achieved using nucleation inhibitors. Although the efficacy of PILP remineralization for dentin caries has not been proved clinically, various additional barriers remain to be overcome.

FUTURE ADVANCES

Many possibilities are on the horizon for new dental materials. Among these are the development of a limitless bulk-fill composite that self-adheres to all tooth structure and offers antibacterial properties; instant curing technologies; the ability to functionally restore and stimulate beneficial biological responses that encourage natural repair of small tooth defects; in situ tissue-engineered replacements of whole tooth structures and entire dental pulps; materials with native antimicrobial characteristics; materials that contain sensor molecules or compounds that monitor events at margins and surfaces and can alert clinicians and patients about potential problems so they can be addressed preventively; and new ceramics that are strong, highly esthetic and translucent, and fabricated chairside by additive manufacturing methods using a fully digital clinical workflow and also incorporate computer-controlled ion implantation techniques that esthetically color the final prosthesis.

Clinical Significance

The development of materials to support dental care and allow the practice of dentistry to provide functional, esthetic, and strong dental structures has been an ongoing effort for over 100 years. During that time, materials and methods have been created in response to problematic situations as well as in an effort to make patients happy with the result. Based on what has been achieved in the past 100 years, it's exciting to consider what might be achieved in the next 100.

Bayne SC, Ferracane JL, Marshall GW, et al: The evolution of dental materials over the past century: Silver and gold to tooth color and beyond. *J Dent Res* 98:257-265, 2019

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DENTAL PRACTICE CHANGES

Changes in dentistry in the United Kingdom

BACKGROUND

Over the course of 15 years, it's likely that dental practice would change, especially with all the new materials and methods that have been developed for dentistry. The dental practices of general dental practitioners in the United Kingdom were compared based on questionnaires completed in 2002, 2008, and 2015 to determine which areas have changed and which have not.

METHODS

A self-report questionnaire was distributed to 1000 UK-based general dental practitioners in 2002 and 2008 and to an additional 500 practitioners in 2015. The questions dealt with a wide range of topics concerning practice patterns, techniques, and materials used. Response rates were 70%, 66%, and 78%, respectively, in 2002, 2008, and 2015. The results were reported in topical groups, including demographics, techniques used, indirect dentistry, and postgraduate education.

RESULTS

Demographics

The proportion of men responding diminished from 73% in 2002 to 60% in 2015. This was interpreted as proof that more women are choosing to enter dentistry. In addition, mean years since graduation has risen from 18 years in 2008 to 20 years in 2015.

The number of dentists in a practice also tended to increase. Of those surveyed in 2002, 28% of the practices had 2 dentists, 27% had 3 dentists, and 14% had 4. The mean number of dentists per practice was 3.6 in 2008 and 4.2 in 2015. More dental practices were located in a town or city center in 2015 as well. A mean of 23.9 dentist-delivered patient treatment sessions per week was found for the 2015 survey, which is in line with the numbers reported for earlier periods. Dental hygienists are also found more often in dental practices, with nearly half of those surveyed in 2002 having no dental hygienist but the 2015 practices averaging 1.2 hygienists per practice. This does not, however, represent a dramatic increase, which was expected with the increased emphasis on preventive measures.

When considering payment for services, 82% of those responding in 2002, 57% of those in 2008, and 50% of those in 2015 were treated under the National Health Services (NHS) arrangements. Thus fewer patients are receiving NHS treatment now than 15 years ago.

When asked about the use of computers, the vast majority of practices in 2015 used a computerized system. Nearly three

fourths have a website, and a third using social media to communicate with patients. About half of the respondents reported using intra-oral cameras in 2015, but it is anticipated that clinical photography will become an integral part of everyday life for practitioners. In the 2015 survey, 74% of dental practitioners used digital radiography/digital imaging, indicating a rapid acceptance of this technology in view of its increased efficiency and effectiveness.

Techniques

The general dentists reported that orthodontic treatment is not provided in most cases; likely this is seen as more appropriately delivered by specialist practices. Increasing numbers of practitioners are also using magnification to see more clearly. However, use of a rubber dam did not increase substantially between 2008 and 2015. Most often its use is confined to endodontic treatment.

Although zirconia-based crowns and bridges were not available in 2002, they were quickly adopted and currently are used by 47% of dentists in the United Kingdom. The use of nickel-titanium files was adopted by 80% of dentists because they provide a faster, easier, and more effective means to complete root canal preparation. Among the other materials that have been adopted in the last 2 surveys are tricalcium silicate materials and fiber-reinforced resin composite bridgework. However, neither of these last materials are widely used, likely because of the absence of significant evidence-based documentation in their support.

Computer-aided design/computer-aided manufacturing (CAD/CAM) restorations were used by 5% of the 2008 respondents and 17% of the 2015 respondents. Although the potential for CAD/CAM technology in dentistry is widely recognized, UK dentists may consider this option as too expensive or extreme. Similar findings for implants may be the result of this same reluctance to see implants as anything less than the last restorative option.

When preventive dental measures were evaluated, it was found that 20% of respondents did not use topical fluoride in 2008, but just 5% did not use it in 2015. Seventy-four percent of the 2015 respondents used practice-based fluoride gel treatments, an increase from 40% in 2008.

Home-based bleaching was offered by 35% of the respondents in 2002, 81% of those in 2008, and 90% of the 2015 respondents. In-office bleaching was offered by 18%, 35%, and 28%, respectively. The fall in practice-based bleaching may be attributed to the bleaching-related sensitivity patients experience. However, bleaching remains an element of everyday practice.

The material most often used for restoring occlusal-proximal cavities in permanent molars was reported to be amalgam by 90% of those responding in 2002, 75% of those in 2008, and just 55% of those in 2015, reflecting changes in the view of this material as safe. Premolar tooth restorations were done in amalgam by 86%, 59%, and 40%, respectively, in 2002, 2008, and 2015. The shift has been to predominantly resin composite systems for direct restorations.

Primary tooth restorations are now recommended to be done using the Hall technique, an innovative way that employs preformed metal crowns. Although the numbers of non-users of this technique have been reduced since 2002, just 56% of the 2015 dentists use this approach, and 29% use it only occasionally. The material selected for primary tooth restorations today is glass-ionomer cement (GIC), although about a third of respondents selected resin-modified GIC (RMGIC). The ease of use and effectiveness of GIC and RMGIC has significantly improved dentists' ability to manage cavity filling in pediatric patients.

Indirect Dentistry

The use of resin luting materials has increased since 2002, but the dependence on glass-ionomer and phosphate luting materials remains significant. Resin luting materials offer superior physical properties compared to glass-ionomer and phosphate materials, but the resin materials were reported to be preferred by just 6% of the 2002 respondents, 11% of the 2008 respondents, and 14% of the 2015 respondents. With such slow uptake, manufacturers don't recoup their research and development costs for years, which may delay further innovation and advances in materials. The use of condensation-cured silicone impression materials has fallen over the course of the 3 surveys, perhaps as a result of the usefulness of alternative materials.

Postgraduate Education

In 2002, 5% of respondents had not taken any postgraduate education courses. By 2002, 2% had avoided all postgraduate education, but 63% had taken 5 or more courses. In 2015, all respondents had taken postgraduate training, with 79% indicating they took 5 or more courses per year.

Clinical Significance

Dentists tend to be slow to jump on the bandwagon for new technology, new procedures, and new materials. This can be a good thing, but it can also mean that they miss out on the advantages of the newer approaches and materials and spend more time and effort on their practice than is actually required. Changing to new methods can be hampered by the absence of evidence-based reviews of the methods or the poor numbers of patients who are reported, among other things. Robust practice-based research is needed to provide a strong evidence base that will allow dentists to confidently adopt newer techniques and materials.

Burke FJT, Wilson NHF, Brunton PA, et al: Dental practice in the UK in 2015/2016. Part 4: Changes since 2002? *Br Dent J* 226:279-285, 2019

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Searching for wisdom online

BACKGROUND

The internet is full of false information or disinformation largely because it is not regulated for the reliability of its content. The European Commission set up a High-Level Expert Group (HLEG) to address this problem and established 5 pillars to combat this disinformation based on enhanced transparency, the promotion of media and information literacy, empowering users to address disinformation, safeguarding the diversity and sustainability of the news media ecosystem, and promoting continued research on how disinformation impacts society. Dental students expect to access not only lectures but also other digital content at their convenience. However, much of the content they access online is not peer-reviewed. The YouTube platform is the most popular of the online video sharing platforms and can also be referred to in Google searches. Anyone, including experts, companies, and laypeople, can publish content and classify that content into categories, such as education and science, with no peer review. An evaluation of the reliability of dental education content found on YouTube was undertaken, with the secondary aim of determining if users' engagement with these videos is affected by how the content is offered.

METHODS

A YouTube search for dental content was conducted using the following keywords: restorative dentistry, pediatric dentistry, orthodontics, and oral surgery. The first 10 results of each search were divided by publisher. In addition, an analysis was done of the number of views, length, category, retention index, and date of publication of the content.

RESULTS

Two of the 40 videos were posted by an American dental school, but had been produced in the 1970s and were outdated. The content of the 40 videos was evaluated for value in terms of education, science, people/blogs, comedy, film/animation, how-to/style, and sports. Seventy-five percent of the videos were posted by individuals not connected to any university, 20% by companies, and 4% by a single American university.

Average video length was 9.22 minutes, and the average number of views per month was 21,593, for a total of 25 million views. The videos averaged a lifespan of 48 months on YouTube.

Videos published as educational or educational/scientific were older than those in the other categories. Videos with the highest interaction indexes were 76% older than those with the lowest interaction indexes. Longer movies had 44% more views than shorter ones. The interaction index for the oldest movies was 264% higher than that for the most recent videos.

User retention was also evaluated. Just 55% of the videos had user retention data available. These data indicated that the average video user retention was inversely related to viewing rate through time. User retention was better with shorter videos.

DISCUSSION

This review indicated that free online dental information is outdated and not provided by a reliable academic source. As a result, the 40 videos evaluated provided unreliable information, yet they received 25 million views. This seems to indicate that users have little ability to find trustworthy information online.

Clinical Significance

Universities need to consider how their student use YouTube and incorporate such findings into their educational efforts. Student retention and learning appear to be influenced by the length of the video and the more recent publication of the video. Dental education providers need to advise students on how to search for reliable content or provide more open source content that is current and peer-reviewed.

Da Silva MAD, Pereira AC, Walmsley AD: Who is providing dental education content via YouTube? *Br Dent J* 226:437-440, 2019

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