een santeon ziekenhuis

Progressive myopia: treatment with atropine

Using the drug atropine to slow down the rapid progression of nearsightedness (myopia) in patients with progressive myopia.

Meer over myopia and atropine

If the lens is too convex or the eyeball is longer than average, images are projected in front of the retina rather than on the retina. A negative (minus) lens can remedy this (see image below).

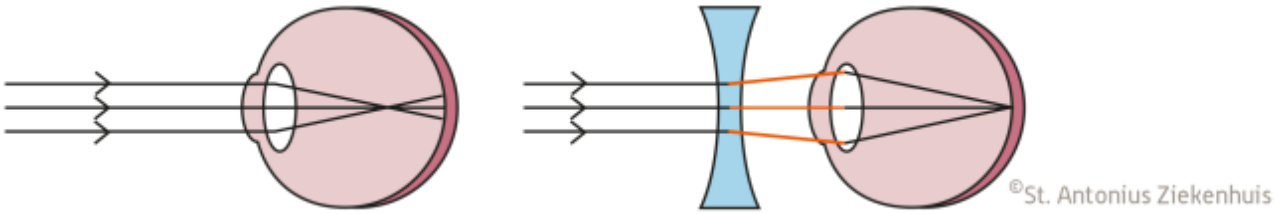

Image: a myopic eye, without and with correction

Myopia usually develops between the ages of 6 and 12. It gradually worsens during the teenage years as the eye grows and the eye length (axis length) increases.

Risks of high myopia

Myopia is often accompanied by an eyeball that is too long (greater axis length). An average healthy eyeball is 23 mm long. A nearsighted eye is longer, with lengths of over 30 mm. An eyeball with an axis length of over 26 mm or a refractive power of -6 dioptres or more is considered high myopia.

High myopia can lead to thinning of the retina. As a result, problems can occur from the age of 40. The retina's central part, known as the macula or the yellow spot, may suffer wear spots, which affect central sharp vision. Bleeding may also occur around the yellow spot, or the retina may detach (myopic macular degeneration).

High myopia also causes a greater risk of cataracts and glaucoma (loss of nerve fibres near the optic nerve). The risks of these disorders increase sharply with each increase in refractive power above -6 dioptres. They can lead to severe and permanent low vision. These risks do not diminish after refractive correction by laser or implant lens.

Your child has been diagnosed with a progressive form of myopia. This means that the disorder will continue to increase over time. Several factors play a role here, including heredity and environmental factors.

Hereditary factors

Myopia is often an inherited disorder. Scientific studies are investigating which genes are responsible. Your child's risk of myopia is higher if you and/or the other parent also have myopia.

Environmental factors

In addition to heredity, environmental factors are known to affect the likelihood of myopia. The likelihood of myopia increases significantly when a child focuses at too short a working distance (i.e., the distance between the fixation object and the child's eyes) for long periods, such as when reading a book, playing games or watching videos on a tablet or phone. As such, when children want to watch a movie, it is better to show it on the TV, as the distance to the television screen is usually more than 1.5 meters.

In short: if your child loves reading books or using a tablet or phone, they are at greater risk of developing myopia.

Protection factor

In addition to hereditary and risk factors, there is also a protective factor: playing outside. Population studies have shown that children who spend a lot of time outdoors are less likely to develop progressive myopia. Playing outdoors and sports are advisable if your child is in the risk group for myopia.

Tips and lifestyle advice for all children's eyes

The rapid increase in myopia can be limited by modifying the child's lifestyle, reducing the influence of the environmental factors that cause (progressive) myopia.

Take a 20-second break after 20 minutes of close viewing, with the child's eyes focused at an "infinite distance" (preferably as far away as possible). Consider: looking out the window for a moment or staring into the distance. Ensure a proper working distance (> 30 cm). This means that your child should hold the book or screen at least 30 cm from their eyes. An arm's length distance is recommended.

The national lifestyle advice for pediatric eyes is summarised in the 20-20-2 rule:

- Do not allow your child to watch close-up for more than 20 consecutive minutes. Make sure to implement a 20 seconds break with the eyes focused on the distance.
- Allow your child to play outside for at least 2 hours a day (14 hours a week). This includes sports, cycling and other outdoor activities.

Voorbereiding

Preparation: Create a Mijn Antonius account

Mijn Antonius is the secure online patient portal of the St. Antonius Hospital. If you don't have an account yet, it is a good idea to create one. You can read and see how to do this on our Mijn Antonius webpage (https://www.antoniusziekenhuis.nl/node/3302)

Behandeling

Treatment with atropine eye drops

The goal of treatment is to slow the rapid progression of myopia.

The treatment does not improve the refractive power, but it does slow down the progression in cases that respond well to the treatment.

Scientific studies have shown that atropine is the most effective drug for slowing the rapid progression of myopia. Atropine can be prescribed in different concentrations (0.01%, 0.05%, 0.10%, 0.25%, 0.5% and 1%). Atropine eye drops are prescribed by your ophthalmologist and can be picked up at your pharmacy. Atropine eye drops come in vials with a shelf life of 1 month after opening. You will be prescribed several vials per prescription.

If your child has been diagnosed with progressive myopia by the orthoptist or ophthalmologist, you may be advised to start administering atropine eye drops. First, the refractive power is determined using eye drops and by determining the length of the eye (axis length). The starting dose is usually 0.05%, but this depends on your child's age and the measured decrease in refractive power and axis length of the eyes.

The duration of treatment depends on age, axis length, and refractive power. The orthoptist or ophthalmologist will determine whether treatment should be continued at each check-up. Allow for a lengthy treatment process of several years.

Should the axis length of your child's eyes increase rapidly despite treatment, it may be decided to switch to a higher concentration of atropine eye drops.

Instructions

- Drop 1 drop of the prescribed dose of atropine eye drops into each eye every day before going to bed.
- Use a good pair of sunglasses (prescription if necessary) or wear a cap in sunny weather.
- Discuss complaints related to vision with the orthoptist. Glasses may need to be adjusted, or reading glasses or reading sections in the glasses may be needed. At higher doses, self-tinting lenses or prescription sunglasses are also often advised.
- 4-6 weeks after starting treatment, you will have a telephone consult with the orthoptist. Check-ups at the Ophthalmology Outpatient Clinic take place every six months.

Atropine wears off after two weeks. The pupils may remain enlarged for up to two weeks after stopping treatment. Accommodation (the ability of the eyes to focus) will improve again during the same period.

Nazorg

Side effects of atropine

Atropine is an active substance (alkaloid) that occurs naturally in certain plant species (Atropa belladonna). One of the effects of atropine is pupil dilation and relaxation of the internal muscles that focus the eye (accommodate). Children who take atropine drops for the first time often experience light sensitivity during the first few days. We recommend that your child wears good sunglasses or a cap in sunny weather. You may also choose to purchase self-tinting lenses for your child. Relaxation of the ability to focus prevents children from seeing sharply at close range. This primarily occurs with higher doses of atropine. The reading complaints that can result from this are often solved by removing the glasses when reading. Sometimes reading glasses or multifocal glasses are needed.

General physical side effects occur in less than 1% of treated children. These may include red eyes, fever, skin

rash, rapid heartbeat, dry mouth and behavioural disorders. Long-term use of atropine (3.5%) can also cause an allergic reaction. If any of these side effects occur, contact the ophthalmology clinic to discuss the following steps for the treatment.

More about atropine

Atropine is a toxic substance when ingested in high doses. Keep out of reach of young children and store safely. Atropine has been thoroughly researched as an eye drop and has long been used for various eye disorders.

No serious effects were seen in several large studies in which atropine was used as an eye drop for prolonged periods. No physical side effects were observed in these studies either. Atropine as an eye drop can, therefore, be used safely to treat progressive myopia. Strict monitoring by an orthoptist/ophthalmologist is required.

Expertise en ervaring

The ophthalmologists at St. Antonius Hospital have extensive experience in treating ophthalmic complaints. You can come to us with complaints such as cataracts, retinal abnormalities (medical retina and macular degeneration), seeing spots and flashes, squinting (strabismus), tear and tear duct complaints, corneal diseases, diabetes in the eye, increased eye pressure in the eyeball (glaucoma), atropine treatment for progressive myopia and paediatric ophthalmology.

Our ophthalmologists work closely with technical ophthalmic assistants (TOA), optometrists, orthoptists and contact lens specialists. Children up to 12 with symptoms are referred to the orthoptist by the family doctor, where the ophthalmologist will also look at the symptoms.

You can also come to us for eyesight tests and contact lenses.

Safe Care in the hospital

Safety comes first at the St. Antonius Hospital. Our staff will do everything possible to make your visit to the hospital as smooth as possible. Please help us take good care of you by telling us:

- What medications you are taking.
- Whether you have any allergies.
- Whether you are (possibly) pregnant.
- If you don't understand something.
- What you care about.
- If you see something that is not clean.

You can read more about contributing to safe care on the Dutch Patient Federation's website (https://www.patientenfederatie.nl)

Other treatment options: eyeglass correction and/or contact lenses

For children to regain sharp vision, the eyes are corrected with the help of glasses. In older children, myopia-control lenses or myopia-control contact lenses may additionally be prescribed. The orthoptist or ophthalmologist may perform a dilated eye exam to determine the exact corrective lens power.

This examination will be performed regularly throughout your child's growth. The rate of increase in corrective lens power varies greatly from child to child, but adjustment of glasses or contact lenses will be necessary from time to time to maintain sharp vision.

Meer informatie

More information about myopia can be found at: www.myopie.nl (http://www.myopie.n), Erasmus MC

Gerelateerde informatie

Specialismen

- Oogheelkunde (https://www.antoniusziekenhuis.nl/oogheelkunde)

Contact Oogheelkunde **T 088 320 22 00**