

**ASTIGMATISM: CAUSES, DIAGNOSTICS AND  
METHODS OF TREATMENT**

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**Annotation:** *Astigmatism is one of the most common refractive errors affecting vision. This disease is caused by the irregular shape of the cornea or the lens of the eye, as a result of which the light waves are not focused properly and the vision is blurred. 30-60% of the world's population suffers from astigmatism. The article describes in detail the causes, types, diagnostic and treatment methods of astigmatism. Corneal and lenticular types are discussed, as well as complex forms such as myopic and hypermetropic. Modern methods such as refraction examination, keratometry and eye topography are highlighted among the diagnostic methods. Laser surgery methods such as glasses, contact lenses, LASIK and PRK have been considered as treatment options. At the same time, important recommendations for prevention of astigmatism and maintenance of eye health are given. This article is a comprehensive and systematic collection of information about astigmatism and is a useful resource for professionals and the general public.*

**Keywords.** *Astigmatism, visual defects, corneal unevenness, myopic and hypermetropic astigmatism, keratometry, eye topography, toric contact lenses, LASIK surgery.*

**The main part.** Astigmatism is a visual defect associated with the spherical shape of the cornea. In this case, since the power of light refraction in different directions is different, the point of light collection is also at different levels. This results in impaired or blurred vision at any distance. Astigmatism is one of the most common defects in the world. Its prevalence depends on age, sex, race, geographic location, and environmental conditions. Most people have mild forms of astigmatism and can live without glasses or contact lenses. Severe cases of astigmatism are less common, but they affect vision. The prevalence in children is 10-20%. It is often present at birth or during development. After the age of 40, these numbers increase, and after the age of 60, the highest rate occurs. The prevalence is high in developed countries such as the USA, Europe and Japan, because the disease is detected early and included in the statistics. More than 1 billion people worldwide have some degree of astigmatism. Ethnically, it is often observed in East Asian countries. Forms of astigmatism occur in 20-30% of the population of Uzbekistan. It should be mentioned that diseases in our country are diagnosed later and are not fully included in the statistics. Various factors are responsible for such a wide spread of this disease. Hereditary factors, in some cases a congenital defect in the shape of the eye, a change in the shape of the cornea with age, presbyopia, i.e. a decrease in the flexibility of the eye lens after the age of 40, eye injuries, after eye surgery, keratoconus, diabetes,

inflammatory diseases of the eye, environment and lifestyle, i.e. excessive eye fatigue, incorrect distribution of light, other eye conditions. Congenital defects are the causes of astigmatism.

There are several types of astigmatism, and they are characterized mainly by the shape of the cornea or lens, as well as how light is focused. In corneal astigmatism, the cornea does not have the same plane, but is bent more in one direction than the other. Lenticular astigmatism: light does not focus properly due to the wrong shape of the eye. Regular astigmatism is when the cornea is regularly bent more in one direction than the other. In irregular astigmatism, light is focused in several directions, which significantly reduces visual acuity. In the case of myopic astigmatism, astigmatism appears together with myopia. Hypermetropic astigmatism occurs when astigmatism and hypermetropia coexist. If myopic and hypermetropic types are found together, it is called mixed astigmatism. It is called physiological astigmatism if it is characteristic of the normal anatomical structure of the eye. Pathological astigmatism is caused by a significant distortion of the shape of the cornea. It is important to detect astigmatism early and correctly diagnose its type through regular examinations.

Symptoms of astigmatism often depend on its type, degree and accompanying other defects. The most common symptoms are: Blurred vision at different distances, eye fatigue very quickly, headache, especially in the forehead and around the eyes, squinting or discomfort when looking at light sources, i.e. photophobia, squinting or squinting to see things more clearly, poor night vision, diplopia, i.e. seeing one thing as two eyes, tiredness after prolonged use of the eyes, itching or redness, seeing near and distant objects equally blurry, constant rubbing or moving of the eye. In mild cases of astigmatism, symptoms may not be noticeable, but in more severe cases, vision can be significantly reduced. Children may have symptoms of astigmatism early, but they may not talk about it. Therefore, it is important to have regular eye examinations in children. If you notice any of the above signs, you should immediately consult a doctor, and you can save your eyesight.

There are various diagnostic methods for detecting and evaluating astigmatism. These methods help to accurately measure the refractive errors of the eye, the shape of the cornea and the ability to see. Among the most commonly used methods of diagnosing astigmatism, the following can be included: Refractive examination - determining how the eye focuses light, keratometry - measuring the curvature and shape of the cornea, corneal topography - a detailed description of the surface of the cornea and determining its irregularities, autorefractor - automatically measuring the refractive errors of the eye, skiascopy - determining the refractive errors of the eye using different lenses, photokeratoscopy - aberrometry - detection of irregularities in the optical system of the eye using a special device, pachymetry - measurement of the thickness of the cornea with a special sensor (used before laser surgery), detection of disturbances in the field of vision, contrast sensitivity test - a method of checking the sensitivity of the eye at different contrast levels by showing images with different contrasts. These methods determine the type, degree and direction of

astigmatism, which plays an important role in the selection of treatment methods. Modern diagnostic methods allow to determine the most subtle levels of astigmatism.

There are different methods of treatment of astigmatism, which are selected depending on the condition of the patient, the type and degree of the disease. We use glasses to correct astigmatism and restore vision. Contact lenses are also used for this purpose. 2 types of lenses are used, namely toric and air permeable contact lenses. It is more convenient than glasses. One of the most effective ways to permanently treat astigmatism is laser refractive surgery. It has types such as LASIK, PRK, LASEK. They are made to correct the shape of the cornea and are highly effective. In cases where laser surgery is not possible to eliminate astigmatism, the implantation method is used by placing a special artificial lens in the eye. The orthokeratology method is suitable for children and young people and is used to temporarily change the shape of the cornea. At the same time, it is necessary to do eye exercises. It does not completely cure astigmatism, but it serves to strengthen the eye muscles and improve vision, reduce eye fatigue. It is advisable to use different types of eye drops to moisturize the eyes and relieve fatigue. The choice of any treatment method must be made in consultation with a specialist. It is better to prevent this disease before treatment. Even if the underlying causes cannot be eliminated, it is possible to reduce the risk and development of astigmatism by protecting the eyes and supporting a healthy lifestyle. Checking the eyes at least 2 times a year, observing the regime when using electronic devices, creating working conditions that do not tire the eyes, protecting the eyes from sunlight, eating products rich in vitamins A, C, E and omega-3 fats such as vegetables, fruits, fish and nuts, using moisturizing eye drops, doing regular eye exercises, protecting the eyes from various harmful chemicals, it is most important to avoid wearing the wrong glasses and lenses, to organize a healthy lifestyle. All these measures help to prevent the risk of disease and to preserve vision.

**Conclusion.** In conclusion, early detection and treatment of astigmatism is very important to preserve vision, because as the risk increases, the probability of recovery decreases by a certain percentage. Modern diagnostic and treatment methods make it possible to effectively treat astigmatism. In the future, new technologies and research will help to develop easier and more convenient, highly effective methods of treating astigmatism. Maintaining eye health and regular consultation with a specialist is important for everyone. Each of our members is a gift to us. It is our duty to preserve it as given!!!

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