When will BB-8 become a dentist?

Restorative dentistry has seen remarkable innovation over the past decades. When I graduated from dental school, bulk filling was evil, zirconium dioxide ceramics were magic, and only nerds played with intraoral scanners and CAD/CAM fabrication of single tooth restorations – of course the graphics needed for defining crown margins were in 2D with the first 3D versions being envisaged.

Fifteen years later most restorations are made from zirconia while casting metal alloys seems to be almost gone. Large caries defects are restored according to the bulk-fill technique, and due to the superior performance of modern composite resin systems often no longer require indirect restorations such as onlays.

Although the most critical problems of intraoral digitization, ie subgingival preparation margins and contamination by saliva and blood, have not been overcome completely, intraoral scanners are in widespread use, and companies making a good portion of their revenues with impression materials prepare themselves for the time after day zero.

The younger generation of dental practitioners we are currently educating at dental schools are digital natives who adapt very easily to a virtual world with high levels of self-confidence. Of course, universities are trying to make the next step and apply augmented reality for training, eg on work stations simulating a phantom patient. The kids for whom we are implementing these things already have mastered years of pre-university training using online games such as Pokemon Go.

Industry tries to exploit all of these novel possibilities, with the rapid development cycles observed in intraoral scanning providing evidence. There can be no doubt that most innovations provide added value for us as clinicians, and our patients as well.

So what is coming next? Industry for sure will continue refining current methods and tools, claiming superiority if the marginal gap of a crown can be reduced by another 0.005 µm as compared to the very low numbers CAD/CAM technology has made possible. The basic problem that a gap size of 0 µm is technically impossible will, however, remain and secondary caries will occur if patients do not adequately clean their teeth.

An identical situation can be observed in implant prosthodontics with a myriad of researchers having described a wide variety of methods for achieving passive fit of multi-unit restorations. Despite all the fancy technology available today, passivity of fit remains a dream, but the restorations work very well because bone's adaptational capacities compensate for inaccuracies resulting from the technical processes we apply.

Guided surgery has enabled us to place implants in more challenging situations and with an improved prosthetic vision in mind plus more safety for our patients' vital structures. But even when obstacles to technology adoption and personal learning curves are taken into account, it appears to me that we are seeing more and more implants that are not in a good state – often due to improper planning, poor soft tissue conditions, or simply due to a lack of hygiene.

While I sometimes wonder how such studies are conducted and what is used for reference, it has been shown at length that guided surgery enables anybody to predictably place implants with a higher level of precision as compared to the traditional workflow. Based on clinical observation, it sometimes appears that modern tools cannot compensate for a lack of understanding and training. I would even argue that in "the olden days" when a high level of knowledge was required to compensate for limited diagnostic options, the number of problematic implants was not higher than that today.

In my opinion, limited resources and an aging population are the two major challenges we have to face in healthcare, and in dentistry in particular. While we strive to achieve maximum esthetics regardless of the number and complexity of interventions needed, there is a high number of patients who cannot get access to basic restorative/prosthetic treatment. The use of industrialized fabrication techniques as well as preventive measures will hopefully help to overcome this issue in the long run. Although prosthodontists have long been treating older patients, the lists of prescription medicine and medical precon-

ditions that we face on a daily basis are getting longer, and hence the treatment getting more complex. In addition to a caring attitude, potentially the most decisive factor for successful treatment in such a surrounding is to listen to the patient and to integrate the patient's wish, the medical situation as well as socioeconomic factors, and to form a patient-specific treatment plan.

I am absolutely sure that BB-8 one day will be able to outperform all of us in terms of the technical aspects of our profession, but I doubt that this is a decisive advantage.

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