

Insight into why some children develop myopia

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Myopia (nearsightedness) develops in children when the lens stops compensating for continued growth of the eye, according to a study in the March issue of *Optometry and Vision Science*, official journal of the American Academy of Optometry. The journal is published by Lippincott Williams & Wilkins, a part of Wolters Kluwer Health.

Using detailed information on eye growth and vision changes in children over time, the new research shows "decoupling" of lens adaptation from eye growth about a year before myopia occurs. Donald O. Mutti, OD, PhD, of The Ohio State University College of Optometry, is lead author of the new study.

Growth Imbalance Leads to Myopia...

The researchers analyzed repeated measurements of vision and eye growth performed over several years in children aged 6 to 14. The study focused on the growth of the two key parts of the eye affecting normal vision: the cornea, the transparent front part that lets light into the eye; and the lens, located behind the cornea, which focuses light rays on the retina at the back of the eye.

Myopia or nearsightedness—difficulty seeing objects at a distance—develops in about 34% of American children as they grow. Vision professionals and scientists typically think of myopia as a problem occurring when the eyeball becomes too long (front to back) for the optical power of the cornea and lens.

However, it has been unclear how this imbalance develops in children who previously had normal vision. To answer this question, Dr. Mutti and colleagues compared changes in eye growth for children who developed myopia at different ages versus those whose vision remained normal.

They found that, in children without myopia, the lens grew thinner and flatter to maintain normal vision as the eye grew. This adaptation maintained a normal balance between the optical power of the lens and the increasing length of the eyeball. From age nine months to nine years, eyeball length increased by an average of three millimeters.

...As Lens Stops Responding to Increasing Eye Length

However, in children who developed myopia, the lens stopped changing in response to eye growth. Nearsightedness developed not just because of increases in the length of the eyeball, but rather because the optical power of the lens no longer changed as the eye grew.

The imbalance occurred rather suddenly: about one year before the children became nearsighted. For at least five years after the development of myopia, the eye kept becoming longer but the lens stopped flattening and thinning.

In contrast to the lens, changes in corneal growth showed little or no relation to the development of myopia. The cornea is responsible for about two-thirds of the optical power of the eye, and the lens for the remaining one-third.

The study provides vision professionals with an important new piece of information on why some children develop myopia. However, what's still unclear is why the lens suddenly stops adapting to continued growth of the eye. More research will be needed to answer that question—one possibility is that an abnormally thick ciliary muscle within the eye forms a mechanical restriction preventing the stretching that thins and flattens the lens as the eye continues to grow.

Source:

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