Lazy Eye: Understanding and Treating Amblyopia

A complete guide on the causes and treatments of Lazy Eye (Amblyopia)

Created by
You’ve been to the general optometrist or an ophthalmologist, and you’ve just been told your child has amblyopia. And if your child is over the age of eight, you may have even been told there is no way to treat the condition.

This news obviously comes as a shock. Even though amblyopia affects 2-4% of children in this country, you’ve probably never heard of the condition. Like any concerned parent, you’ve scrambled to your computer, your mind racing with questions.

What exactly is amblyopia? What is a “lazy eye”, and how is it different from “crossed eyes” or “wandering eyes”? Can children over the age of eight be treated for this condition?

**What is amblyopia?**

Amblyopia is the technical term for a condition that is often referred to as “lazy eye.” The nickname, “lazy eye,” arises from the fact that one eye sees more clearly than the other. This clearer-seeing eye performs the bulk of the work, which naturally makes us consider the other eye “lazy.” (It should be noted that a person can also have amblyopia in both eyes, in which case both eyes would be considered ‘lazy’.)

The [American Optometric Association](https://www.aoa.org) defines the condition: “Amblyopia (lazy eye) is the loss or lack of development of vision in an eye that is unrelated to any eye health problem. The brain, for some reason, does not acknowledge the images seen by the amblyopic eye. Reduced vision due to amblyopia is not correctable with lenses alone.”

The AOA continues, “If there is a large enough difference in the degree of nearsightedness, farsightedness or astigmatism between the two eyes, or if the eyes are crossed, the brain learns to ignore one image in favor of the other.”

What does that mean? In essence, at a very early age, as your child’s visual system is developing, his or her brain is not receiving similar images from the two eyes (we’ll get into the causes in a little bit.)

In fully functioning visual systems, the brain combines the two similar images into one complete image. This one image allows you to see things clearly, and in 3D.

In amblyopia, the brain has difficulty combining the images from the two eyes because the visual information from each eye is being processed differently. One image is clearer than the other and spatial information from each eye is also different.
Because the brain cannot effectively combine the two images, it suppresses, or “turns off” one of them. When the suppression occurs over a long period of time eventually the clarity of vision with that eye becomes worse.

The visual system is designed to use both eyes to explore visual space. When both eyes are working it is called binocular (literally “two eyed”) vision. An amblyope has binocular vision, they are just not very good at it. They are binocular peripherally and suppress centrally.

Amblyopia almost always affects one eye, but may occur in both eyes as well.

**The difference between amblyopia and strabismus**

Amblyopia, or “lazy eye”, is often confused with strabismus, or “crossed eyes”. Strabismus is when an eye is physically turned in, out, up or down. Strabismus is related to eye alignment, while amblyopia has to do with the sharpness of the images in each eye.

A constant unilateral strabismus can actually cause amblyopia (one eye is turned all the time), while alternating or intermittent strabismus rarely causes “lazy eye.”

Strabismus is usually easy to spot, but amblyopia is not. Without actually checking the acuity in each eye at a vision screening or eye exam, it can be very difficult to tell whether a child has amblyopia.

**What causes amblyopia?**

The root cause of amblyopia is a poorly developed visual system. One eye sees more clearly than the other eye due to a number of reasons:

1. Constant eye turn (strabismus) in one eye
2. Anisometropia (large differences in vision/prescriptions between the two eyes)
3. Reduced vision in one eye due to trauma, lid droop, etc.

Remember, this is a neurological process. The brain will work mostly with the eye that has the clearer image and will suppress the image from the lazy eye.

**How would a parent notice amblyopia in children?**

Amblyopia is difficult to detect by simple observation. The most common indicator is an obvious difficulty with depth perception. A child who has trouble catching and throwing objects, or is clumsy and always bumping into things may have amblyopia.

Amblyopia can be detected at a school screening, but not always. “It’s one of the reasons it’s important for kids to be seen for an eye exam from the first year of life and on, because outwardly it’s not real
obvious,” said Dr. Brandon Begotka of The Vision Therapy Center. “Some kids will go for years before their parents notice there is a problem. “

He notes that kids figure out how to function even with amblyopia. In most cases, the brain suppresses the image from the eye, so there isn’t any double vision. The child never realizes the brain is doing this because the eye is being suppressed.

**Research**

If you’ve been told that your child has amblyopia, or “lazy eye”, then you may have also been told there’s no effective treatment for lazy eye in children older than the age of eight.

The notion that older children and adults can’t be treated is based on a long-held, but incorrect, belief concerning the “critical period.”

Since it is rare for amblyopia to develop in a child over the age of eight, many doctors over the years have assumed that the brain’s ability to change with respect to visual acuity is limited beyond this age. However, recent research, as well as years of proven success among vision therapy patients, has proven that assumption wrong.

**What is the source of the misinformation about amblyopia?**

In her book *Fixing My Gaze*, neuroscientist Sue Barry relates how the misconception in the scientific and medical communities began.

She writes that since the mid-1990s, the “scientific and medical communities have cited strabismus and a related disorder called amblyopia as classic examples of developmental disorders that cause permanent changes in vision if they are not corrected within a critical period in early life.”

The conclusions, she states, were based on experiments by David Hubel and Torsten Wiesel at Harvard Medical School. The two studied cats that had strabismus, or misaligned eyes. It was noted that the vision in the cats had not developed normally, and that they could not see in 3D.

Many scientists and doctors assumed the cats would never acquire stereo vision because they had not acquired the ability during what is referred to as a “critical period” of vision development. In this period, it was assumed, if certain visual skills (specifically visual acuity and stereopsis) were not learned by the brain, they could not be developed later in life.
Hope with a “plastic” brain

Barry cites that more recent scientific research indicates otherwise. The adult brain appears to be more “plastic” than had been previously thought, and the circuitry of the brain can actually change at any age as a result of our actions and experiences.

Recent research indicates that children age seven through 17 with amblyopia may still benefit from amblyopia treatment. A study, funded by the National Eye Institute (NEI), appeared in the April 2005 issue of Archives of Ophthalmology. According to the director of the NEI, Paul A. Sieving, M.D., Ph.D., “Doctors now feel confident that traditional treatments for amblyopia will work for many older children.”

It’s great to see clinical research backing what clinicians in the optometric vision therapy field have known for years. So what are these “traditional treatments” for amblyopia that are mentioned in the study?

Traditional treatment typically involves prescribing glasses and then patching the stronger eye with an eye patch or using eye drops to blur the better-seeing eye while doing daily activities. This is the common approach taken by many medical practitioners for amblyopia and the duration of the patching can vary from a few hours to the entire day.

Research indicates we shouldn’t rely exclusively on patching for amblyopia

Dr. Dan Fortenbacher, a developmental optometrist, noted in a post on the blog VisionHelp that there is a new body of research that indicates “it is better to treat the amblyopic patient with binocular vision therapy in conjunction with a more limited amount of occlusion (patching) therapy.”

Dr. Fortenbacher refers to several studies, including a review of an important study on eye-hand coordination skills in children with and without amblyopia, and a list of 105 scientific papers showing the evidence-based research on the topic of binocular vision in the treatment of amblyopia.

Dr. Kellye Knueppel of The Vision Therapy Center notes that the critical period years are still the best time to catch and treat amblyopia, which is why it’s important for parents to pursue good eye care with their children at an early age. However, this latest body of evidence bodes well for people of all ages who are suffering from amblyopia.
Traditionally, patching and/or prescribing glasses have been used to treat amblyopia, often for children at a younger age. Today, studies (mentioned above) have shown that combining vision therapy with patching is a more effective treatment than just patching alone.

The reason vision therapy is so important in amblyopia treatment is that it gets at the root cause: the two eyes do not perceive visual space the same and therefore cannot work together.

Our goal is to train the brain to process information from each eye as equally as possible, and then do training to get both eyes to work together as a team.

Making the “lazy eye” see more clearly by patching alone does not automatically mean that the other visual information will be processed the same with each eye. It also does not do anything to help the brain learn to combine the information from the two eyes effectively. As a result, often the clarity of vision with the “lazy eye” will regress after patching has stopped.

How does vision therapy help? “Basically, the two eyes don’t see visual space the same,” Dr. Begotka said. “We’re working to get the eyes to see visual space more similarly, so they can work as a team.” The approach taken by developmental optometrists that practice vision therapy generally includes the following steps:

1. **Find the right lenses or glasses.** It’s important that we make sure the child has the right prescription. In addition to helping people see more clearly, lenses also change where things appear to be in space. We want to prescribe glasses that help the child see more clearly, but even more importantly to help the brain pay more attention to the “lazy eye.”

2. **Use patching effectively.** Studies indicate that the most effective treatment combines the use of patching with vision therapy. We may decide to start with patching and later add therapy or begin the patching and therapy simultaneously.

3. **Begin vision therapy to get the eyes to see the same and work together.** Vision therapy helps get to the root of the problem, which is that the two eyes don’t see visual space in the same way. Through a series of exercises and activities, the eyes can be trained to work together.

Amblyopia can be a confusing concept unless you have background in eye care. If you have a child with amblyopia, consult with a developmental optometrist to determine if vision therapy and patching would be an effective treatment.

For many years, vision therapy optometrists have been helping children and adults with amblyopia. Your child deserves a similar opportunity.
Q&A

How long does it take to treat someone for amblyopia using vision therapy?

Duration of treatment varies based on the severity of the amblyopia. The best way to know how long it will take to treat a specific case is to get a Functional Vision Test.

How do I determine if my child has amblyopia?

Amblyopia can be very difficult to detect. A Functional Vision Test is the first step for diagnosing the condition. Contact the Vision Therapy Center if you’re interested in scheduling a Functional Vision Test.

Can a child be treated for lazy eye when he or she is older?

Yes. For years, there has been a long-standing belief that children could not be treated for amblyopia once he or she is outside the critical period. (The critical period occurs early in life, when a child’s visual system undergoes it’s most critical development.)

Despite the prevalence of this thinking, research indicates that a variety of treatments will be effective outside the critical period. This can be attributed to the brain’s plasticity, which allows the visual system to be retrained at any age.

The bottom line? Even adults with amblyopia can be treated.

Are glasses and eye patching the only way to treat amblyopia?

Traditionally, ophthalmologists and many optometrists have used glasses or contacts along with eye patching as a means of treatment for lazy eye.

However, studies indicate that the most effective treatment combines the use of patching with vision therapy. Because every case of amblyopia is different, the treatment plan may involve patching but should always include vision therapy to be most effective.

Is amblyopia the same as strabismus?

While amblyopia can be caused by strabismus in certain cases, they are two different conditions. Strabismus is often referred to as “crossed eyes.” It’s when one or both of the person’s eyes are turned in, out, up or down. Amblyopia has to do with visual acuity, or the clarity with which an eye can see. In amblyopia, one eye does not see as clearly as the other eye, even with glasses or contact lenses.

While the terms are easily confused, the symptoms are not. Strabismics tend to have one eye turned some or all of the time, which is generally visible to parents.

However, amblyopia is often not easy to spot. In fact, most children and adults don’t even know they have it, as their visual system will tend to compensate for the eye that doesn’t see as clearly. And because they have amblyopia from a young age, they simply don’t know any different.
About The Vision Therapy Center

Established in 1995 by Dr. Kellye Knueppel, The Vision Therapy Center, Inc. has two locations dedicated solely to vision therapy.

We are a team of developmental optometrists and vision therapists that provide “vision therapy” for children with vision problems that are often undetected by typical vision screenings, such as amblyopia. Vision problems relate not only to acuity, but eye tracking, processing, and other visual skills. Vision therapy is a series of activities that help improve visual skills.

In addition to Dr. Knueppel, a team of fully-trained specialists work with patients of all ages, from infants to senior citizens. The Vision Therapy Center works cooperatively with other optometrists, teachers, reading specialists, occupational therapists, physical therapists, chiropractors and other professionals.

For more information about The Vision Therapy Center, visit our website at [www.thevisiontherapycenter.com](http://www.thevisiontherapycenter.com) and subscribe to our monthly eNewsletter.