Google GLASS: in the cath Lab

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#ISET2015
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wearable computing

"Traditional computing paradigms are based on the notion that computing is the primary task. Wearable computing, however, is based on the idea that computing is NOT the primary task."

- Steve Mann
Biomechanical Assessment of Two Artificial Big Toe Restorations From Ancient Egypt and Their Significance to the History of Prosthetics

Jacqueline Louise Finch, PhD, Glyn Harvey Heath, PhD, Ann Rosalie David, OBE, PhD, FRSA, Jai Kulkarni, MA, FRCP
Wearable Computing

- **Consistency** – constant interaction between user and computer
- **Multitasking** – should not have to stop to perform an action – it integrates into user’s action
- **Augmented Reality**
Augmented Reality

- **Definition**: a technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

- Coined by Boeing researcher Tom Caudell to describe a digital display used by aircraft electricians that could overlay airplane wiring blueprints over generic looms.
• Part of Google X – “Moonshots”
  – First released to Glass Explorers in 2012
• Hands-free
• Internet-connected & Android-based
• Optical Head-mounted display (OHMD) allowing all the functionality of a smart phone but…
• Activated by voice command
What You see

8:47

" ok glass "
Glass Features

• Small, comfortable & durable
• Phone calls
• Navigation
• Photos/videos
• Information about location
• Apps ("GlassWare")
• Augmented Reality
ok glass,
Activate STEMI
Lookup Patient
Make a Call
Send Text
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Published Literature

Published literature by year and type:
- Peer Review
- Lay Press

Years: 2013, 2014

Peer Review:
- 2013: 250
- 2014: 550

Lay Press:
- 2013: 1600
- 2014: 2300
In the Journals

- Google Glass in pediatric surgery
- Worn 4 weeks consecutively + daily log
  - Before it can be recommended universally for physicians and surgeons:
    - substantial improvements to the hardware are required,
    - issues of data protection must be solved, and
    - specialized medical applications (apps) need to be developed.

- Google Glass in the pharmacy - Wearable scanning tool w/camera
  - Support dispensing by providing info during scanning/documenting/verification process
  - Great ref tool for evidence-based decision making
  - “We must emphasize that these are potential uses…”
More Published Reports

• Emergency Providers see “big potential” for Glass
  – Facilitate telemedicine consults w/specialists
  – First responders can use hands-free feature

• Forensic Medicine
  – Used in combo with “self-developed app” to perform post-mortem exams on 4 decedents and c/w standard DSLR pics
  – Lower ratings for Glass pics from 6 forensic examiners
  – Glass took longer to take pics
  – Battery charge decreased quickly

• Airway Assessment
  – Document Assessment & management of the airway
  – Generate a video for EMR under standard cond

ED Manag 2014 May;26(5):55-8
J Med Int Res 2014 Feb 12;16(2)
Pediatric Anesthesia 24 (2014) 1009-11
Potential for Glass in Medicine

• Teaching
  – Live, interactive, first person view of the procedure/surgery (able to live stream to anywhere with WiFi)

• Virtual Assist – remote assistance with procedures viewing the case through primary surgeon’s eyes
  – Transmits case to expert elsewhere
Best Described Uses

- **Education**
  - First person, interactive view of procedures/surgeries (med students, conferences)
  - Experts instructing thru Glass (Safirstein)/novice able to be coached by remote expert (Assad)

- **Telemedicine/peer-to-peer collaboration**

- **Trauma** – Eyes in the field

- **Pre-op checklists**

- **Cognitive disease assistant** – “memory support system”
  - Cues, prompts, GPS, facial recognition

- **Medication compliance tools**

- **Outpatient integration with EMR** – dictation of H&P, write Rx, request consultation via Glass voice commands
Limitations

- Privacy/HIPAA
- WiFi dependence
- Patient safety
- Lack of dedicated healthcare applications
- Reliance on third party software
- Visual quality
- Technical challenge
Conclusions

• Wearables have great potential in medicine
• Potential to augment and facilitate emergency care, procedural capabilities and education will assure success
• Google Glass (this generation) is probably not the answer