New Technology That We Like

Like the tech world, there is no end to new gadgets, techniques and innovations for optometrists—and their patients—to consider. We’ve talked to Berkeley Optometry docs about what they’re most excited about. Here’s their list.

1. Algorithms for Image Processing

Our Digital Health Clinic, in conjunction with EyePAC, LLC, is beta testing algorithms—which have been generated using deep learning techniques—to grade photographs for detection of diabetic retinopathy. We’ve found our automated analysis of the images produces accurate results within 30 seconds, and may facilitate the live clinician’s decision as to assessment and management. Eventually, our docs hope to use this process to analyze images of the retina, which you can’t do with standard OCT. The scans are so powerful that individual red blood cells can be detected as they move through vessels. This new technology may replace fluorescein angiography, which is far more invasive since it requires a dye injected into the arm and takes about 40 minutes. OCT angiography takes 5-6 seconds.

2. OCT for Angiography

While OCT technology has been around for years, the latest generation could have a far reaching impact on the way retinal and optic nerve disease is diagnosed and managed. The new machines have the ability to acquire more than 65,000 scans per second, allowing for a cross sectional view of the retina, which you can’t do with standard OCT. The scans are so powerful that individual red blood cells can be detected as they move through vessels. This new technology may replace fluorescein angiography, which is far more invasive since it requires a dye injected into the arm and takes about 40 minutes. OCT angiography takes 5-6 seconds.

3. Amniotic Membranes

Cut out in the shape of contact lenses, these futuresterile bandages—approved by the FDA—were created from human amniotic membrane harvested from the innermost layer of the placenta and then placed over the eye to promote healing and reduce inflammation. They have been especially effective for extreme dry eye, or for stubborn abrasions that won’t heal. The Berkeley Optometry clinic is using them now!

4. Enchroma Lenses

An estimated 300 million people have a color vision deficiency. Enchroma, a Berkeley technology company, has developed lenses that allow many of them—specifically those who have difficulty seeing reds and greens—to see more vividly. Who have difficulty seeing reds and greens—to see more vividly. According to the company, the lenses work by “separating light into its primary spectral components before they reach the eye.” And while they don’t work for everyone, the results appear to be encouraging for those that they do work for. A quick search on YouTube serves up dozens of videos of people trying the lenses for the first time—tears of joy and amazement are not uncommon.

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6. Smart Contact Lenses

Sensimed’s “Triggerfish” disposable silicone contact lens has a tiny micro sensor that captures changes in strain as a surrogate measure of intraocular pressure over a 24-hour period. Elevated IOP is a leading risk factor for the development of glaucoma. An antenna wirelessly transmits data collected from the sensor to a portable recorder worn by the patient. By observing peaks in a patient’s eye pressure, the type, dosage and timing of glaucoma medications may be optimized to better control IOP.

7. Surrogate Measures of Intracranial Pressure

In microgravity, fluids can move toward the upper body, causing increased intracranial pressure, which turns out to be one of NASA’s top human spaceflight risks, leading to vision impairment in crew members. Because lumen punctures are invasive and difficult to perform in orbit, NASA is researching non-invasive ways of measuring intracranial pressure through the ear, eye and head—techniques that could benefit astronauts in space and people on earth. One technique, called “tympanic membrane displacement,” measures pressure that is transferred from the brain to the inner ear. According to NASA, the non-invasive methods could provide options for determining if intracranial pressure is raised and how this may directly correlate to vision problems.

8. Vision Therapy with VR

Dennis Levi, professor of optometry and vision science here at UC Berkeley, has had success using the new generation of immersive virtual reality (VR) gaming technologies to help correct strabismus in adults—something that was thought to be impossible (see page 14 in this magazine for full story) only a short time ago. His lab is collaborating with developers to create VR training programs that can be used on commercially available VR sets such as the Oculus Rift or HTC Vive, with the potential to raise exponentially the number of people treated for amblyopia, strabismus, and stereo-deficits.