

What is myopia (nearsightedness) ?

Myopia is a condition in which the eye is out of focus. Ability to see far away is limited, hence the term "nearsighted". Objects are in focus at near, but blurry at a distance.

What causes the myopic eye to be out of focus?

The curvature of the cornea, the clear dome covering the front of the eye, may be greater than normal. The eye may be relatively long from front to back.

What does it mean for the eyes to be out of focus?

To understand myopia (nearsightedness) and hyperopia (farsightedness), one needs to become aware of the eyes' ability to adjust focus automatically.

Try this experiment. Close one eye and hold your thumb six inches in front of your face. Look past your thumb to focus on an object in the distance. Notice that when the distant object is seen clearly, the thumb is out of focus. Now focus on your thumb. When your thumb is seen clearly, the distant object is out of focus. We do not usually realize that our eyes are focused at a given distance, because our eyes look around and adjust so quickly. We look out the window, then at the person across the desk, then at our watch -- all seem in focus. We are fooled into thinking our eyes are in focus at all distances at once.

How do the eyes adjust focus?

A circular muscle inside the eye, called the ciliary muscle, attaches around the lens inside the eye. When this muscle contracts, the lens changes shape, adjusting the focus of the eye. As the muscle contracts, one sees things up closer; as it relaxes one sees farther away. In myopia, even when the ciliary muscles are maximally relaxed, vision is blurry beyond a certain distance.

Understanding eyes that are out of focus

Imagine looking through a small, hand held telescope with a knob around the eyepiece which is turned to adjust the focus. Numbers around the knob go from 0 to 10. When turned one way the knob stops at 0; when turned the other way the knob stops at 10.

If the telescope is properly focused, it is in focus at far distances when the focusing knob is set on 0, and in focus at closer distances as the knob is turned toward 10. When the knob is turned to 1, the scope is in focus at 1 meter (about 40 inches); when turned to 2, the scope is in focus at 1/2 meter (20 inches); when turned to 4, the scope is in focus at 1/4 meter (10 inches); etc. The closest distance at which the scope can focus clearly on an object is 1/10 meter (about 4 inches), with the focusing knob turned all the way to 10.

An eye which is neither myopic (nearsighted) nor hyperopic (farsighted) is like the properly focused telescope above.

Now imagine a scope which is 2 units out of focus. When the focusing knob is turned to 0, the scope is in focus at 1/2 meter, but not at distances beyond. Up close, when the knob is turned all the way to 10, the scope is in focus at 1/12 meter rather than 1/10 meter (3 inches vs. 4 inches). Distance vision is thus poor. Near vision is good; in fact near focus is possible even closer than normally. A myopic (nearsighted) eye is like the scope in this example.

Is myopia a common problem?

Yes. More than 50 million Americans have myopia.

What signs might indicate myopia?

Blurry distance vision. Squinting. Headaches. Eye strain.

At what age are glasses typically needed?

Myopia usually first appears in grade school or junior high. It occasionally begins as early as infancy, or as late as the early 20's.

Are very young children ever given glasses for myopia?

Pre-schoolers are not given glasses unless the myopia is significant. Detailed distance vision, such as for school and driving, is not yet needed. If myopia is severe, though, as in some premature babies, glasses are given even in infancy.

Can myopia run in families?

Yes. If neither parent is myopic, a child's chance of becoming myopic is about 1 in 10. If one parent is myopic, the chance increases to about 1 in 5. If both parents are myopic, odds are 50-50 or more.

Does excessive reading or near work cause myopia?

Many people believe this, but it is difficult to prove. We know heredity contributes to myopia (see above). But in any given person, it is hard to say how much myopia is due to heredity and how much to something else, like excessive close work.

Even if reading tended to make myopia worse, few parents would want to discourage their child from reading. It is also not clear what it is about reading that might make myopia worse. If it were the effort of focusing up close, bifocals or reading glasses would be expected to help. Some studies do show a small benefit with bifocals. But at least one study suggests it might be the constant back and forth eye movement that is the culprit, in which case bifocals would not be expected to help.

Can anything be done to prevent myopia from worsening?

Some studies have shown that atropine, a long acting dilating drop, reduces the worsening of myopia over time. Treatment is not easy, though. The drop must be used daily in each eye. Bifocals with Photogrey lenses must be worn.

Rigid gas permeable contact lenses have been used to flatten the cornea, thus correcting some myopia. A series of lenses must be used to achieve the change. Frequent checkups are required. We do not practice or endorse this treatment.

Is surgery available for myopia?

Yes. Laser surgery (PRK, LASIK) can correct myopia (nearsightedness). Surgery is usually done on adults, not children. Waiting until the myopia has stabilized improves the odds of an accurate surgical correction.