

Commentary: Smartphone-based, wireless, slit-lamp imaging with small footprint – making photodocumentation easy

Smartphones have been a major driving force for affordable innovations across several fields in this era. We have seen how smartphones have brought about a revolution in frugal

ophthalmic innovation in India.^[1] We have also seen the power of smartphone apps for ophthalmologists^[2] and for people with low vision.^[3] Smartphones have helped to democratize hardware and software innovation and give power literally in the hands of the people.

Why Imaging?

A picture is worth a thousand words. Documentation is very important in the medical field, not just for medicolegal reasons but also to monitor changes in various signs and lesions.

Since ophthalmology is a very visual subject, this becomes all the more important. Drawing helps to a certain extent in documentation, but accuracy is best with an annotated image in an Electronic Medical Record (EMR) system.

Why Smartphones?

Smartphones have become very good at photography over the past few years. Even an affordable, mid-range smartphone of today has very good cameras that can rival conventional digital cameras in image quality and ease of use. In addition, images taken on smartphones can be easily edited, labeled, uploaded into an EMR, used for teleophthalmology, or shared with a discussion group. Also, it is often said that the best camera for the job is the one that is always with you. The portability and convenience of smartphones is unrivaled in this regard.

Smartphone Imaging in Ophthalmology

Dr John Davis Akkara and Dr Anju Kuriakose have previously elaborated on tips and tricks on how to take good slit-lamp photographs using smartphones.^[4] Indian innovators like Dr Prithvi Chandrakanth have demonstrated anterior segment photography with only a smartphone and an intraocular lens.^[5] Of course, for slit imaging, we need the portable slit as demonstrated by Dr John Davis Akkara in Smartphone Portable Eye Clinic System. We have also demonstrated how to take fundus photos with smartphones using DIYretcam^[6] and T3retcam.^[7] The journey of innovations in fundus imaging starting with candles, all the way through smartphones with 20D lens, and finally panoramic images with only a smartphone has enthralled us.^[8]

The accompanying article^[9] evaluates an anterior imaging module that attaches to a slit lamp using a beamsplitter. This device, being wireless and smartphone-based, has several advantages over conventional slit-lamp imaging systems.

The Pursuit of Laziness

In order to make photodocumentation a routine, it has to be integrated into the workflow with minimum extra effort. If a separate slit-lamp camera has to be used, it interrupts the workflow and is less likely to be adopted. If the EMR is not integrated into the photo capturing process, often the photos are unlabeled and details are lost. The benefits of photodocumentation should far outweigh the extra effort needed for most people to accept it as standard practice.

Future of Smartphone Imaging

As smartphones become more capable and ubiquitous, we can expect even more capabilities of smartphones in ophthalmic imaging. Perhaps, it may be possible to perform infrared meibography using the special infrared camera of OnePlus 8 Pro (which was disabled due to privacy concerns). Affordable virtual reality visual fields on smartphones is now very much possible.^[10] Perhaps, smartphone keratometry and autorefractometry are just a simple step away. Maybe, intraocular pressure could be measured by smartphones. Maybe even smartphone optical coherence tomography will become a standard. These are not out of the realm of possibility. Watch out for these innovations in the very near future.

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