Myopia Management

There are traditionally two factors that may determine whether your child will develop myopia or become more myopic – genetics and environmental factors. However, more recently, the choice of optical correction has become an important potential third factor in myopia progression, and this is where myopia management plays a role.

None of us, currently, can alter our genetic risk of developing myopia - although this is useful information to be aware of in estimating risk. However, there has been a considerable amount of research into the effect of environmental influences on myopia progression and this of course is something we can try and adjust to reduce the risk of becoming myopic or reducing the rate of progression.

The two main potential influences are the following:

1) Time spent outdoors (especially for children that have not yet developed myopia) - ideally one hour at least per day.

2) Near tasks - ideally material should be positioned at least 40 cm away from the eyes and regular breaks should be taken to look in the distance every 30 minutes for a few minutes.

There's no getting away from the fact that, as parents, these can be challenging behavioural modifications to instil in our children - handheld devices, required school work on screens, exciting video games, cold weather and rainy days are all not on our side!

In order to understand myopia management, it is necessary to answer a few questions.

- A) What is myopia (and conversely what is hypermetropia)?
- B) How is myopia traditionally corrected or treated?
- C) How can traditional methods of correction contribute to progression of myopia?
- D) How does myopia management work?
- E) Why use myopia management?
- F) Is it safe?
- G) How much does it cost?

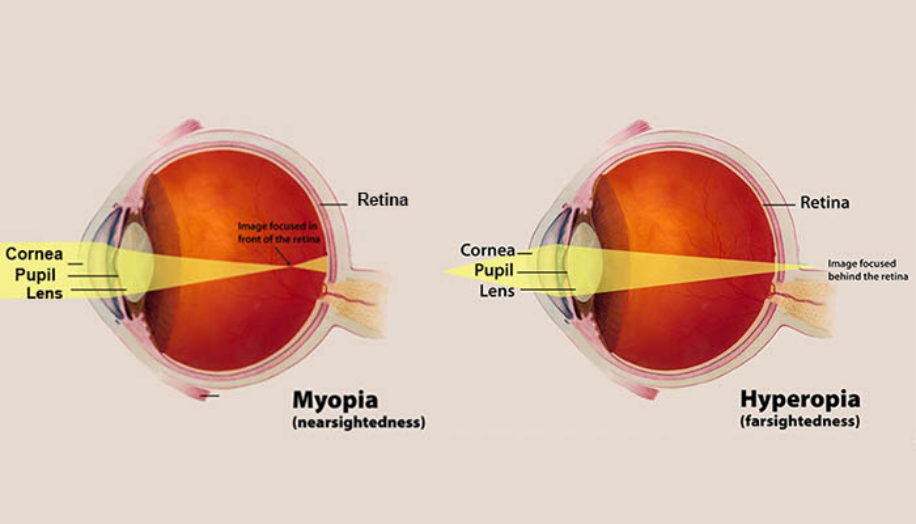
A) Myopia/hypermetropia

- What is myopia?

In myopia (short-sightedness) objects in the distance are more blurred than those at near. The image on the left shows light entering the eye is being bent too much and focuses in front of the retina. An eye with myopia is said to be myopic.

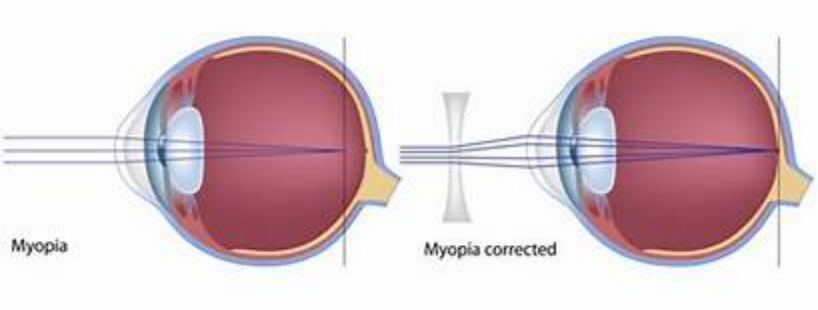
- What is hypermetropia?

Conversely, the image on the right shows the light isn't being bent enough and therefore focuses behind the retina. A eye with hypermetropia is said to be hypermetropic or hyperopic.



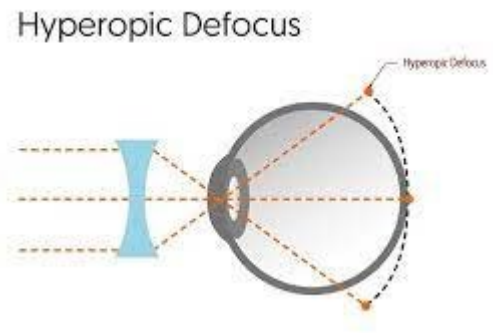
B) How is myopia traditionally corrected or treated?

The image on the left below shows a myopic eye without correction. The image on the right shows the effect of a minus powered, or concave lens, on light entering the eye - the effect of which is to diverge the light and therefore push the image further back on to the retina and the point of focus.



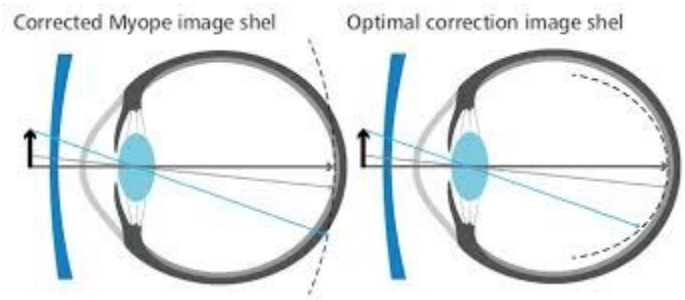
C) How can traditional methods of correction contribute to progression of myopia?

- As demonstrated above, a minus or negative powered lens is placed before the eye to diverge the light, pushing the image onto the retina to correct myopia.
- You will notice in the image below, that the light at the centre of focus falls on the retina. However, as you move away from the centre, the remainder of the image (or image shell) becomes increasingly focused behind the retina.
- This part of the image is said to be in hyperopic defocus.
- Research has shown that this hyperopic defocus is a contributor to increasing myopia.
- It is believed that the hyperopic defocus signals the eye to continue to grow longer (what is called increasing axial length). As the eye continues to grow longer, all images will increasingly fall short of the point of focus, and therefore require stronger minus lenses to place the image back on to the retina.



D) How does myopia management work?

The image below on the left shows the hyperopic defocus created when correcting myopia with traditional glasses and/or contact lenses. The image on the right shows the ideal, or desired, correction – which is to create a slightly myopic defocus in the peripheral retina.



Whether glasses or contact lenses are used, the aim of either treatment is to correct the hyperopic defocus.

E) Why use myopia Management?

Firstly, is important to clearly state that whatever method of myopia management is employed, there is no guarantee of success. The published literature demonstrates a slightly less than 60% reduction in myopia progression in both peripheral defocus contact lenses and spectacles. Of course, some children's myopia will progress at a rate less than this and some more. Secondly, there is currently no defined end point to the treatment - although it is likely that treatment would be maintained until they are at least 18 years old. Finally, there is no guarantee that having ceased treatment, the myopia will not continue to progress.

Having said all of that, these methods are currently our best option in slowing the progression of myopia and *any* reduction is important for the two following reasons:

1) From a practical point of view, if myopia management meant a child's prescription stabilised at -3.00 instead of -4.50, this makes it easier to function without their glasses or contact lenses, should the need or situation arise.

2) Secondly, with regards to eye health, the more myopic an eye is, the higher the odds of developing certain conditions such as glaucoma and retinal detachment in the future. These eye conditions are known to be more prevalent with increasing myopia and this information is in no way stated as a scare tactic or persuade the decision to embark upon any myopia management technique. Furthermore, the optometrist will not mention these eye health risks directly to your child and you may also personally decide to adopt a similar degree of tact when discussing the benefits of treatment with your child.

At Darling Eyecare we can offer both soft daily disposable contact lenses or spectacle lenses as potential management treatments. These are the following options currently available in this practice*:

1) **Hoya's MiYOSMART spectacle lens – this uses a technology called D.I.M.S. (Defocus Incorporated Multiple Segments) to alter the peripheral retinal focus.**
   NB The MiYOSMART lenses must be fitted into frames that meet specific fitting criteria (we will guide you in the frame choice). The specs will generally be worn full time, but this may depend on the level of myopia and the degree of progression.

2) **CooperVision's dual focus MiSight contact lens – these also alter the peripheral retinal focus. It is expected that the contact lenses are worn for 10 hours per day for 6 days per week.**

With either method, there will be a short adaptation period due to the altered peripheral focus. Most children adapt to this very easily and quickly.

Whether contact lenses or spectacles are used to manage myopia will partly depend on various factors such as your child's age, strength of the prescription, eye muscle balance, the stability of the myopia, family history, eye health, current medications, and hobbies/sports etc. The optometrist will discuss with you and your child the most suitable option and of course answer any questions you may have - after all there is quite a lot of information to digest! Please ask questions!

** Another contact lens option, whereby contact lenses are kept in overnight to reshape the cornea (called orthokeratology), is not currently available in this practice - if you would like further information on this please let us know.*

F) Is it Safe?

Using spectacles in myopia management has been shown to be safe. As the D.I.M.S technology is incorporated into a single vision lens, MiYOSMART lenses are classed as a non-invasive treatment option. They pose no risk to eye health as they are just like wearing a conventional pair of lenses.[1]

There is a risk of infection with contact lens wear, but this is very low. A recent retrospective review of six randomized controlled trials of myopia control showed a very low incidence of contact lens related complications and no serious events.[2]

Finally, the optometrist, Mark Darling, has completed the relevant training courses to fit and dispense, both CooperVision's MiSight contact lens and Hoya's MiYOSMART spectacle lens.

G) How much does it cost?

Unfortunately, at the present time, myopia management strategies are not funded by the NHS. As a business we of course need to balance the need to make a profit against the ethics of providing an important treatment option to *any* child that may need it. As such, our pricing very much considers the latter and endeavours to give you the absolute best price possible. Please find below our current prices for both MiSight contact lenes and MiYOSMART spectacle lenses. It is expected that your child will use only one of these methods.

MiSight contact lenses: £36 per month – incudes fitting and all necessary after care.

NB Your child will also require their normal glasses for when they are not wearing contact lenses – or as back up at the very least.

MiYOSMART spectacle lenses: £90 initial payment + £18 per month – this includes any frame priced up to £60 and new lenses after one year.

Prices are correct as of 1st May 2021 and are subject to change, but with a three-month notice period.

Myopia Management is an exciting opportunity as it finally gives optometrists an alternative solution to just continuing to issue stronger prescriptions for myopia. There will undoubtedly be continued developments and treatment options available and we will of course keep abreast of these. I personally look forward to the day when no child needs to rely on specs or contact lenses to see and has the visual freedom to learn and play in a beautifully clear world!

1 Transl Vis Sci Technol. 2020 Aug 5;9(9):11. doi: 10.1167/tvst.9.9.11. eCollection 2020 Aug. Effect of Defocus Incorporated Multiple Segments Spectacle Lens Wear on Visual Function in Myopic Chinese Children

2 Safety of soft contact lenses in children: retrospective review of six randomized controlled trials of myopia control. Cheng X, Brennan NA, Toubouti Y, Greenaway NL. Acta Ophthalmol. 2020 May;98(3):e346-e351. doi: 10.1111/aos.14283. Epub 2019 Oct 25. PMID: 31654485