

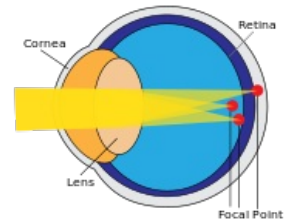
Astigmatism

Astigmatism is a type of **refractive eye defect** that is caused by asymmetry of the optical power of the cornea. In a healthy eye, the cornea has a round regular shape. Light passes through the cornea, which is refracted equally in all directions, whereas in astigmatism the cornea is more or less curved in one or both planes. Therefore, the light falling on the cornea is refracted in different directions and the rays of light do not merge on the retina into one focus. The result is **blurred vision** at all distances. Lens astigmatism is much rarer.

The cause of astigmatism is still not fully clarified. Most people are born with astigmatism, but it can occasionally appear after an eye injury or surgery.

Symptoms of astigmatism

People with astigmatism often complain of headaches, eye strain, blurred vision, squinting, or fatigue after tasks that require focus, such as reading or working at a computer. Due to the fact that astigmatism often occurs with other eye defects such as *nearsightedness (myopia)* and *farsightedness (hypermetropia)*, many people do not even know they have it.



Compound astigmatism

Types of astigmatism

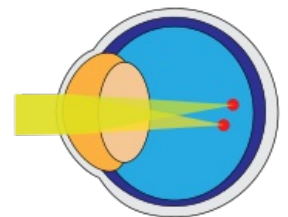
There are five types of astigmatism:

■ Simple astigmatism

1. Myopic - light is refracted into two foci in one plane, one ray on the retina, the other in front of the retina
2. Hypermetropic - one ray is refracted on the retina and the other behind the retina, all in one plane

■ Compound astigmatism

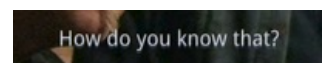
1. Myopic - light is refracted into two planes in front of the retina
 2. Hypermetropic - light is refracted into two planes behind the retina
- Combined astigmatism - light is refracted into two planes, with one ray in front of the retina and the other behind the retina



Compound myopic astigmatism

Astigmatism correction

In astigmatism, the cornea does not have the same curvature in all planes passing through the optical axis. Due to that we can distinguish the maximum and minimum curvature in two mutually perpendicular planes. We call these planes The Main meridians. The difference in optical power between the two meridians expressed in diopters, characterizes the degree of astigmatism. For correction are used toric lenses, which refract light in one axis differently than in the other axis. This compensates for the asymmetrical shape of the cornea.



This is how people with horizontal astigmatism see subtitles

References

Related articles

- Eye (biophysics)/Eye defects

Sources

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- KYMPLOVÁ, Jaroslava. *Katalog metod v biofyzice* [online]. [cit. 2012-09-20]. <<https://portal.lf1.cuni.cz/clanek-793-katalog-metod-v-biofyzice>>.

