

Myopia Control - A Cure for Nearsightedness?

By Gary Heiting, OD

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If your child has myopia (nearsightedness), you're probably wondering if there is a cure — or at least something that can be done to slow its progression so your child doesn't need stronger glasses year after year.

For years, [eye care practitioners](#) and researchers have been wondering the same thing. And there's good news: A number of recent studies suggest it may indeed be possible to at least control myopia by slowing its progression during childhood and among teenagers.

What Is Myopia Control?

Although an outright cure for nearsightedness has not been discovered, your eye doctor can now offer a number of treatments that may be able to slow the progression of myopia.

These treatments can induce changes in the structure and focusing of the eye to reduce stress and fatigue associated with the development and progression of nearsightedness.

Why should you be interested in myopia control? Because slowing the progression of myopia may keep your child from developing high levels of nearsightedness that require thick, corrective eyeglasses and have been associated with serious eye problems later in life, such as early cataracts or even a detached retina.

Currently, four types of treatment are showing promise for controlling myopia:

- Atropine eye drops
- Multifocal contact lenses
- Orthokeratology ("ortho-k")
- Multifocal eyeglasses

Here's a summary of each of these treatments and of recent myopia control research:

Atropine Eye Drops

Atropine eye drops have been used for myopia control for many years, with effective short-term results. But use of these eye drops also has some drawbacks.

Topical atropine is a medicine used to dilate the pupil and temporarily paralyze [accommodation](#) and completely relax the eyes' focusing mechanism.

Atropine typically is not used for routine dilated eye exams because its actions are long-lasting and can take a week or longer to wear off. (The dilating drops your eye doctor uses during your eye exam typically wear off within a couple hours.)

ATROPINE AND MYOPIA

Nearly Half Of Nearsighted Schoolchildren In Taiwan Prescribed Atropine For Myopia Control

A study has revealed that eye doctors in Taiwan are routinely prescribing atropine eye drops for nearsighted

A common use for atropine these days is to reduce eye pain associated with certain types of uveitis.

Because research has suggested nearsightedness in children may be linked to focusing fatigue, investigators have looked into using atropine to disable the eye's focusing mechanism to control myopia.

And results of studies of atropine eye drops to control myopia progression have been impressive — at least for the first year of treatment. Four short-term studies published between 1989 and 2010 found atropine produced an average reduction of myopia progression of 81 percent among nearsighted children.

However, additional research has shown that the myopia control effect from atropine does not continue after the first year of treatment, and that short-term use of atropine may not control nearsightedness significantly in the long run.

Interestingly, one study found that when atropine drops were discontinued after two years of use for myopia control, children who were using drops with the lowest concentration of atropine (0.01 percent) had more sustained control of their nearsightedness than children who were treated with stronger atropine drops (0.1 percent or 0.5 percent). They also had less "rebound" myopia progression one year after treatment.

Also, many eye doctors are reluctant to prescribe atropine for children because long-term effects of sustained use of the medication are unknown.

Other drawbacks of atropine treatment include discomfort and light sensitivity from prolonged pupil dilation, blurred near vision, and the added expense of the child needing bifocals or progressive eyeglass lenses during treatment to be able to read clearly, since his or her near focusing ability is affected.

Orthokeratology

Orthokeratology is the use of specially designed gas permeable contact lenses that are worn during sleep at night to temporarily correct nearsightedness and other vision problems so glasses and contact lenses aren't needed during waking hours.

SEE ALSO: Should Your Teen Wear Contacts? Click here to learn more >

But some eye doctors use "ortho-k" lenses to also control myopia progression in children. Evidence suggests nearsighted kids who undergo several years of orthokeratology may end up with less myopia as adults, compared with children who wear eyeglasses or regular contact lenses during the peak years for myopia progression.

Many eye care practitioners refer to these lenses as "corneal reshaping lenses" or "corneal refractive therapy (CRT)" lenses rather than ortho-k lenses, though the lens designs may be similar.

In 2011, researchers from Japan presented a study that evaluated the effect of ortho-k lenses on eyeball elongation in children, which is a factor associated with myopia progression.

A total of 92 nearsighted children completed the two-year study: 42 wore overnight ortho-k lenses and 50 wore conventional eyeglasses during the day. The average age of children participating in the research was about 12 years at the beginning of the study, and children in both groups had essentially the same

schoolchildren in hopes the treatment will slow the progression of childhood myopia.

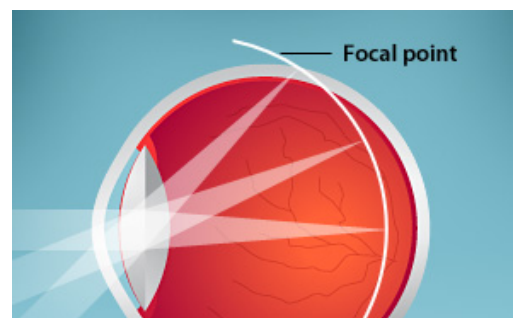
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Taiwan has one of the highest prevalences of childhood myopia worldwide, with one study finding 84 percent of Taiwanese children are nearsighted by age 16.

The researchers found the number of nearsighted children who were prescribed atropine eye drops increased significantly, from 36.9 percent in 2000 to 49.5 percent in 2007. The prescription eye drops were most frequently prescribed for myopic children between the ages of 9 and 12.

The study used a representative sample from the National Health Insurance claims data. All schoolchildren between the ages of 4 and 18 who had visited an ophthalmologist and were diagnosed with myopia between 2000 and 2007 were included. As of 2007, approximately 98 percent of Taiwan's 23 million people were enrolled in the country's National Health Insurance program, which was launched in 1995.

A report of the study was published online by *Eye*, the official journal of the Royal College of Ophthalmologists (U.K.) in January 2013.



amount of pre-existing myopia (-2.57 D) and the same axial (front-to-back) eyeball length (24.7 mm).

At the end of the study, children in the eyeglasses group had a significantly greater increase in the mean axial length of their eyes than children who wore the ortho-k contact lenses. The study authors concluded that overnight orthokeratology suppressed elongation of the eyes of children in this study, suggesting ortho-k might slow the progression of myopia, compared with wearing eyeglasses.

In 2012, the same researchers published the results of a similar five-year study of 43 nearsighted children that showed wearing ortho-k contact lenses overnight suppressed axial elongation of the eye, compared with wearing conventional eyeglasses for myopia correction.

Also in 2012, researchers in Spain published study data that revealed children 6 to 12 years of age with -0.75 to -4.00 D of myopia who wore ortho-k contact lenses for two years had less myopia progression and reduced axial elongation of their eyes than similar children who wore eyeglasses for myopia correction.

In October 2012, researchers in Hong Kong published yet another study of the effect of ortho-k contact lenses on controlling myopia progression in children. A total of 78 nearsighted children ages 6 to 10 years at the onset of the investigation completed the two-year study.

Children who wore ortho-k lenses had a slower increase in axial length of their eyes by 43 percent, compared with kids who wore eyeglasses. Also, the younger children fitted with the corneal reshaping GP lenses had a greater reduction of myopia progression than the older children.

Furthermore, as myopia control expert Jeffrey J. Walline, OD, PhD, from The Ohio State University College of Optometry pointed out in his analysis of the study published in the same issue of *Investigative Ophthalmology & Visual Science*, the benefit of slowed myopia progression from wearing the corneal reshaping lenses extended beyond the first year of myopia treatment.

In March 2014, researchers in Taiwan published results of a study that compared the use of ortho-k contact lenses vs. atropine eye drops for the control of myopia in children ages 7 to 17. Participants had myopia ranging from -1.50 to -7.50 D (with up to -2.75 D of astigmatism) at the beginning of the three-year study period.

The two myopia control treatments produced comparable results: children wearing the ortho-k lenses experienced myopia progression of -0.28 D per year, and those who wore eyeglasses and applied 0.125 percent atropine eye drops nightly had an average myopia progression of -0.34 D per year.

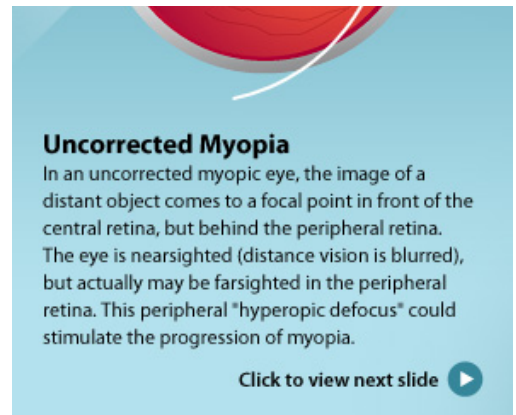
Although this study did not include a control group that received no treatment to control myopia, the study authors mentioned that in similar studies the progression of nearsightedness among children wearing ortho-k lenses for myopia control was roughly half that of those who received no myopia control treatment over a two-year period.

Multifocal Contact Lenses

Multifocal contacts are special lenses that have different powers in different zones of the lens to correct presbyopia as well as nearsightedness or farsightedness (with or without astigmatism).

But researchers and eye doctors are finding that conventional or modified multifocal soft contact lenses also are effective tools for myopia control.

In 2010, researchers from Australia, China and the United States presented data from a study of experimental myopia control contact lenses worn by Chinese schoolchildren for six months. The contacts had a special dual-focus multifocal design with full corrective power in the center of the lens and less power in the periphery.



Participants were between the ages of 7 and 14 at the onset and had -0.75 to -3.50 diopters (D) of myopia, with no more than 0.50 D of astigmatism. A total of 65 children wore the experimental multifocal contacts, and 50 children wore eyeglasses. After six months, the children wearing the multifocal contact lenses had 54 percent less progression of their myopia than the children wearing eyeglasses.

In June 2011, researchers in New Zealand reported on a comparison of an experimental multifocal soft contact lens and conventional soft lenses for myopia control in children. A total of 40 nearsighted children ages 11 to 14 participated in the study. The children wore the multifocal contact lens on one randomly assigned eye and a conventional soft contact lens on the fellow eye for 10 months, then switched the lenses to the opposite eye for another 10 months.

In 70 percent of the children, myopia progression was reduced by 30 percent or more in the eye wearing the experimental multifocal contact lens in both 10-month periods of the study.

In November 2013, researchers in the U.S. published the results of a two-year study that revealed nearsighted children who wore multifocal soft contact lenses on a daily basis had 50 percent less progression of their myopia, compared with similarly nearsighted children who wore regular soft contact lenses for two years.

Children participating in the study ranged in age from 8 to 11 years and had -1.00 to -6.00 D of myopia at the time of enrollment.

The study authors concluded that the results of this and previous myopia control studies indicate a need for a long-term, randomized clinical trial to further investigate the potential of multifocal soft contact lenses to control the progression of nearsightedness in children and thereby reduce risks associated with high myopia.

CHILDREN'S VISION NEWS

Nearly Half Of The Global Population May Be Nearsighted By 2050, Researchers Say

February 2016 — Researchers at the Brien Holden Vision Institute in Sydney, Australia, recently pored over data from 145 studies and analyzed the prevalence of myopia and high myopia among 2.1 million study participants. The group also used data published since 1995 to estimate trends from 2000 to 2050.

What they found was alarming.

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An estimated 1.4 billion people worldwide were nearsighted in 2000. That's about 23 percent of the total global population. But by 2050, the researchers predict this figure will soar to 4.8 billion, afflicting 49.8 percent of the world's population.

The good news is, there are ways to protect your children from landing on the wrong side of this statistic. One key may be to encourage them to turn off their electronic devices and head outdoors.

The study points out that the projected increases in myopia are driven principally by lifestyle changes characterized by more near-work activities, like using computers and portable electronic devices, including smartphones. Other proposed risk factors for myopia include long hours spent in the classroom and less time outdoors, especially among young children in countries such as Singapore, Korea, Taiwan and China.

Although the vision of most people with nearsightedness can be corrected with glasses and contact lenses, high levels of myopia increase the risk of eye diseases such as cataracts, glaucoma, retinal detachment and myopic macular degeneration — all of which can cause irreversible vision loss.

The study report authors concluded that the prevalence of high myopia is likely to increase seven-fold from 2000 to 2050, which would make myopia a leading cause of permanent blindness worldwide. The report appeared online this month on the website of the journal *Ophthalmology*. — **A.H.**

Multifocal Eyeglasses

Multifocal eyeglasses also have been tested for myopia control in children, but results have been less impressive than those produced with multifocal contacts.

A number of studies published between 2000 and 2011 found that wearing multifocal eyeglasses does not provide a significant reduction in progressive myopia for most children.

The Correction of Myopia Evaluation Trial (COMET), a study published in 2003, found that progressive eyeglass lenses, compared with regular single vision lenses, did slow myopia progression in children by a small but statistically significant amount during the first year. But the effect wasn't significant in the next two years of the study.

But in March 2014, researchers in Australia and China published the results of a three-year clinical trial that evaluated the progression of nearsightedness among 128 myopic children ages 8 to 13 years. All participants had experienced at least -0.50 D of myopia progression the year preceding the start of the study.

One group of children wore conventional single vision eyeglasses, a second group wore bifocals, and a third group wore bifocal lenses with prism. After three years, children who wore either type of bifocal eyeglasses had significantly less mean progression of nearsightedness (-1.01 D to -1.25 D) than children who wore single vision lenses (-2.06 D).



When your child is nearsighted [\[Infographic\]](#)

Detecting Myopia Early

The best way to take advantage of methods to control myopia is to detect nearsightedness early.

Even if your child is not complaining of vision problems (nearsighted kids often are excellent students and have no visual complaints when reading or doing other schoolwork), it's important to schedule routine eye exams for your children, starting before they enter preschool.

Early childhood eye exams are especially important if you or your spouse are nearsighted or your child's older siblings have myopia or other vision problems.

What About Myopia Control In Adults?

Myopia typically develops during the early school years and tends to progress more rapidly in pre-teens than in older teenagers. This is why myopia control studies usually involve relatively young children.

While it's true that myopia also can develop and progress in young adults, this is less common. And it's possible that an adult's eyes may not respond to myopia control treatments the same way a child's eyes do. For these reasons, it's likely that most research on controlling myopia progression will continue to focus on nearsighted children rather than adults.

Can Eye Exercises Cure Myopia?

You no doubt have seen or heard advertisements on television and the Internet that claim eye exercises can reverse myopia and correct your eyesight "naturally."

Some of these eye exercise programs recommend you ask your eye doctor to write you an eyeglasses prescription that intentionally under-corrects your nearsightedness for full-time wear as an adjunct treatment to performing the exercises. The claim is that the exercises and undercorrection of your myopia will reduce your nearsightedness, so you will need less vision correction as time goes on.

It's worth noting here that research has shown undercorrection of myopia is ineffective at slowing myopia progression and may in fact increase the risk of nearsightedness getting worse. Also, intentional undercorrection of myopia causes blurred distance vision, which may put your child at a disadvantage in the classroom or in sports and affect their safety.

My opinion (and the opinion shared by most eye doctors and vision researchers) is that eye exercises do not cure myopia, are highly suspect, and are not supported by well-designed independent research. Buyer beware! [AAV](#)

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References & Notes >>

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