

Orthokeratology

Short sight (myopia) is where your eyeball is too long or your cornea (the clear window at the front of your eye) is too steeply curved. This means that, without glasses or contact lenses, things that are far away from you appear blurred.

Orthokeratology (sometimes called OrthoK or corneal reshaping lenses) is a procedure where your contact lens practitioner uses specially designed rigid gas-permeable (RGP) contact lenses to alter the shape of your cornea to temporarily reduce or correct your short sight. You wear orthokeratology lenses overnight, while you are asleep. This means you do not have to wear glasses or contact lenses during the day.

Orthokeratology can also be effective if you have a low degree of astigmatism as well as short sight. Astigmatism is where your eye is shaped a bit like a rugby ball rather than a football and this distorts both your distance and near vision. You can tell if you have astigmatism by looking at your glasses prescription. The amount of short sight or long sight is written in the 'sph' box and the amount of astigmatism is written in the 'cyl' box. If you are short-sighted your 'sph' is minus and if you are long-sighted your 'sph' is plus.

Can I have orthokeratology?

The success of orthokeratology depends on your individual clinical circumstances, including your level of short-sightedness. The procedure works best for people who are short-sighted from -1.00 to -5.00D, with no more than -1.75D of astigmatism. To see if you fall within these categories, look at your most recent prescription. If the number in the 'sph' box is 5.00 or less and the 'cyl' box is 1.75 or less you may be suitable for orthokeratology. If you are more short-sighted (over -5.00D), you may still be suitable for orthokeratology, but this will be more complicated and has a lower chance of success.

Does age matter?

As you get older, the flexibility of the lens inside your eyes reduces. This will become noticeable from your



Ask your optometrist if you are interested in having orthokeratology.

late thirties or early forties and means that you may be less able to focus on things that are close up. If you are short-sighted, you will be able to read simply by removing your glasses, but if your short sight is corrected with orthokeratology you may need to put glasses on to read. You may find this is more inconvenient than simply removing your glasses to read. Your eye-care practitioner will discuss this with you in more detail. One of the advantages of orthokeratology is that it is reversible, so if you don't like the effect you can return to how you were before the treatment.

Can orthokeratology stop children becoming more short-sighted?

Short sight is very common. It usually starts during primary school years and tends to get worse until the eye is fully grown. Clinical studies have shown that orthokeratology lenses may be effective in slowing down the rate at which the short sight gets worse. However, this should be balanced against the risks of developing an infection, which could lead to loss of sight.

The risks of developing an infection relate to the number of years of wearing contact lenses. If a child wishes to have orthokeratology, because of their age they are likely to be wearing the lenses for more years than if they were an adult. This will increase their risk of developing an infection. It is therefore essential that their parents are involved in making sure that the child looks after the lenses, is aware of the symptoms which may indicate a problem, and follows the instructions given by their contact lens practitioner. This will help to minimise the risk of an infection.

What are the risks?

Most complications from wearing contact lenses are minor. Wearing any type of contact lens carries some degree of risk, but wearing contact lenses overnight increases this risk significantly.

Microbial keratitis is a sight-threatening complication of wearing contact lenses. A review¹ found that the risk of microbial keratitis in people who wear orthokeratology lenses overnight is similar to that in people who wear other contact lenses overnight. It has been estimated that the incidence of microbial keratitis in children is 13.9 in 10 000 patient-years of wear, and that in adults is 7.7 per 10 000 patient-years.²

A recent study³ compared groups of people wearing orthokeratology lenses with those wearing daily disposable or frequent replacement soft contact lenses. It was found that over 10 years the incidence of complications was similar between the two groups, but the types of complications were different. Patients wearing soft lenses were more likely to have eyelid complications, such as a sty, whereas those wearing orthokeratology lenses were more likely to have corneal complications such as keratitis or infiltration of inflammatory cells into the cornea.

Research has found⁴ that more bacteria stuck to orthokeratology lenses than to conventional contact lenses made of the same material. This may mean that people who wear orthokeratology lenses are at an increased risk of an infection if appropriate conditions are present.

There have been several reports of people developing sight-threatening eye infections after they have worn orthokeratology lenses. These infections can be caused by contamination from water sources. Many of the reports are from Asia and at the time when these infections developed, the regulation of these overnight-wear contact lenses in Asian countries was limited, with tap water sold as a multipurpose contact lens care solution⁵. You should not let water come into contact with any contact lenses, so don't shower, swim or wash your face with them in.

If you want orthokeratology treatment, you should discuss this with your contact lens practitioner who can give you advice based on your own circumstances.

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All our fact sheets are thoroughly researched and based on the most up-to-date scientific evidence and are regularly reviewed and updated. This fact sheet contains general information. It is always best to raise any specific concerns you may have with your optometrist.

How can I reduce my risk of getting an infection?

You must make sure that you clean your lenses and accessories as directed by your contact lens practitioner.

- Rub your lenses with cleaning solution before you store them
- Rinse your lenses with sterile saline or multi-purpose solution before you put them into your eyes
- Store your lenses and their accessories in a clean environment (not near a toilet)
- Clean your lens case every day and store it dry when you are not using it. Disinfect your lens case at least every week and replace it at least every month
- Never use tap water to clean or store your lenses.

How often should I have check-ups if I have orthokeratology treatment?

It is essential that you have regular check-ups after the lens fit has stabilised. Ideally, these should be at least every six months. These aftercare examinations will include your contact lens practitioner looking at the condition of your contact lenses and lens case.

If your contact lens is uncomfortable then it should be removed. If you have a painful eye and it does not resolve when you remove the contact lens then you should seek emergency eye care from your optometrist or from a hospital eye clinic. It is also vital that you contact your contact lens practitioner immediately if you have any blurriness, pain or redness in your eyes, so that any issues can be diagnosed and managed as soon as possible.

¹ Liu M and Xie P The safety of orthokeratology – a systematic review *Eye & Contact Lens* 2016;42:35-42

² Bullimore MA, Sinnot LT and Jones-Jordan LA The risk of microbial keratitis with overnight corneal reshaping lenses *Optom Vis Sci* 2013 90(9):937-44 <https://www.ncbi.nlm.nih.gov/pubmed/23892491/> [Accessed 22/1/19]

³ Hiraoka T, Sekine Y, Okamoto F et al Safety and efficacy following 10-years of overnight orthokeratology for myopia control *Ophthalmic Physiol Opt* 2018;38:281-289

⁴ Choo JD, Holden BA, Papas EB et al Adhesion of *Pseudomonas aeruginosa* to orthokeratology and alignment lenses *Optom Vis Sci* 2009 Feb 86(2) 93-7

⁵ Watt KG, Swarbrick HA. Trends in microbial keratitis associated with orthokeratology *Eye Contact Lens* 2007;33: 373-7