prescription"; and "There is scientific evidence that a child wearing ordinary lenses usually progresses about one dioptre per year. Using myopia management lenses, this sort of change could take a year and a half to two years"⁴⁰.

We have known for some time that using pictures in health communications improves a patient's ability to understand

and remember what has been discussed⁴¹. A 2003 study found that patients will immediately forget 40-80 per cent of the information from a medical consultation, and nearly half of what is remembered will be incorrect⁴². Therefore, utilising the many resources available to download to add to your discussion will be paramount.

Parents are familiar with growth charts for height and weight etc, so using growth charts in myopia management can be appealing as they are more likely to comprehend the goals and outcomes.

There are two major studies which have produced AL growth charts – one for European children⁴³ and one for Chinese children⁴⁴. These recent works both imply that there is a need for differentiation between gender and ethnicity. These growth charts show normal eye growth in emmetropisation as well as the abnormally faster eye growth indicating future myopia. A single measure of AL can be plotted to ascertain whether the child is at risk of myopia or even high myopia.

THE WHAT

What we should be informing our myopia management patients is laid out in **Table 4**. In 2021, the World Council of Optometry passed a resolution on the standard of care for treating myopic patients, and in the author's opinion it is well worth consideration. It states, among other things, that the lack of an established standard of care is a disservice to the profession, patients and public health.

Simply correcting the myopic child is no longer sufficient, and myopia management should be a professional obligation, not optional. The resolution advises that the standard of care should include public education (**Figure 3**) and early, frequent discussions with parents that explain:

- What myopia is
- Lifestyle factors that may impact myopia
- The increased risks to long-term ocular health that myopia brings
- The approaches that are available to not only correct but also manage myopia and slow its progression

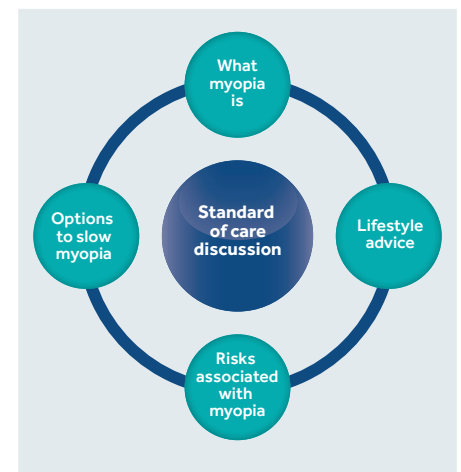


FIGURE 3: Standard of care discussion about myopia

CONCLUSION

In conclusion, myopia management is, and should be, a crucial part of our professional life, whether contact lens optician, dispensing optician or optometrist. We owe it to our patients to keep up-to-date with the latest research to enable us to have an evidence-based discussion with them.

The two key take-home points from this CPD article are:

1. A one-year delay in onset is equal to several years of costly myopia management intervention²⁶ so have that conversation with parents early on in the process; and
2. Reducing the progression of any myope by -1.00D, regardless of what level they are at, reduces their risk of developing macular myopathy by 40 per cent⁸.

PRACTITIONER RESOURCES

- The British Contact Lens Association (BCLA) informed consent form is available at www.bcla.org.uk/Public/Public/Member_Resources/Myopia-Management---Children.aspx?hkey=1acfeb33-dda1-4c5c-9a56-3225ee560012
- www.myopiaprofile.com is a phenomenal website with free resources to download. It looks at the science and the practical sides of myopia management.
- IMI white papers and reports along with a free infographic can be found at <https://myopiainstitute.org>
- Review of Myopia Management is a valuable resource for updates: <https://reviewofmm.com>
- The CooperVision axial length estimator is available at <https://coopervision.co.uk/practitioner/clinical-resources/myopia-in-children/axial-length-estimator>
- The CooperVision vision simulator can help parents and carers understand the impact of myopia on a child's vision: <https://coopervision.co.uk/practitioner/clinical-resources/myopia-in-children/myopia-simulator>
- The Menicon Bloom App helps you converse with, and educate, your patients and their carers.

- The Ulster University PreMO risk indicator can assist in assessing a child's risk of developing and progressing myopia and is based on data from white children in the UK. It is available to download at: www.ulster.ac.uk/__data/assets/pdf_file/0011/826184/PreMO-risk-indicator-for-website.pdf.
- Additional resources from Ulster University estimate axial length: www.ulster.ac.uk/research/topic/biomedical-sciences/research/optometry-and-vision-science/research/myopia-and-the-nicer-study

PATIENT AND CARER RESOURCES

- The BCLA: Myopia and its Development factsheet is available to download at: www.bcla.org.uk/Public/Public/Consumer/Myopia-and-its-development-factsheet.aspx
- The BCLA Myopia and your Child factsheet is available to download at: www.bcla.org.uk/Public/Public/Member_Resources/Myopia-Management---Children.aspx?hkey=1acfeb33-dda1-4c5c-9a56-3225ee560012
- www.mykidsvision.org is a patient site linked to myopiaprofile.com and provides patient friendly information and resources.

KEITH TEMPANY qualified in 1976 and worked in both independent and multiple practice before opening a fee-based contact lens only practice in 2002. He has been shortlisted for seven Optician awards, winning three, including Contact Lens Practitioner of the Year in 2010 and 2014. Keith joined the British Contact Lens Association (BCLA) council in 2009 and was voted in as president in 2017 and his Presidential Address was on myopia management. Keith is chair of the BCLA Myopia Management Committee, and oversaw the development and launch of the BCLA Myopia Management Certificate, of which he is now co-course lead. Keith is the store director of Leightons & Tempany Opticians & Hearing Care in Poole, and works as an independent consultant. He is an experienced author, lecturer and facilitator of contact lens and dry eye education both nationally and internationally.

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References for this article are published with the online version.

LEARNING OUTCOMES FOR THIS CPD ARTICLE

DOMAIN: Communication

2.1: Communicate effectively about the risks, advice and management options for myopia, with patients, and their parents/carers, who may be at risk of developing or progressing with myopia.

DOMAIN: Clinical Practice

5.3: Be aware of the latest research into the onset and progression of myopia in children and consider how you will apply this knowledge in your day-to-day clinical practice.

7.1: Conduct an adequate assessment when managing paediatric patients including family refractive history, time spent outdoors, and time spent using near vision including study and leisure activities.

DOMAIN: CL speciality

Ensure paediatric patients and their parents/carers are carefully informed about their personal risk of developing myopia or progressing with myopia. Provide the correct advice and inform of the available management options within your scope of practice and appropriately refer to an alternative eyecare practitioner where required when outside of your scope of practice.



**Communication
Clinical Practice
Speciality: Contact Lens
Opticians**

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