

Smart Phones in the Field of Ophthalmology

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Abstract :

The popularity of smart phones and their use among physicians is gradually increasing. Now smart phones have come a long way from simple cellular phones to modern era gadgets and they can perform almost all activities that our computers can. Various applications (apps) available on smart phones can be used directly or indirectly for patient education, physician education, referral, patient monitoring. This article describes the various tools available on smart phones for the examination of ophthalmic patients, including its basic function like photographic recording for further studies and comparisons, by ophthalmologists.

Introduction :

The last two decades has seen many advances in the field of science and technology. But most astonishing and most popular amongst these are the cell phones, which took a giant leap from the 1st generation models, serving the primary function of call transfer, to the recent new generation smart phones loaded with multiple applications, bringing in a whole new dimension to all fields including medical science.

So, what is a smart phone? A smart phone is a mobile phone which is additionally equipped with an operating system. The popular operating systems are android, the IOS and the windows. The smart phones have the ability to support multiple applications i.e. software programmes designed to perform specific activities. It can be safely said that a good smart phone can perform all activities of a modern day computer.

As today most of the physicians use smart phone, they should be aware of their potentials. So this article focuses on the various uses of smart phones and its wide range of applications over various operating systems, in the field of ophthalmology.

Uses In Clinical Ophthalmology -

1. Tools used for testing (testing tools)-

Commonly used evaluation tools in the form of apps like-

- Near vision charts, colour vision plates, pupil gauze- in conditions of unavailability of conventional charts these can be used in emergency, indoor and outdoor settings. They have an added advantage of being resistant to wear and tear. However the use of these should be under professional experience to avoid misjudgments.
- Fluorescein light with pen light
- Pediatric fixation target- to engage a pediatric patient and enable his cooperation during examination
- 4 dot and accommodation target
- Pediatrics optotypes
- Amslers grid
- Red desaturation test

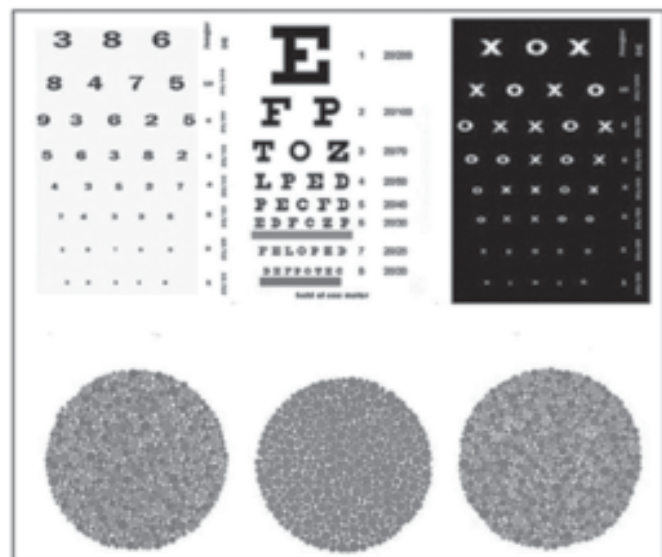


Figure 1. Near vision cards and Ishihara colour plates

2. Physician reference tools -

Smart phones have made available various definitions, differential diagnosis, classifications and grading systems such as angle anatomy, iritis severity, macular holes, diabetic retinopathy etc at finger tips of physicians. Also, a lot of coloured diagrams, questionnaires and randomized controlled trials are available online like collaborative initial glaucoma treatment study(CIGTS), normal tension glaucoma study (NTGS), Early manifest glaucoma trial(EMGT), ocular hypertension treatment study(OHTS), which are highly valuable for budding ophthalmologists.

3. Patient education -

Instruction sheets, manuals, images and videos in HD and 3D are available online which make them aware leading to better cooperation on part of the patient which in turn leads to better treatment.

4. Photography-

This is one of the most valued and most commonly used features of the smart phone in the recent times. Photographs of patients, slit lamp findings, IO findings, fundus biomicroscopy and video recordings of surgery can be taken and these can be used for further consultations and can also be uploaded online and shared with physicians around the globe.

5. Medical calculator apps-

As glaucoma risk calculator, back vertex distance calculator, IOL calculators

6. Smart phones have replaced timers, calculators

7. Some useful apps. -

EHB (Eye Handbook)

A free app available in Google play and iTunes. This app has a comprehensive collection of videos, eye atlas, testing tools, various coding systems (including ICD9,ICD10,CPT,E&M codes),forum for discussion, ophthalmic instrument information, acronyms, eponyms,

mnemonics, dictionary. It also gives information about journals and provides access to their websites.



Figure 2. Screen shot of EHB.

Pub med

Provides shortcut to the library of the national institute of health from which files can be downloaded, saved, shared with others by mail.

AAO eBooks

it's a paid app where in the members can download various books published by America academy of ophthalmology in eBooks format.

Ikonion

This application may be downloaded by patients wanting more information about their disease process. It provides patients with a brief description of eye diseases along with high-resolution pictures, videos, and animations which facilitate a better understanding of common eye conditions.

There are a lot of other apps available which are intentionally left away due to limited space.

Limitations - Patient privacy might be at risk during digital recording, transfer of data or due to photography.

The standardization and quality of tests can never replace the routine examination tools. There is always possibility of error so professional guidance is required. Older patients may not find them comfortable to use.

Conclusion

Smart phones have already made a great impact on field of ophthalmology and medical practice in general. There is an increasing number of available smart phone applications and ophthalmologists are becoming more familiar with use of smart phones.

Innovative role of smart phone technology and its use in research, education and information sharing can makes smart phones a future of ophthalmology and medicine. Also awareness has to be created among Ophthalmologists regarding the vast opportunities smart

phones can bring to the field of Ophthalmology.

References

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