Digital ecosystem: The future is not in five years, the future is now

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At a time when venerable institutions in numerous countries, such as the UK’s National Health Service, are already setting up their own digital ecosystems and when not only companies but also private households are increasingly becoming almost paperless, it is certainly not too early to take an interest in the digitisation of our own dental practices. Many practices are already equipped with digital devices that replace or complete some steps of the traditional dental procedure in the daily practice. However, what I would like to highlight in this article is the potential that those clinicians who are willing to fully engage in the digitisation of their practices and to create their own digital ecosystems can realise.

What is a digital ecosystem?

“Digital ecosystems are comprised of companies, people, data, processes and things that are connected by the shared use of digital platforms. These partnering ecosystems are created to enable collaboration and provide mutually beneficial results to all parties involved.” In the case of a dental practice, the involved parties may be the patient, the clinicians and the entire practice team, as well as external stakeholders, such as supplying companies and other healthcare or insurance providers.

What is needed to create a digital ecosystem?

Foremost in the realisation of such a system is the most undigital of all conceivable elements, namely the human being, or more precisely all team members of the practice in question. Of course, the implementation of a digital ecosystem will fail even with the most sophisticated technical equipment if not all persons involved in the practical operations understand and support the digital process.

Technically, in addition to the obvious requirements, such as sufficient and interconnected computer workstations and a fast Internet connection, the cornerstones of a digital ecosystem in the dental practice are a powerful intra-oral scanner and a 3D radiographic unit. Depending...
on the specialty, these devices can be complemented by a high-quality digital camera, a milling machine and a 3D printer.

**What are the benefits of such a digital ecosystem?**

In general, correctly used digital devices produce more accurate results compared with conventional instruments and therefore indirectly provide a higher quality of care. In addition, they usually save treatment time and therefore costs, not only owing to the shorter chair time but also owing to the significantly fewer consumables required and, in many cases, the reduced space requirements. In some cases, digital procedures are also perceived as more pleasant by the patient.

But these tools only become really efficient when they can be networked with one another, so that a digital workflow becomes possible without any gaps. This networking already has its most obvious advantages in practice when, for example, the measured values of the intra-oral scan are superimposed with those of the 3D radiograph to form a very meaningful data set. The use of the collected digital data by the practice’s own 3D printers or CAD/CAM units, for example for temporary prosthetic work, is also evident and profitable.

**What about interaction with the outside world?**

With digital ecosystems, the greatest untapped potential, which is already technically exploitable today, probably lies in the connection to the world outside the dental practice. For example, artificial intelligence (AI) for simulating treatment outcomes can be highly efficient in motivating patients to comply with treatment started. And, of course, such simulation can be an important factor in enabling patients to see the benefits of treatments offered by the dentist in the first place—the decision-making process is certainly made easier. However, this works best with very realistic simulations which clearly stand out from the robotlike images that have been known for some time. Only simulations with the individual and high-quality patient data sets, as discussed above, allow the potential to be fully exploited.

In some cases, such as in orthodontics with the new DenToGo (Struamann), a comprehensive suite of AI-based software solutions for tablets and smartphones, not only is patient choice facilitated by prior simulation, but progress is monitored and documented throughout the treatment period. The patient’s mobile phone as an imaging device is included in the communication with the practice.

In a concrete example, DenToGo Vitals Check allows in the first step a fast and visually easy-to-understand patient assessment. During this in-practice process, the clinician can identify, together with his or her patient, the orthodontic treatment needs and possibilities. Another DenToGo feature, My Smile, then provides almost immediately a realistic photographic simulation of the individual patient’s aesthetic situation during and at the end of the envisioned treatment—this, of course, helps tremendously in the decision-making for or against a treatment.
During the actual treatment, DenToGo Monitoring allows close-meshed support by the dentist without the patient having to come to the practice frequently: the patient takes photographs of his or her progress and sends these to the practice, which then gives either individual feedback or feedback automatically generated by the software but still perfectly adapted to the patient’s situation and needs. After completion and still without mandatory in-practice visits, DenToGo Smile Guard ensures good post-treatment stability and even helps to prevent relapse through regular notifications sent by DenToGo to the patient.

In short, DenToGo allows the dentist to provide high-frequency follow-up while reducing the number of practice appointments required during the treatment period. The patient feels better cared for and the clinician still has more time for other appointments with higher added value.

**The DenToGo suite of Softwares**

*AI providing added value to doctors and patients*

- **DTG VITALSCHECK**
  - Instant assessment of the patient oral condition at the clinic

- **DTG MYSMILE**
  - Realistic simulation of the patient’s smile during and after treatment at the clinic

- **DTG MONITORING**
  - Remote monitoring of the patient’s treatment at the clinic

- **DTG SMILEGUARD**
  - Remote monitoring of the patient’s post treatment phase at the patient home

**Fig. 5:** Suite of Software—unique and comprehensive digital ecosystem to the dentist and patient.
Greater visibility brings added value to the dental practice

The routine use of the technical cornerstones of a digital ecosystem in the dental practice makes the step to efficient patient communication extremely easy. Successful treatments automatically documented in images, scans and radiographs can quickly be shown on social media or in-house channels, such as the waiting room TV, as proof of competence.

Thanks to such visibility, existing patients are motivated to undergo new or additional treatments and new patients are attracted to the practice.

Additional potential of a digital ecosystem

The documentation of the clinical conditions of each patient case, which is greatly facilitated by a digital ecosystem, can also offer further advantages. For example, replacement prostheses for damaged prosthetic work can be fabricated with minimal effort and very quickly—patient satisfaction is guaranteed in such cases. Even in less pleasant situations, such as disputes with insurance companies or even legal cases, complete and meaningful data sets can be of great value to the clinician.

Lastly, the digital ecosystem helps with what are probably the most obvious forms of exchange with external partners, such as the laboratory or dental technician or other non-dental medical professionals treating the same patient. Of course, in such applications, but also in general in the implementation of a digital ecosystem, the utmost care is taken with regard to data protection—open communication but with clear boundaries.

Reference


Fig. 6: DenToGo at IDS 2019.

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In 2009, she began her professional career in the dental industry and has since acquired a broad background, particularly in strategic marketing and product management roles, in Austria, Singapore and Switzerland. Matt demonstrated her experience above all in leading the successful global launch of the new Straumann 3D printer, the CARES P series. Currently, she is Director of Solutions Management Orthodontics at Straumann.