Association of Optometrists

Myopia and myopia management

Consent for treating a child

Myopia (short-sightedness) is a common eye problem. Sight difficulties caused by myopia can usually be corrected with prescription glasses or contact lenses, but myopia can also affect people's eye health in other ways.

There are several treatments designed to manage (slow down) the progression of myopia, particularly in children and young people. These treatments have advantages and disadvantages.

This leaflet explains what myopia is, the health risks it can cause, and the possible benefits and risks of myopia management treatment. Your optometrist will be able to tell you more about myopia, and myopia management, and advise you on the options for treating myopia.

If an optometrist has recommended myopia management treatment for your child, they will ask you to read this leaflet. They will also ask you to sign the form at the end of it to confirm that you understand the risks of myopia and myopia management, and that you agree to the treatment.

What is myopia?

Myopia happens when the eye focuses light in front of the retina (the light-sensitive layer of cells at the back of the eyeball), rather than on it. This means that distant objects will be blurred, but close objects will be clear. The most common way to correct this is with glasses or contact lenses which refocus light onto the retina. If your child is very myopic (short-sighted) and this is left uncorrected, their distance vision will be poor.

Myopia can develop at any age, but it is more likely to begin in childhood. Once myopia begins to develop it usually continues to get worse until young adulthood, but will sometimes stabilise before then. The development of myopia has been linked to different factors, including family history, ethnic background, environment (particularly living in cities and spending a lot of time indoors) and spending a lot of time carrying out close-up tasks. (See reference 1 at the end of the document.)

What are the risks of myopia?

Being myopic increases the risk of certain conditions, and this risk increases the more myopic you are (see reference 2). If your child has myopia, they are more at risk of developing the following conditions at some point during their life.

Myopic maculopathy — This refers to a condition which damages the central vision. If your child has a large degree of myopia they are at a greater risk of developing myopic maculopathy.

Retinal detachment — This is where the retina pulls away from the other layers of the eye. It can lead to permanent sight loss if it is not treated quickly. Higher levels of myopia increase the risk of this happening.

Cataracts — This is where the lens of the eye becomes cloudy. Cataracts are very common and mostly develop in older age. There is some evidence that suggests higher levels of myopia mean cataracts may develop at a younger age. Treatment for cataracts is normally straightforward and effective.

Patient information | Sept 2021 | Copyright © 2021 Association of Optometrists

Glaucoma — This is a condition where the optic nerve becomes damaged. It affects the peripheral vision (side vision) first, but can lead to severe sight loss. There is some evidence that myopia may slightly increase the risk of developing glaucoma.

What is myopia management?

Myopia management is a name for any process that tries to limit how myopic a patient becomes. This involves either prescribing an appliance, such as contact lenses, that changes the way the eye focuses light, or using medication to change how quickly the eye grows. Both methods are designed to help the eye grow in a way that focuses light more accurately. Myopia management does not cure or reduce myopia, but aims to slow down the rate at which it gets worse.

The eye grows rapidly until early adulthood, so myopia management will usually be continued until your child is at least 17 years old. If myopia management is stopped before your child's eye has stopped growing, the myopia may start to get worse again.

What are the options for myopia management and how effective are they?

Scientific evidence shows that different forms of myopia management can work for some people, but not for everyone. Most of the evidence has been gathered from a South-East Asian population in countries such as Singapore, although there is recent evidence from the US and Europe. As genetic as well as environmental factors also affect myopia, we can't tell beforehand whether myopia management will work for your child.

Standard soft or rigid gas-permeable contact lenses

Evidence suggests that while standard contact lenses improve vision, they have little to no effect on slowing down myopia.

Standard glasses

Evidence suggests that while standard glasses improve vision, they have little to no effect on slowing down myopia. If glasses do not correct myopia properly (for example, if the glasses are not strong enough), this has been shown to make myopia develop more quickly or become more severe than it might otherwise have done.

Atropine eye drops

Some evidence suggests that low-dose atropine (0.01%) may be able to significantly slow down the progression of myopia in some patients. However, atropine is not currently licensed for myopia management in the UK.

What are the risks of atropine eye drops?

Atropine may cause the pupils to increase in size and make it difficult to focus on things up close. The larger pupil size may make the eyes more sensitive to light. These side effects are normally more severe with the higher 1% dose of atropine, and will disappear when the treatment is stopped.

As low-dose atropine is a new treatment that is currently only being used as part of research in the UK, there is limited evidence on the side effects of long-term use. This means there may be other risks that we don't yet know about.

More generally, higher-dose atropine (1%) has been linked to tachycardia (raised heart rate), altered mental states, dry mouth, urinary retention (being unable to empty the bladder properly), constipation and flushed skin. However, these side effects are thought to be extremely rare with low-dose atropine (0.01%).

Soft multifocal contact lenses

There is currently a limited range of CE-marked lenses that are available specifically to manage myopia. These lenses need to be worn for 10 hours each day, six days a week. A similar effect may be achieved using normal soft multifocal contact lenses with a 'centre distance' design, which are normally prescribed for older people who need reading glasses. Although they are not licensed to manage myopia, evidence suggests that soft multifocal contact lenses may be able to significantly reduce the progression of myopia in some patients.

What are the risks of wearing contact lenses?

Most contact lens complications are minor and will disappear without any lasting damage if patients stop wearing the lenses. However, stopping wearing lenses designed to manage myopia may result in the myopia developing at a faster rate than it did before starting myopia management treatment.

Microbial keratitis

This complication of wearing contact lenses is rare, but it can cause sight loss. It is caused by bacteria or fungi entering a damaged area of the cornea (the front part of the eye). The damage to the cornea may be caused by scratches or sore patches due to inserting and removing contact lenses and wearing contact lenses for too long.

Acanthamoeba keratitis

This is another complication of wearing contact lenses. It can also cause sight loss. Acanthamoeba is a microscopic organism that is commonly found in tap water. Most cases of acanthamoeba keratitis happen after the contact lenses have come into contact with tap water or have been worn when showering, swimming or bathing. Acanthamoeba keratitis is a rare complication, but it can be very difficult to treat and treatment is not always successful.

About the AOP
The Association of Optometrists (AOP) is the leading representative membership organisation for optometrists in the UK. We support over 82% of practising optometrists, to fulfil their professional roles to protect the nation's eye health. For more information, visit www.aop.org.uk

Orthokeratology contact lenses

These are different from standard contact lenses because they aim to alter the shape of the front of the eye to change the focus, rather than using a lens to refocus light as it enters the eye. These lenses are normally worn overnight for eight hours, rather than during the day. Evidence suggests that orthokeratology may significantly reduce the progression of myopia in some patients.

What are the risks of orthokeratology?

Orthokeratology lenses have the same risks as all contact lenses (as explained above). However, the risk of microbial keratitis has been reported to be significantly higher in these lenses compared with daily-wear soft multifocal lenses (see reference 4). As well as those risks, there are other risks due to the way orthokeratology lenses work by reshaping the front surface of the eye, such as the contact lens binding to the front surface of the eye. Although this can happen with any contact lens and can be solved by adjusting the lens fit, it can be distressing, especially for children, if it happens. As these lenses are deliberately worn overnight, the risk of the eye not getting enough oxygen and the lens sticking to the eye are higher than with some other lenses.

Myopia-control glasses

The lenses in these glasses are different than in normal glasses because they are designed to allow clear central vision while stopping the light from focusing clearly around the edges of the vision. There is currently very limited evidence about how successful these lenses may be, but early studies show they may significantly reduce the progression of myopia in some patients.

Spending more time outdoors

Spending more time outdoors has been shown to delay the age when myopia starts; this will help to reduce the risk of fast progression of myopia. Researchers aren't sure why this works, but it is thought to be linked to exposing the eyes to more natural light. Even on an overcast day there is significantly more natural light outdoors than indoors.

Potential myopia progression reduction for each treatment option

Please ask your optometrist to explain the information in the table below to you.

Treatment	Potential reduction in rate of myopia progression (power)	Potential reduction in rate of eye growth (axial length)
Standard soft or hard contact lenses	Does not apply	Does not apply
Standard glasses	Does not apply	Does not apply
Atropine eye drops 0.01%	0.25D to 0.75D per year	Minimal effect
Soft multifocal contact lenses	<0.25D per year	0.11 mm per year
Orthokeratology contact lenses	Does not apply	0.15 mm per year
Myopia-control glasses	Approximately 0.25D per year	0.16 mm per year
Increasing time outdoors	<0.25D per year	Not known

See reference: 3 and 5. *Note:* There is currently very limited evidence on myopia-control glasses, so the results in the table above may change.

References

1. The complex interactions of retinal, optical and environmental factors in myopia aetiology. Progress in retinal and eye research, Flitcroft, D. I. (2012).

   IMI–Defining and classifying myopia: a proposed set of standards for clinical and epidemiologic studies. Investigative ophthalmology & visual science, Flitcroft, D. I., He, M., Jonas, J. B., Jong, M., Naidoo, K., Ohno-Matsui, K., & Yannuzzi, L. (2019).

2. The complex interactions of retinal, optical and environmental factors in myopia aetiology. Progress in retinal and eye research, Flitcroft, D. I. (2012).

   IMI–Defining and classifying myopia: a proposed set of standards for clinical and epidemiologic studies. Investigative ophthalmology & visual science, Flitcroft, D. I., He, M., Jonas, J. B., Jong, M., Naidoo, K., Ohno-Matsui, K., & Yannuzzi, L. (2019).

3. Efficacy comparison of 16 interventions for myopia control in children: A network meta-analysis. Ophthalmology, Huang J, et al. (2016).

   IMI–Interventions for Controlling Myopia Onset and Progression Report. Investigative ophthalmology & visual science, Wildsoet, C. F., Chia, A., Cho, P., Guggenheim, J. A., Polling, J. R., Read, S., & Wu, P. C. (2019).].

   IMI–Industry Guidelines and Ethical Considerations for Myopia Control Report. Investigative ophthalmology & visual science, Jones, L., Drobe, B., González-Méijome, J. M., Gray, L., Kratzer, T., Newman, S., & Schmid, K. L. (2019).

   IMI–Clinical myopia control trials and instrumentation report. Investigative ophthalmology & visual science, Wolffsohn, J. S., Kollbaum, P. S., Berntsen, D. A., Atchison, D. A., Benavente, A., Bradley, A., ... & Hirota, M. (2019).

4. Jonas, J. B. et al. IMI Prevention of Myopia and Its Progression. Invest Ophth Vis Sci 62, 6–6 (2021).

5. Lam, C. S. Y. et al. Defocus Incorporated Multiple Segments (DIMS) spectacle lenses slow myopia progression: a 2-year randomised clinical trial. Brit J Ophthalmol 104, 363 (2020).

Consent to myopia management in children

I have read and understand the risks associated with myopia and myopia management.

- [ ] I understand that if I choose not to treat my child's myopia, there is no certainty that it will get worse.
- [ ] I understand that there is no guarantee that myopia management will reduce the progression of my child's myopia.
- [ ] I understand that myopia management does not cure myopia, and my child is likely to need glasses or contact lenses to correct any myopia they have before they start treatment.
- [ ] I understand that when my child stops myopia management, there is a risk that their myopia may begin to progress quickly. The older my child is when they stop myopia management, the lower this risk is.
- [ ] I understand that if my child refuses to start or continue with myopia management their treatment will stop, even though that may mean their myopia gets worse.
- [ ] I understand that if my child's myopia is treated with contact lenses, they will also need prescription glasses during the treatment to wear when they are not wearing their lenses.
- [ ] I understand that if my child's myopia is treated with atropine eye drops, they may need prescription glasses to provide clear vision.
- [ ] I understand that my child will need appointments with an optometrist every six months to make sure their eyes are healthy.
- [ ] I understand that this treatment is provided privately and is not available on the NHS.

Patient name:	
Name of parent or legal guardian with responsibility for the patient named above:	
Parent's or legal guardian's signature:	**Date:**
Optometrist's name:	
Optometrist's signature:	**Date:**

About the AOP

The Association of Optometrists (AOP) is the leading representative membership organisation for optometrists in the UK. We support over 82% of practising optometrists, to fulfil their professional roles to protect the nation's eye health. For more information, visit www.aop.org.uk