

# 'Internal astigmatism' doesn't compensate for changes in the eye over time

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For people with nearsightedness (myopia), the lens doesn't compensate for growth or other changes in the structure of the eye, according to a long-term follow-up study in the September issue of *Optometry and Vision Science*, official journal of the American Academy of Optometry.

The results add a new piece of evidence to a longstanding debate as to how or whether the lens or other [eye](#) structures change in response to focusing abnormalities—especially those caused by irregular shape of the eye, or astigmatism. The lead author was Ruth E. Manny, OD, PhD, of University of Houston College of Optometry.

## Is 'Internal Astigmatism' Compensation or Constant?

The researchers analyzed follow-up data on 367 individuals with [myopia](#). Over a 14-year period, the subjects underwent detailed measurement of eye structures as well as assessment of refractive (focusing) error. The findings were compared to one-time measurements in a matched group of 204 subjects without myopia.

The goal was to assess changes in the "internal astigmatism" of the eye over time. "Clarity of vision is determined by the precise shape of the eye and coordination of several optical components that must all be perfectly balanced to provide proper focus," explains Michael Twa, OD, PhD, Editor-in-Chief of *Optometry and Vision Science*. "A longstanding question is how the eye adapts and controls its shape to deliver correct

focus as it grows from birth to adult dimensions."

One theory is that the lens of the eye can adapt its shape in response to growth and other changes in eye structure. If so, there would be a change in internal astigmatism—the difference between corneal astigmatism at the front of the eye and total astigmatism measured from the whole eye.

The study found some significant differences between the groups with and without nearsightedness. Internal astigmatism was greater in subjects without myopia, who were better able to compensate for corneal astigmatism. Participants with low corneal astigmatism were less likely to have a large amount of internal astigmatism.

However, internal astigmatism did not change in response to changes in the shape of the eye—instead, it remained relatively stable over time. "There was no evidence that the lens or other internal structural elements of the eye were actively compensating for corneal astigmatism," says Dr. Twa.

The new study can't explain the sources of internal astigmatism. However, the findings do not support the theory that the lens plays any active role in compensating for astigmatic defocus of the eye.

The results may have important implications for surgical procedures to correct vision—for example, to minimize residual astigmatism in patients with cataracts undergoing intraocular [lens](#) replacement surgery. Dr. Manny and coauthors note that new instruments now becoming available may provide new insights into the factors affecting changes in eye structures over time.

**More information:** Ruth E. Manny et al. Internal Astigmatism in Myopes and Non-myopes, *Optometry and Vision Science* (2016). [DOI: 10.1097/OPX.0000000000000946](https://doi.org/10.1097/OPX.0000000000000946)

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