

Testing Smartglasses to Superimpose Images for Surgery



We've come a long way since the 1960s, when comic book ads promised glasses with X-ray vision. Today, we have smartglasses, wearable pieces of technology that may not bestow see-through sight but have the potential to improve surgery.

Currently, surgeons who rely on medical imaging for guidance must look up from the patient they're operating on to view an X-ray on a wall or screen. Although research has shown that placing medical images in the field of view of the surgeon's hands improves efficiency and performance for some procedures, operating room layout and sterility concerns prevent this.

Smartglasses, which superimpose a digital image in the user's field of view, could address this challenge. A surgeon could drill a screw into a bone under X-ray guidance, for instance, without moving her head, thanks to glasses showing the X-ray next to her hands.

"These glasses can potentially speed up some very common surgeries and make the work environment more comfortable so surgeons can operate more effectively," says Greg Osgood, a Johns Hopkins orthopaedic surgeon leading a pilot study to test smartglasses for surgery.

For the research, surgeons used Osterhout Design Group R-6 glasses to place screws through rods in artificial tibias. Prior to the procedures, X-ray software was loaded onto the glasses via a wireless keyboard.

One of the findings the researchers hope to investigate is why old habits die hard for some surgeons.

"These glasses can make the work environment more comfortable so surgeons can operate more effectively."

—Greg Osgood,
orthopaedic surgeon

"When they use the glasses, they're still looking up like they're looking at a monitor across the room," says resident orthopaedic surgeon Alex Johnson.

Osgood hopes this study will dovetail with that of robotics, vision and graphics researcher Nassir Navab of the Whiting School of Engineering, who is developing systems that line up medical imagery on a patient's body. Together, their work could result in technology that makes doctors feel like they have X-ray vision.

WEB EXTRA: To see how smartglasses guide a Johns Hopkins surgeon drilling into an artificial bone, click on this article at hopkinsmedicine.org/insight.



DAVID SEMPLE / AA REPS

What Makes a Great Medical App?



Cardiology fellow Satish Misra has tried hundreds of apps since 2009. That's when he and Iltifat Husain of Wake Forest School of Medicine co-founded iMedicalApps, a website that reviews apps created for health care providers and their patients.

Since then, the founders and a team of volunteer reviewers have evaluated roughly 2,000 apps offering everything from treatment guidelines to three-dimensional anatomical models.

"We're like a discovery service that identifies potentially useful apps and less useful or even dangerous ones," says Misra, who curated this month's Tech Envy column on must-try medical apps (on the back page).

While health and medical apps offer a wide range of functions, Misra finds the majority do not

meet their stated goals. When this is the case, the apps are not reviewed on the iMedicalApps website (imedicalapps.com).

But what does Misra think makes a great medical app?

It does what it states it will do in the simplest, most intuitive way possible, he says. The app is transparent, providing users with the information they need to decide whether to trust the app or not.

The app includes its sources of information, background on its

developers and how a user's personal data will be utilized. In addition, a great app is kept up to date by its developers to ensure its safety and usefulness.

Each month, iMedicalApps gets 400,000 online views, and Misra and his team are hoping to build on that success by launching a new website called iPrescribeApps. The HIPAA-compliant site will allow physicians to search for devices and apps relevant to a particular disease, then email or text their patients information and instructions on how to use them.



PAUL ZWOLAK / THREE IN A BOX



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A look at innovative developments outside the halls of Johns Hopkins Medicine

Expert-Recommended Medical Apps



Johns Hopkins cardiology fellow and *iMedicalApps.com* editor Satish Misra curated this month's lineup for *Tech Envy*. Here's his medley of must-try medical apps.

Get the latest editions of your selected medical journals with **Read by QxMD**. Save the PDFs, email them or send them to Evernote to keep them in your personal library. The app offers the option to track readings for continuing medical education credits. 📱

Practice simulated operations on your couch with realistic **Touch Surgery**. This gamelike educational app tests you on procedures like inserting a chest tube or performing a craniotomy. The app can guide you step by step through a selected procedure, or you can skip the practice to be evaluated on your technique and knowledge of a surgery. 📱

HearthDecide's interactive heart models can help doctors explain procedures to patients. This paid app's 3-D models let you slice and dice the heart in different ways. Developer Orca Health makes similar apps for spine, shoulder and hand surgeries. 📱

The **American Red Cross First Aid** app offers instructions for the most common first aid emergencies. This patient-friendly app is easy to use and covers a broad range of scenarios, from minor to moderate injuries. It features an educational page, basic treatment instructions and tips on emergency preparedness. 📱

Telemedicine Goes to Schools, Homes



Elementary school students are getting appointments with Johns Hopkins physicians without ever leaving the nurse's office. Howard County General Hospital is participating in a telemedicine program in elementary schools with high numbers of students who don't have health insurance or a primary care provider.

When students see the school nurse for a headache, sore throat, earache, rash or cough, they get their vitals taken and then connect with a doctor using secure computer software. After the physician is on the screen, the nurse can employ one of several Bluetooth exam tools, like a high-definition stethoscope or otoscope, as part of the doctor's exam.

Parents are invited to attend the appointments through a call and hear about their child's diagnosis or prescription, or ask questions.

"We try to treat the child's medical issue at the time of the visit and provide a primary care physician in the community for follow-up," says David Monroe, a pediatric emergency medicine specialist

at Howard County General. So far, no students have had to leave school to see a doctor.

Another provider, Johns Hopkins Hospital psychiatrist Deirdre Johnston, is also using telemedicine to provide care to patients who otherwise may not receive it. As part of a program to address the mental health needs of older adults in Baltimore City, a nurse practitioner brings an iPad with a secure connection to patients' homes. The patients use the tablet to see Johnston for their evaluations or checkups.

"It's ideal because it expands what we can do," says Johnston. "There is a huge opportunity in telemedicine for populations that find it hard to get to the doctor."



CAI SEPULS / THREE IN A BOX

Digestible Content:

6 Top Health Pages from hopkinsmedicine.org

Do we have your attention? According to the Statistic Brain Research Institute, the average person's attention span is only 8 seconds.

To make information easily digestible, the Internet strategy and Web services team cuts it into bite-sized pieces:

- Bullets
- Numbers
- Charts
- Diagrams

Check out the six top health pages on the left and see how the team processed information to help consumers absorb the content.

Food for thought: Three of the six top health pages relate to digestion—literally!

Vital Signs Health Library Page 63,296 page views

5 Things Your Poop Can Tell You About Your Health 34,250 page views

What Are Platelets and Why They Are Important 31,816 page views

Gas in the Digestive Tract Health Library Page 31,501 page views

Feeding Guide for the First Year Health Library Page 25,156 page views

Stomach and Duodenal Ulcers (Peptic Ulcers) 24,496 page views

Source: Google Analytics data from November 2015.