



## Current Dental Apps & the Way Forward

### KEYWORDS

Dental, Health, Apps

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**ABSTRACT** *Smartphone apps are now being increasingly used to help the patient to manage his health and gain access to useful information<sup>1</sup>. Thus it is essential to use the existing technology to spread dental health. The need of the hour is to develop a suitable app for the patient's use and help the patient to choose from an assortment of apps available in the market. Thus, an online search was conducted on the World Wide Web and Google Play Store to gain an insight into the existing dental apps. The search result showed an array of apps, of various specialities and features. Based on the observations regarding the existing apps, an app was designed to advocate oral health in the future. It is important for the end user to be able to choose an app with features that are personalized and validated.*

### INTRODUCTION

Mobile phones, initially, were used to communicate with people by sending text messages or calling them but the advent of smartphones has opened a plethora of tools that are easily accessible and tailor made to cater to the needs of an individual. Smartphones come with the advantage of being able to support and run "Mobile apps". Apps are computer programs specifically designed to run on devices such as smartphones and tablet computers in order to carry out a specific function. An app is capable of executing a number of functions suited to the need of the individual using it. It can book railway tickets, manage finances, solve mathematical problems, give beauty tips, and manage fitness routines: the uses are limitless.

In today's day and age, it is essential to use the existing technology to spread dental health education. Smartphone apps are now being increasingly used in medicine and dentistry to help the patient to manage his own health and gain access to useful information<sup>1</sup>. Being easy to use, effective and inexpensive, they can help both the patient and the clinician in a variety of ways. Evidence based studies have shown that mobile apps promote oral hygiene, eliminate fear regarding the treatment from the mind of the patient, help the clinician gain knowledge about the latest trends in the field<sup>2,3,4</sup>. The need of the hour is to develop a suitable app for the patient's use and help the patient to choose from an assortment of apps already available in the market.

### OBJECTIVE

The study was carried out in order to gain an insight into the existing dental mobile apps and to improvise the basic components of a dental health education app to help the end user gain knowledge and access to oral hygiene.

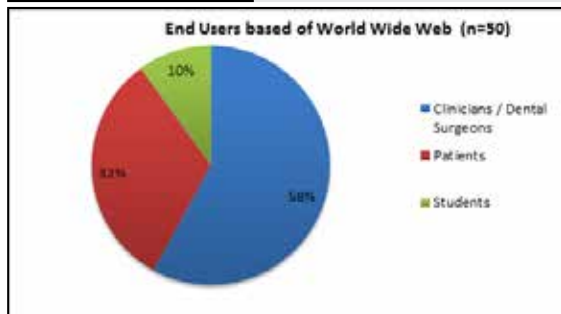
### METHODS

This is a literature review based on a search conducted using the keywords "*dental education*" and "*dental apps*" an online search was made on the World Wide Web, using the Google search engine. A second search on the Google Play Store using the keywords "*Orthodontics*", "*Endodontics*", "*oral surgery*", "*x ray*". A third search was made on the Android Google Play to search for apps specific to the patient's needs, using the keywords "*dental games*", "*tooth brush*", "*braces*", "*dental procedures*".

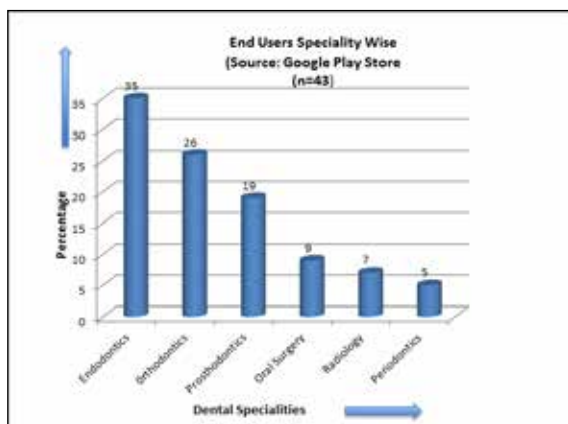
The Play Store includes a brief description, number of downloads, user reviews and cost of the app. These details were noted and the inclusion criteria for the study was that, the number of downloads of the apps must be more than a thousand and the user ratings more than 3. General medical apps and apps having a user rating below 3 were not included in this study.

### RESULTS

The World Wide Web search results were divided on the basis of the end users. Most of the apps focussed on the clinicians needs (29 out of 50) like record keeping, updating knowledge of dental procedures, searching new products available in the market and basic practice management. On the other hand, the apps for patients included basic education apps (16 of 50), tips on maintaining oral hygiene, self diagnosis and tutorials for dental procedures. Apps for students (5 of 50) were based on providing question banks, tutorials and lectures by professors [ Fig.1]. There were educative video games for children, product catalogues for lab technicians and hygienists as well. Almost all apps were compatible with both iOS and Android operating systems. More than 50% apps were free of charge (26 out of 50)<sup>5,6,7</sup>.



A second search was made on the Android Google Play to search for apps specific to the field of expertise. Out of the 43 apps, 11 were for orthodontia<sup>8</sup>, 3 for dental radiology, 15 for endodontia, 8 for prosthodontia, 4 for oral surgery and 2 for periodontia [ Fig.2].



A third search was made on the Google Play Store to search for apps specific to the need of the patient. Out of the 43 apps, 20 were games related to dentistry, 5 included brushing and flossing tutorials and reminders, 6 were patient education apps explaining basic dental procedures like implant placement and root canal treatment with the help of videos and diagrams. 12 were dental photo editors which allow the patient to add braces to his picture<sup>9</sup>.

For patients, there are an array of apps which provide explanations and images for various dental treatments and ailments. They also allow the patient to report dental emergencies and book an appointment<sup>5,6,7</sup>. In order to make the brushing session more exciting and ensure that the patient brushes for the required duration of time, apps also play a random song for 2 minutes from the music library. Such apps have over 50 thousand downloads<sup>2,9</sup>.

It was also found that the most downloaded app was "Crazy Dentist", with over 50 million downloads on the Google Playstore, a videogame designed to simulate dental procedures in order to provide entertainment.

## DISCUSSION

Almost all apps were compatible with both iOS and Android operating systems. This is probably because these two operating systems are the most widely used<sup>10</sup>.

The keywords being used gave us searches that included general medical apps and apps having downloads less than thousand. These apps were not included in the study.

Seeing the end user statistics, most of the apps in the market are either for patient education or for clinicians. Patient education apps mostly included sophisticated reminders that encourage the patient to brush, floss, change orthodontic elastics or alert him of an upcoming appointment. It also explains basic dental procedures which help to eliminate fear from the mind of the patient and answer his queries. Studies have shown that when the patient is aware of the procedure being carried out, he is less apprehensive<sup>11</sup>. Clinicians use apps for practice management which ease burden of record keeping and data management. Dentists can easily update knowledge of latest products and medicines in the market with a click of a button. Clinicians can read publications online from leading journals as "e-journals" are becoming more prevalent<sup>10</sup>.

The existing apps though interactive and well designed, lacked personalisation. Also, the apps were specifically designed either for the patient or the clinician; there was no integration of the two. Moreover, most of the information contained within any app on the app store is often not independent and even more often not validated. The clinician must guide the patient to use the app that is best suited to the latter's needs and should ensure that the information being provided is genuine<sup>8</sup>.

Hence, the idea of a prototype application, was conceived as a part of this study, which aims at helping people manage their own health and wellness through a number of unique feature like "Backup Data", "Emergency", "Chat with My Dentist", "Remind Me", "New Product", "Patient Education" and "Referrals". The "Back Up" feature shall combine the immediate need and information required by the patient along with creating a back up to manage patient's records for easy reference both by patient and dentist. The backup is to be created on dentist's computer, also, through cloud system for dentist's future reference. This application is an oasis among the desert of many dental applications available, as it integrates the functionality of both patient and dentist .

Some of the features like, "Emergency", which shall guide the patient to help themselves, are necessary for any patient oriented dental app. The patient might encounter a dental emergency ranging from sudden tooth pain, broken prosthesis or a broken tooth. The app shall be designed in such a way so as to give tips for first aid, how to handle the emergency by do it yourselves and locate the nearest dental hospital. Other available apps, e.g., Lexi Dental Complete have a feature of emergency handbook but they lack the feature of locating the nearest dentist<sup>12,13</sup>. Another important feature, "Chat with My Dentist" will allow the patient to message his dentist, ask FAQs, clear doubts, fix an appointment and discuss problems regarding the treatment. Most of the apps available for communication are for clinicians, for e.g., Dentist Manager is an application which enables dentists to manage a list of patients. The dentist can add multiple patients, store information about them, make pictures, add them to gallery, add or edit notes in dentition view<sup>14</sup>.

Another indispensable feature for a patient-dentist integrated app is, "Remind Me". This is a calendar feature which shall notify the patient one day before his dental appointment and keep a record of previous appointments to ensure that no appointment is missed. This feature has to be coordinated between the dentist and the patient. The dentist shall also get a reminder for his different patients.

Other features like, "New Product", "Patient education", "Referrals" shall help both the clinician and the patient in understanding and cooperating with each other through the course of treatment. The "New Product" feature shall include all new products and medicines specific to the patient treatment which will be listed along with reviews and records of any adverse drug reactions, cost, dosage form and daily intake. The clinician shall help the patient chose the product which is best suited to his needs. The latter shall be able to order the product online. Certain apps offering this feature are Lexi Dental Complete and Dental Product Shoppe. Patient education feature will explain the ongoing procedure to the patient with the help of 2D and 3D animations and videos. Dental procedures ranging from scaling to implant placement will eliminate the fear of uncertainty from the mind of the patient while increasing awareness of the treatment planning. Dental Demo Suite GP (DDS GP) is the most comprehensive chair side mobile application available for patient education<sup>16</sup>. This app has stock images, which the dentist can make use of, to explain a particular procedure. The prototype applications shall make use of self-explanatory videos which do not necessary require a trained personnel. The "Referrals" feature shall allow the doctor to refer the patient to another dentist following proper ethical guidelines and procedures. The treatment plan and other medical data of the patient can be transferred from the mobile of one dentist to another using the app. Along with other details including the medicines being prescribed and treatment being followed. (Fig 3)



## CONCLUSION

In the endeavour to develop a comprehensive dental app, a prototype application was conceived which incorporates certain features and designs that are useful for both the patient and the doctor. It displays a high level of personalisation, the clinician can modify the app according to each patient and each treatment and the app will display results accordingly. The information provided on the app can be crosschecked by the dentist; hence the information is bona fide. This will provide a better degree of dental health care and education.

As with all other technologies, there is a rising concern about whether the technology will create a cost limitation and might not benefit people who are not well versed with computer technology. This difficulty is also often increased by a range of physical (e.g., poor eyesight) and/or cognitive disabilities (e.g., dementia) that such users might be suffering from that can further limit their use of the technology<sup>16</sup>.

Dentists, on the other hand, must realise that they need to embrace this upcoming technology in order to advance their practice and provide the best possible healthcare for their patients. Less adaptive professionals could potentially see a decrease in demand for their services<sup>17</sup>.

It should be considered that by the time of publication, some apps would have been added, while others would have been removed. A further study can be done to revise the existing knowledge of dental apps<sup>10</sup>

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