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QR Codes in Dentistry

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What is QR Code?

A QR Code (stands for "Quick Response" or "Quick read") is a two dimensional symbology or barcode which is mobile phone readable and was developed in Japan by DENSO WAVE in the year 1994.[1] It was developed for the automobile industry with the primary aim of being a symbol that is easily interpreted by scanning equipment which was used to track automotive parts and vehicles through a production line.These codes are very similar to the linear barcodes that are widely used for various purposes such as pricing, patient identification, billing procedures and tagging.[2]

In contrast to the original linear bar codes that literally consisted of vertical bars, QR codes are constructed in a mosaic pattern. This creates the two-dimensional pattern that allows for many more possible combinations while maintaining its uniqueness and recognition speed. It containsinformation in both the vertical and horizontal directions, (figure 1) whereas a bar code contains data in only one direction.Conventional bar codes are capable of storing a maximum of approximately 20 digits (figure 2); QR codes are capable of handling several hundred times more information.[1] Also, a QR code is capable of encoding the same amount of data in approximately one-tenth the space of a traditional bar code. QR code also has the advantage of being inexpensive and readable from any form of display e.g. paper prints, digital displays, banners, stickers etc.

These advantages favorthe application of QR codes in a variety ofday to day aspects,including dentistry. A study conducted by researchers from National Library of Medicine found varied application of these codes in medical information as well.[3,4]

How does it work?

To recognize a QR code, mobile devices or smartphones that have an integrated webcam are required. A smartphone removes the friction of needing to be near a desktop to access the web, get contact information, securely access practice and patient data.

This technology simplifies the process by increasing the speed, reducing the time, effort and resources. There are many free applications available where the device camera can be used to capture a QR code and "translate" it into the corresponding destination, which can be accessed immediately.

Using a QR code in combination with a QR code reader is an easy method to unlock the power of this technology. These codes can store website URL,YouTube links, Google map locations, Twitter, Facebook, LinkedIn, Foursquare, iTunes, plain texts, telephone numbers, SMS, email address, email message, contact information (V card), WiFi login and Paypal buy now links.5Once a QR code is prepared it can be either printed on paper, banners, T-shirts or stickers, or they can be projected on digital screens for accessibility.

Applications in Dentistry
QR codes can have a wide range of application in various aspects of dentistry. They can be used as a tool in dental education, product promotion and practice management.

Figure1: QR code

Figure 1 and 2. QR Code and Linear Barcode

Dental Education

In the field of dental education QR codes can revolutionize the accessibility that studentswill have to scientific material available on the web.

They also can be used to give students brief overview of a topic just by scanning a QR code before entering a lecture, workshops or seminars.They can be used inlecture notes or presentations to get access to detailed information from an e-learning site or specific scientific material available on the web. Each lecture slide can have different QR codes for video links, journal access or e learning information relevant to the topic. They can be used to code standard operating procedures, give instruments lists for specific clinical procedures and to conduct student surveys.These codes can be used for self assessment exams and OSCE training sessions where the answers to the questions can be coded to maintain secrecy and decrease the workload on the academicians guiding the session.

QR codes can be used to give accessibility to students to online surveys, faculty feedback and course evaluation forms. The student's progress/ assignments or projects can be reviewed. Easy access to student digital portfolios for regular updates, each student can be assigned a QR code at the beginning of the year or start of their course.

Among other uses, information encrypted on a QR code can help in orientation of a new student through the dental school/campus by providing maps, videos and layouts of the school with information regarding the departments and clinics or labs.

Product Promotion

QR codes can be used to deliver detailed information on dental products such as tooth brushes, dental floss, mouthwashes, advanced oral hygiene aids as well as oral cancer detection kits and saliva testing kits. The information provided on product leaflets could be enriched and elaborated by using the QR codes, which would help in patient education and motivation. Thus, leading to better compliance towardsusage of dental products.

Practice Management

In the field of practice management these codes could be used to find directions to dental schools/ dental clinics,
advertisements for new treatment procedures, video links to dental surgical procedures, post operative instructions, patient awareness and wellness data.Patients seated in waiting areascould use these codes to access general health information, getinformation regarding various biomaterials used in dentistry, profile information of attending dentists and specialists in a clinic, post testimonials online and use the link to respond to patient assessment questionnaires. QR Code on a brochure can facilitate initial patient doctor contact by linking them to a website to get more information, or book an appointment. It is indeed a simple and effective way to improve the image of an organization on a technical, user friendly and ecofriendly front.

Dental professionals can access current clinical information and decision support at the point of care by ease in access to online medical and dental text books, professional guidelines, drug references and evidence based reviews.[6,7] They may also aid the health care provider to allay the apprehensions of patients instantly by showing them videos of dental procedures and other materials.

QR codes were developed for the automotive industry but have found many applications in various fields. With the integration of technology and healthcare on many fronts and the majority of urban global population having access to mobile devices & smartphones; decoding a QR code to access valuable information is not

unthinkable.This article suggests potential uses of QR codes in dentistry with an aim to motivate the fraternity to be innovative and use this tool for improving quality of health care.

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