

Editorial

SMARTPHONES IN MODERN MEDICINE: THE SMART WAY AHEAD

This is the 21st century; the changes in the medical field are not only reflected by advances in surgical applications or diagnostic and therapeutic modalities but also by opportunities that have been provided to the medical community by way of technology to access data and interact in new ways. This was not imaginable 10 years ago, but today its a different world.

What really is a 'Smartphone'? The Oxford dictionary defines a smartphone as 'a mobile phone that is able to perform many of the functions of a computer, typically having a relatively large screen and an operating system capable of running general-purpose applications.'¹ It is estimated that over 1.08 billion people worldwide use smartphones.² Market research firm estimates report that 72 to 85% of physicians in the United States use smartphones on a regular basis.^{3,4} This number is likely to increase in the coming future.

Smartphones run on *operating systems* (OS). A number of operating systems have been developed and each one has its own *pros and cons*. The iOS is the operating system for Apple-based smartphones. The Windows Phone OS was unveiled in 2010 by Microsoft. Perhaps, the most popular OS worldwide is the Android. It was unveiled in 2007 and the arrival of Android-based devices has taken the smartphone world by storm. It is an open source; Linux-based smartphone OS developed by Google Inc. Many applications are available on the Android market that can be downloaded free of cost or for a price, if the user wishes.⁵

Most physicians use their smartphone to make calls, browse the internet and download e-mail, listen to music or watch videos; many also use the camera, especially in areas where pictures of wounds and X-rays can be sent by free downloadable applications (see below) for opinion and consultation. This is the routine in our Advanced Trauma Center, where all trauma cases have their wound pictures documented and also reviewed. However, there are other several interesting and innovative applications that can change the practice of medicine and may become routine in the near future. We will look at some of these applications in this editorial.



Mandeep S Dhillon



Siddhartha Sharma

Instant Messenger Applications

Perhaps, the most popular application is the WhatsApp messenger;⁶ others include Viber,⁷ eBuddy⁸ and Skype.⁹ Not only do these applications allow users to make calls and send messages using the internet but also allow sharing of photographs and videos instantly. This may be particularly helpful for getting instant opinions on radiographs, MRI and CT images and electrocardiograms. Also, it is often said that a picture is worth a million words. A well taken image of a wound in the emergency room is perhaps much more informative than any amount of written or verbal description of the same.

eBook Readers

Most medical books are now available in the 'eBook' format and may be purchased online at websites, like amazon.com. Most smartphones, especially those with Android or iOS operating systems, have stock ebook readers installed. Free to install eBook readers include the Kindle reader,¹⁰ the Nook® Reader¹¹ and the Reader™ by Sony.¹² Some useful books may also be found online at the Project Gutenberg website,¹³ free of cost. Having a reference book in the smartphone not only saves the hassle of going to the library but also invaluable to physicians working in the emergency department and surgeons in the operating room.

Medical Reference Applications

There are many applications that allow the physician information on their fingertips. Popular websites include Medscape,¹⁴ Uptodate¹⁵ and Epocrates.¹⁶ The ubiquitous PubMed¹⁷ is now available as a mobile app and its new interface makes searching and browsing for articles a breeze. The entire directory of antibiotics contained within the Hopkins Antibiotics Guide is now available as a medical app through many mobile platforms. From revising or refreshing one's knowledge to searching for a rare condition or checking drug doses or interactions, these websites allow the physician to make the best decisions for their patients.

Podcasts

Podcasts are short audio lectures on a given topic. Users may listen to them online or download and save the file to listen later at their convenience. Many of these are delivered by eminent experts in the field and may be of immense help not only to medical students and residents but also to the practicing physicians to update their knowledge. Popular podcasts include those provided by the NEJM, JAMA, ICU Rounds, Nature and Johns Hopkins Medicine websites. In addition, most specialty journals also offer podcasts on their websites.

Miscellaneous Applications

Many applications have been designed to serve needs of specific medical specialties. In fracture surgery, the AO surgery reference application¹⁸ allows users to browse through diagnosis, decision making, surgical approaches, reduction, fixation and aftercare of specific fractures, and is now being used by thousands of orthopedic surgeons worldwide. The hyperguides.com¹⁹ is an online educational resource that can also be accessed easily on the smartphone. Available in three specialties viz orthopedics, rheumatology and plastic surgery, each of the hyperguides allows users to browse through articles, CMEs, podcasts, videos and quizzes. The Orthopaedics Hyperguide[®] is also available as a mobile application for iPhone[®] users. The Stat ICD 9 Lite application for iPhone[®] includes all ICD-9 classification codes for quick reference. In addition, there are applications for calculating medical scores, like the BMI calculator application and the FRAX tool, which calculate the predicted 10-year fracture risk depending on the T score.

Physicians can search for applications on the Google Play website,²⁰ iTunes store, iMedicalApps website²¹ and QxMD²² website.

Diagnostic tests can also be performed by these smartphones; an example of smartphone and medical-device integration is the iBGStar glucose monitoring system from Sanofi-Aventis (Bridgewater, New Jersey). This is a 2-inch long device that plugs into the bottom of the iPhone and integrates with the iBGStar application. A test strip is inserted into the device and a drop of blood is applied; the device calculates the blood glucose and the application displays the result.

In pediatric applications, mobile devices can assist parents in the home monitoring of children with respiratory problems. In some children, peak flow meters are used to monitor respiratory status, and many smartphone applications, such as Asthma Buddy, Asthma MD and Asthma Track, can be used to track peak flow reading scores, medication use and exacerbations.

CONCLUSION

Folk! smartphones are changing the practice of modern medicine in a never before imagined way. Whereas some aspects of usage are well developed and here to stay, others are still evolving and hold a lot of promise. The technology of the future is here and it would not be wrong to label it as the 'touch' revolution. There is a lot of money being invested too; industry pundits predict the current value of the Medical App market will skyrocket, pushing up overall IT spending to \$9.6 billion dollars in 2013 alone. This will definitely improve and refine these applications further; so those of us who do not have a smartphone, now would be a good time to acquire one.

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Mandeep S Dhillon

President, Indian Arthroplasty Association
President Elect, Indian Foot Society
Vice President, Indian Association of Sports Medicine
Executive Member, International Society of Arthroscopy
Knee Surgery and Orthopedic Sports Medicine
Professor and Head, Department of Orthopedics
Postgraduate Institute of Medical Education and
Research, Chandigarh, India

Siddhartha Sharma

Senior Resident, Department of Orthopedics
Postgraduate Institute of Medical Education and
Research, Chandigarh, India