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#idscologne

## Technical review of IDS 2023

### The wind of innovation is blowing - and still gives tailwind for new developments

The 40th International Dental Show (IDS) from 14 to 18 March 2023 was characterised by an incredible variety of innovations.

The filling therapy plays a major role in the everyday professional life of many dental practices. That's why developments in this field are attracting particularly great interest at IDS.

#### Flowables without bubbles

In summary, it is safe to say that modern-day technologies include glass ionomer cements, compomers, composites, special bulk filling and hybrid composites. Some of the current developments are remarkable here. One issue here for example is how many different shades should a practice work with. Large assortments offer the advantage of being able to work in a very differentiated manner. However, a pragmatic process with for instance five differently pigmented composite masses and a pronounced chameleon effect can be precisely the right choice for many patients. Besides this there is also the alternative of not using pigments for the dyeing process, but instead merely the intrinsic structure of the material. One practical problem was solved at IDS 2023: Bubbles in the flowable composite, which can hardly be eliminated and can lead to discolouring. Syringes especially designed for the purpose hinder the occurrence of bubbles. Air that enters on filling the syringe is mostly diverted into the plunger of the syringe via a filter function. Thanks to soft contours and a conical shape inside the cannula remaining air escapes while dispensing.

#### Probiotic toothpaste and mouthwashes

Prophylactic measures should be carried out rigorously so that a filling therapy is not necessary at all or not required until later on. Brushing one's teeth is the solid and absolutely necessary basis for oral care in the home bathroom. But what can one do beyond this to ensure the health of the teeth and gums? Among others, increased attention has been paid to mouthwashes over the past months: This is a "positive" effect of the COVID pandemic and the resulting increased awareness of broad sections of the population for health issues and oral hygiene.

Another issue that has been repeatedly thematised over the past years, was which is the best dietary strategy from a prophylactic dental care point of view. Probiotics play a central role here, which is also underpinned by scientific work. A toothpaste and a mouthwash enriched with pre- and postbiotics was now presented at IDS. In



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this way, these substances are administered during the daily oral hygiene en passant.

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A new hydro gel based on a mineral salt solution with very low surface tension particularly combats periodontitis. The effect of the gel is caused by a high redox potential, the physical charging of 850 mV allows a membrane-destroying effect on the cells of the germs. After being applied and taking effect, the gel is broken back down into its original substances (water + salts) leaving no residue behind. The hydro gel is suitable for treating periodontitis.

#### **Penetrability, glide path, shaping - one mode for all**

For teeth with an afflicted root, there is a trend towards minimally invasive, endodontic methods and even towards regenerative measures.

Endodontic files are becoming more flexible and more resistant to breakage. In the meantime, this is the case to such an extent that it is changing the concepts and methods. The tooth structure can be spared more and more frequently. The art lies in achieving the right balance: Less is taken away in the coronal area and yet sufficient space is created in the apical region to allow effective rinsing. And instruments with reciprocal motion characteristics have brought about the opportunity to instrument the odd root canal from A to Z using one single preparation file.

A new endo motor is bringing reciprocating systems up to the next level. The treatment is made easier by combining the penetrability, glide path and shaping in one single mode. On top of this, the OPT (Optimum Torque Reverse) mode has improved, which additionally prevents files breakage.

#### **Imaging processes: New intraoral and image plate scanners**

Imaging systems are implemented as tools in all sections of dentistry - such as the intraoral scanner for instance. It has been used as an alternative to shaping elastomers for years - and it has now been further developed. Among others classic challenges such as reflections, spittle and translucencies can be overcome by solving the mathematical problem of the generation of the 3D shape in four-dimensional space.

In future, intraoral scanners could additionally support the dentist during the initial examination. For example, a working group at Copenhagen University suggests a technique for the automated detection of occlusal caries. A fluorescence-detecting intraoral scanner is used here.

Diagnostic X-rays are used as a complementary imaging source. Forward-looking image plate scanners already rely on artificial intelligence (AI) today. Software based on this principle makes the daily workflow for the whole team more efficient: Automatic image rotation, AI-controlled tooth recognition, automatic dosage calculation and the automatic image plate quality test save valuable working time. What's more, the device is produced in Germany following a CO2 neutral process.

Existing software could even be used as a platform technology in the future in order

to include other image data or also clinical information about the patient. Long-term, the aim is to jointly implement the diagnostics, the prognostics and AI-support when taking therapy decisions (among others by consulting both X-rays and intraoral scans). New Cloud solutions unite practice teams, appliances and services in a manner that is compliant with the data protection laws. This makes the planning of interdisciplinary treatment easier and thanks to the digital cooperation more sustainable.

### **Fast and precise production and fitting of dentures**

Many tasks in the prosthetic workflow are becoming faster and more accurate. New wax blanks enable aesthetic try-ins and can be waxed-up in the patient's mouth. As such, the coordination between the dentist and the laboratory functions more smoothly.

A new extraoral scanner allows two models to be scanned at once. For example, the dental technician places a model of the upper jaw and one of the lower jaw on each of the two scan plates and clicks on the start button. The scan is completed in ten seconds and after two minutes the digital models are ready for use in the design software (in the given example: OK/UK). In comparison to scanning two models consecutively, this is three times faster. Alternatively, impressions can be scanned instead of models; in this case the scanning time takes 45 seconds.

The simultaneous scanner operates using two optical lighting units and eight cameras. The scanning accuracy is stated to be 5  $\mu\text{m}$  (pursuant to ISO 12836) and the further processing occurs in line with known digital workflows, both in terms of the software and the substances.

Meanwhile, new milling machines are bringing a higher level of milling speed and precision for dental laboratories due to innovative real-time control technology - the milling times are 30% faster than usual! Whereby the quality of the surface is much better than that achieved by manual refinishing. In this way, laboratories can increase their productivity and quality and deliver faster to the dentists and patients.

Dental 3D printing is becoming faster and more efficient. The intelligent nesting of several components on one single construction platform enables this. The objects are automatically arranged optimally, the function is embedded in the software and works without having to be exported beforehand - and on top of that a new printer was presented at IDS with compatible post-processing units.

The integration of prosthetic restorations is easier in the aftermath of IDS. Because a self-adhesive luting composite reduces the number of necessary components. The original MDP monomer (10-methacryloyloxydecyl dihydrogen phosphate) and the original silane for the strong adhesive bond are already included. Whereby the first-mentioned component ensures the bonding to enamel, dentin, metal and zirconium oxide and the second component the bonding to ceramic, lithium(di) silicate ceramic material and composite. In this way, only one single component is needed and no separate primer. This makes the clinical application efficient and minimises the error potential - for the permanent fixture of crowns and bridges made from

zirconium oxide, lithium disilicate, hybrid ceramics and metal alloys.

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Especially in the field of implant prosthetics it enables a 60 µm thin, single-use pressure sensor with a coating of red dye to recognise overloads. The patient's chewing force distribution is recorded digitally in 256 pressure stages and transferred to an iPad app per Wi-Fi for further evaluation. In the analysis, complications particularly in connection with an unbalanced occlusal chewing pressure or bruxism can be avoided from the onset.

#### **Assistance in the event of limited space and acute CMD**

The development of orthodontics is largely determined by the integration of digital components - through to the bending robot. Numerous further details facilitate the treatment. For instance, new retainers for a patient-individual fit. The digital design particularly also takes tight spaces into account. After approval, the retainer is milled out of a titanium blank 1:1. This ensures maximum wearing comfort due to the highly accurate lingual fit and smaller adhesive surfaces, which in turn allow improved, easier oral hygiene. The material (Titanium Grade 5") is also suitable for people, who are allergic to nickel.

And in the case of acute CMD symptoms there is now immediate assistance in the form of temporary, directly insertable splints. These resolve an adapted relieving posture of the lower jaw or compensate for occlusal interferences. This tackles problems arising from the jaw which can quickly lead to problems in the whole body at the cause. Furthermore, the splint serves as an initial diagnostic agent. Should there be significant relief in the symptoms within 24 hours, as a rule one can assume the cause is neuromuscular.

In the aligner therapy section a new composite with the appropriate flowability enables the precise filling of the template - no excess material, no lacking material, the right positioning. The fluorescence in the UV-A light helps with all of this: Artifacts, excess materials and residues are made visible and can be removed quickly without harming the enamel.

#### **Benefit for the patients**

Some of the innovations bring about a directly perceivable benefit for the patients. For example, they can use a probiotic toothpaste straightaway in their own bathroom. A bite tray that can be used immediately relieves the symptoms of the craniomandibular dysfunction very quickly. The patient-individual retainer simply fits well straightaway.

A fast milling machine in the practice has the potential to reduce waiting times and the number of sessions. And a Cloud that can allow relevant data beyond the practice and the laboratory to be shared also with the patient, allows the latter to co-make and co-take the responsibility for well-founded decisions in the sense of "informed consent".

#### **100 Jahre IDS - shaping the dental future**

"It was a pleasure to experience the breeze of innovations blowing at IDS," Mark Stephen Pace, Chairman of the VDDI (Association of the German Dental Industry). "

The huge driving force of our research and development departments was demonstrated here. The direct comparison at the leading product show of the dental industry is providing them with a tailwind and pushing them to new spheres - and all of this in our anniversary year '100 years of IDS - shaping the dental future'. I am already looking forward to IDS 2025."

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