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Research: LASIK may be a successful treatment for amblyopia

JUN 20, 2007

What is amblyopia?

Amblyopia is a condition generally defined as "reduced visual acuity that cannot be corrected by refractive means (eyeglasses or contact lenses) and cannot be attributed to disease or injury affecting the eye or visual system."

Amblyopia may be caused by a misalignment of the eyes (called *strabismus*) that results in one eye being "shut off" or ignored by the visual part of the brain to prevent double vision. This type of amblyopia is called *strabismic amblyopia*.

A second type of amblyopia is caused by one eye being significantly more nearsighted or farsighted than the other eye, or having much more [astigmatism](#) than the "good" eye. This type is called *anisometropic amblyopia* (or also *refractive amblyopia*).

How is amblyopia detected?

Amblyopia is usually discovered during a routine eye exam in childhood, when one eye cannot see as well as the other after a refraction has been performed to correct all [nearsightedness](#), [farsightedness](#) and/or [astigmatism](#) (referred to as *refractive errors*). A child may not even be aware of the condition—with both eyes open, their vision may seem fine.

Clinically, amblyopia is usually said to exist if the best possible visual acuity of an eye (with corrective lenses in place) is 20/30 or worse, or if one eye sees significantly less clearly than the other. In severe cases, vision in the amblyopic eye may be 20/100 or worse.

How is amblyopia treated?

Treatment of amblyopia usually consists of full-time wear of eyeglasses or contact lenses, combined with patching of the "good" eye for specified periods of time or during certain activities to force the amblyopic to be

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used more. The increased use of an amblyopic eye can sometimes improve the visual acuity that eye can achieve, and in some cases patching can restore normal 20/20 vision.

Researchers disagree about when patching must be started for the therapy to produce visual acuity improvements in an amblyopic eye. Many feel amblyopia therapy is most effective prior to age 10. Beyond then, the visual system seems less amenable to treatment, and visual acuity is less likely to be improved. Other studies suggest improvements in visual acuity may be possible in older amblyopic children and even among adults. Most experts agree, however, that amblyopia therapy is most effective when it is initiated during childhood.

The purpose of LASIK surgery is to improve the vision of adults by eliminating or reducing nearsightedness, farsightedness and/or astigmatism. But a new study suggests LASIK may be an effective treatment for amblyopia in children and young adults as well.



Patching the "good" eye is one treatment for amblyopia. LASIK may soon be another.

New study suggests LASIK may help

At the recent annual meeting of the American Society of Cataract and Refractive Surgery (ASCRS) held in San Diego California, Cyres K. Mehta, M.D. reported the results of a study that investigated the effectiveness of [wavefront-guided](#) LASIK in the treatment of anisometropic amblyopia among 60 amblyopic patients ranging in age from 7 to 25 years. All patients had one eye that was amblyopic and had normal vision in the other eye.

Dr Mehta and his colleagues found that some patients diagnosed with these forms of amblyopia have significant aberrations in their corneas. They found that treating these optical imperfections with wavefront-guided LASIK resulted in significantly better visual acuity in the amblyopic eyes after surgery than what was attainable with eyeglasses prior to LASIK.

Note: The term used to describe the best possible vision with corrective lenses before or after surgery is "best corrected visual acuity (BCVA)" or "best spectacle-corrected visual acuity (BSCVA)," as measured by the smallest line of letters that are readable (20/40, 20/30, 20/20, etc.) on a visual acuity chart used in an eye exam.

With no patching or other amblyopia therapy performed after surgery, the [BCVA](#) results for the treated eyes were:

- 9 eyes (15%) improved by one line (from 20/40 to 20/30, for example).
- 47 eyes (78%) improved by two lines (20/40 to 20/25, for example).
- 2 eyes (3%) improved by more than two lines (20/40 to 20/20, for example).

"In view of these astounding results, we must conclude that all cases of anisometropic amblyopia should undergo corneal wavefront analysis and will benefit from corneal wavefront-linked LASIK," Dr. Mehta and colleagues wrote in the study abstract.

LSN Editor's Note: *It is important to point out that if LASIK is performed on*

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nearsighted children who have amblyopia, it's possible their [myopia](#) may still worsen to the point that they again need to wear eyeglasses and/or need to have a second LASIK surgery later. In most cases, the progression of nearsightedness ends at or before age 21 (the current recommended minimum age for LASIK patients).

It's also important to point out that Dr. Mehta and his colleagues demonstrated improvements in BCVA among anisometropic amblyopes, not individuals with strabismic amblyopia (amblyopia due to misalignment of the eyes). There are no studies that I am aware of that demonstrate LASIK can improve the BCVA of individuals with strabismic amblyopia. - GJH

SOURCE: *Wavefront-guided technology aids in new findings, techniques.* Ocular Surgery News 2007; Vol 25, No 12. p.32.

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