Vision science highlights from the world's leading journals of medicine and science

by Sean Henahan

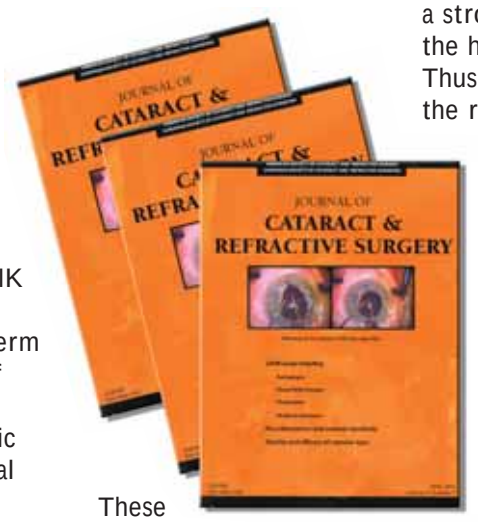
Surface ablation in amblyopes

Laser refractive surgery appears effective for correcting anisometropic myopia in amblyopic children. Researchers treated 36 eyes of 35 children with amblyopia and large magnitude ametropia. A majority of patients had neurobehavioral disorders and/or were noncompliant with spectacle or contact lens wear. The surgeons used the VISX excimer laser to perform LASEK (17 eyes) or PRK (18 eyes). Preoperative myopia ranged from _3.25 to _24.25 D. One patient had hyperopia of +5.87 D. Correction was tailored to match the refractive error of the non-amblyopic eye. Myopia correction averaged _8.95 D with 89% corrected to within 1.00 D of target refraction. Acuity improved postoperatively in 97% of eyes. No child lost acuity. Binocularity improved in 69%. Results were similar with LASEK and PRK. However, myopic regression exceeding 1.0 D/year was seen in half of the eyes. The researchers call for additional study to determine long-term stability and safety of the procedure in this population.

L. Tychsen et al., JAAPOS, "Correction of Large Amblyopiogenic Refractive Errors in Children Using the Excimer Laser ", June 2005,Vol.9, Issue 3, 224-233.

Long-term data on hyperopic refractive surgery

What are the long-term effects of LASIK and PRK? It is too early to tell. Long term follow-up studies of patient who have undergone hyperopic PRK or LASIK reveal some surprises. O'Brart et al. reports a 7.5-year follow-up (mean 90.7 months) of hyperopic excimer laser photorefractive keratectomy. The mean preoperative spherical equivalent, which was treated with a Summit Apex Plus excimer laser, was +4.7 D (range +2.0 to +7.5 D). At the time, patients were divided into four groups for excimer correction: +1.5, +3.0, +4.5, and +6.0 D. The study showed that refractive stability was achieved at one year, but a mean regression +0.28 D from 1 to 7.5 years occurred. Another protocol by the same group looked at hyperopic LASIK at five year out and found more regression, a mean of +0.53 D. This would appear to support previous observations that LASIK correction of higher amounts of hyperopia has poorer long-term stability than LASIK correction of lower amounts of hyperopia. The studies highlight the importance of long-term follow-up and raise several questions.



These include the role of the size of the optical zone, the type of laser, and the flap thickness on long-term outcomes.

D. O'Brart et al., JCRS, "Excimer laser photorefractive keratectomy for hyperopia: 7.5-year follow-up", June 2005, 1104-1113.

The blink of an eye

Parts of the brain appear to pause during blinking, report British researchers. A University College London team found that the brain actively shuts down parts of the visual system during blinking, even if light is still entering the eyes. They designed a special device to study the effects of blinking on the brain. The device, made with fibre optic cable, was placed in the mouth of volunteers wearing lightproof goggles and lying in a functional magnetic resonance imaging (fMRI) brain scanner. The optical fibre illuminated the eyeballs through the roof of the mouth with a strong light, making the head glow red. Thus, light falling on the retina remained constant even when the volunteers blink, enabling scientists to measure the effects of blinking on brain activity independently of the effect of eyelid closure on light entering the eye. The study revealed that blinking suppressed brain activity in the visual cortex as well as parietal and prefrontal areas, which are usually activated when people become conscious of visual events or objects in the outside world. The researchers hypothesise that transiently suppressing the brain areas involved in visual awareness during blinking may be a neural mechanism for preventing the brain from becoming aware of the eyelid sweeping down over the pupil during a blink and the world going dark.

D. Bristow et al., Current Biology, ÅgBlinking suppresses the neural response to unchanging retinal stimulationÅh, 26 July 2005,Vol. 15, 1296-1300.