Digital technologies have been in the focus of researchers and developers in the industry alike for many years. Now they are beginning to increasingly shape the daily routines in dental practices and laboratories including aesthetic dentistry procedures. Once being a subspecialty, the field of aesthetic dentistry has made significant progress due to the introduction of new technologies such as electronic instrument systems and digital methods for producing highly accurate internal molds.

In particular, the diverse methods of CAD/CAM supported design in dental restorations—especially with the use of zirconium high-strength ceramics—and layered or pressed ceramic veneers are now providing excellent solutions for patients that not only ask for highly functional but also aesthetic dental prosthesis. This applies especially to the precise forming of ceramic or metallic foundations for crowns and bridges, as well as to implant prostheses and associated ceramic or plastic veneers.

"Aesthetics in dentistry have continued to gain importance in recent years, as more patients ask their dentist how their teeth can be restored to both functional and aesthetic perfection," explains Dr. Martin Rickert, Managing Board Chairman of the Association of German Dental Manufacturers (VDDI). He adds that in order to meet this strong demand for high-tech dental care more efficiently, users can now rely not only on conventional but also digital methods that make CAD/CAM supported ceramic veneer techniques possible.

Among the latest versions of digital workflows are all-ceramics monobloc processes using CAD/CAM methods to make anatomically complete restorations from advanced materials like lithium disilicate or zirconium dioxide ceramics. Modern CAD/CAM veneering systems that allow to create a restoration with all anatomical details inside a virtual space and subdivide into two partial data records are currently provided by the dental industry. One of these datasets is used for the fabrication of the foundation from zirconium dioxide while the other is used to mill the pre-sintered veneer ceramic. This veneer can then be attached on top of the foundation, coloured and sintered.

Similar methods can also be applied to lithium disilicate ceramics, a material primarily used for the production of single and multi-unit dental restorations.

In addition to a comprehensive presentation of high-tech in dentistry, the International Dental Show will also provide a comprehensive overview of conventional technologies that continue to be useful in dental prosthetics. These include treatment methods using ceramics, precious metals or NEM alloys in their veneers—either processed in layer or in laminated forms. Simultaneously, plastics technology has also made progress in the development of aesthetically pleasing veneers. Innovative composite materials provide unprecedented abrasion resistance as well as the required colour fidelity for the creation of high-quality structural designs.

"Professional visitors from dentists' practices and dental laboratories can look forward to the International Dental Show, the world’s largest trade fair for dental medicine and dental technology in Cologne from 22 to 26 March, 2011, as an excellent opportunity for gathering information from the exhibiting companies’ specialists, other experts and experienced users about the whole spectrum of aesthetic dentistry and especially the latest CAD/CAM methods for making perfect ceramic veneers and substruc-
tures," concludes Dr. Markus Heibach, CEO of the VDDI.
120 years W&H

Surprisingly powerful, surprisingly colourful: LED+ at IDS 2011.
Dental CAD/CAM technology has recently undergone enormous development. At the moment, it is the most innovative segment in dentistry and will again be the focal point of this year’s International Dental Show (IDS), where plenty of manufacturers are going to showcase new systems and CAD/CAM solutions. While dental technology was the primary focus in the past, developers are now also looking at the manner in which these technologies can be applied to the dental practice. Digital impressions play a key role in this process.

While there was a level of caution with regard to the accuracy of full jaw scans, new clinical studies and trials confirm that introral, 3D systems now produce results that are almost comparable to conventional impression methods. In addition, handling and integration into the practice workflow have been developed to such a degree that these systems can now be used for the treatment of dental patients.

Further examples are functional diagnostics with virtual articulators, implant treatment planning through the combination of DVT data and intra-oral scans that allow for chairside production of surgical guides, as well as facial scans serving as a base for a secure prosthetic planning.

However, CAD/CAM technology is not limited to the fabrication of dental restorations. Computerised dentistry is now also influencing other fields in dentistry, such as diagnostics, 3D assessment and digital storage. Owing to these developments, complex approaches have become simplified and can better be integrated into the daily practice—all for the benefit of the patient. As a result of these new developments, which offer completely new opportunities for the daily workflow of the dental practice, dentists will have to become acquainted with these new technologies. Only well-educated dentists and dental technicians are able to assess the differences between the available systems and technologies. Just as studying material science enables confident handling of different materials, the basics of computerised dentistry must find their way into the dental curriculum.

The CAD/CAM technology, the seed for a new kind of dentistry

By Prof. Albert Mehl, Switzerland

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Manufacturers are currently making large investments in this technology and are thus able to constantly introduce new innovations. In this particular field—handheld systems for precise 3-D surface measurements—dentistry is the forerunner of all other engineering sciences, a fact that acknowledges the pioneer achievement of these developments.

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The upcoming IDS will prove that the time is ripe!
Increasing numbers of elderly people and more demand for high-quality dental aesthetics are cited among reasons for an increase in global demand for services of dental laboratories. According to a new report, the world market for dental laboratories is projected to exceed US$14.5 billion by the year 2015.

The report, by Global Industry Analysts, a publisher of market research, states that dental laboratories are witnessing a significant increase in demand for dental prosthetics as well as other restoratives. The report also cites the increasing purchasing power of the baby boom generation as another factor driving the dental laboratory market.

The United States represents the largest market for dental laboratories worldwide, according to the report. The scarcity of technicians and availability of modern restorative technologies and systems are driving dental laboratories to deliver quality dental restorations to dentists on time. Outsourcing is a key element in the U.S. dental laboratory industry.

The report, titled Dental Laboratories: A Global Strategic Business Report, provides a comprehensive review of dental laboratories, market trends, recent industry activity, and focus on market participants. The study analyses market data and analytics in terms of value sales for regions, including The United States, Canada, Japan, Europe, Asia-Pacific, Latin America and the rest of the world.

Dental X-rays linked to cancer
Long-term exposure to increase risk by 200 per cent

A joint research team from Kuwait and the UK has reported a link between dental X-rays and increased numbers of thyroid cancer. After factoring X-rays taken of 300 patients in a hospital in Kuwait, they found that men and women who had had up to four dental X-rays were more than twice as likely to have developed the disease than those who had never had any dental X-rays. For those patients who had had between five and nine X-rays, their risk rose more than four-fold. Although thyroid cancer is one of the least deadliest cancers, incident rates have almost doubled in recent years.

The findings are consistent with previous reports of increased risk of thyroid cancer in dentists, dental assistants, technicians and X-ray workers, suggesting that sensitivity of the thyroid to radiation is not necessarily related to direct irradiation of that organ but to any exposure to ionizing radiation. Besides thyroid cancer, significant risks have been also observed for leukemias and cancers of the breast.

The researchers warned that the results of their study “should be treated with caution” because the data was based on self-reporting by the participants and the fact that other factors could be contributing to the increase in thyroid cancer cases. Further research is required to confirm the exact effect of dental X-rays, the added.

“It is important that our study is repeated with information from dental records, including frequency of X-rays, age and dose at exposure,” Dr Anjum Memon, Senior Lecturer and consultant in Public Health Medicine at Brighton and Sussex Medical School, who led the study, said. “If the results are confirmed, then the use of X-rays as a necessary part of evaluation for new patients, and routine periodic dental radiography, particularly for children and adolescents, will need to be reconsidered, as will a greater use of lead collar protection.”

Global lab revenues projected to exceed US$14.5 billion by 2015
Increasing demand for dental prosthetics and purchasing power of baby boom generation are main factors for market growth

The scarcity of technicians and availability of modern restorative technologies and systems are driving dental laboratories to deliver quality dental restorations to dentists on time. Outsourcing is a key element in the U.S. dental laboratory industry.
The 34th International Dental Show will certainly take many of us by surprise with new methods and products. I guess, the one thing we are all waiting for is one of the big implant manufacturers to step forward and reveal the first implant based on zirconium oxide. While often introduced but never actually launched onto the market, full-ceramic implants are very suitable for aesthetic dentistry due to their high biocompatibility and colour. On the other hand, they also have to have custom yet individualized prosthetics and be resistant to long-term wear.

Let us take, for example, innovative implant surfaces and treatment concepts with angulated implants. Without these new developments and advancements that result in an ongoing improvement of medical products, less implant systems, surfaces and bone augmentation materials would be available today. Instead, implant dentists have now a range of specific surgical techniques and materials for different indications to their disposal.

This leaves both users and patients puzzled about the right choice and, first and foremost, product safety. Conditioned surfaces, for example, which have been hydroxylated with hydroxide ions shortly before insertion to provide more stability and improved osseointegration in the final healing phase are raising the question whether reliable clinical studies exist that determine that these special conditioned surfaces allow reduced healing times.

Another focus will be on biotechnological strategies for osteogenesis. Especially in the field of synthetic bone augmentation materials, the range of products is sheer endless. While some have been developed to function as a placeholder for new bone formation, other materials are supposed to replace autologous bone transplantations entirely. How proved and tested are new products—such as pig’s collagen matrix “from the blister”—which are supposed to replace autologous connective tissue grafts for recession coverage and to achieve soft tissue augmentation?

Despite these technological developments in materials, electronics and computers are the new focal point of diagnostics and therapy in dental practice. The spectrum ranges from 3-D imaging and computer-assisted implantology to digital impression taking and automatic fabrication in dental laboratories. In diagnostics, there are many software companies by now that provide computer-assisted planning based on DVT-scans. At IDS, implant dentists will be on the look-out for software solutions that can process a majority of the established implant systems.

Opto-digital methods that do not require impressions and/or dental casts have been developed for CAD/CAM supported production of implant prosthetics. Chair side prosthetics with scanner in one session have been announced for IDS. According to the industry, dentists will be able to produce individualized components for aesthetics, for example, with these systems.

It is not easy trying to constantly achieve better results and shorter treatment times when working on such a high level and with success rates that are able to outdo any other field in medicine. It is biology that is still setting natural limits. Therefore, it is important to continuously educate dentists who are doing implants not only to let them benefit from technical innovations and new developments in materials but also to let them keep up with the well-being of their patients.

By Christian Berger, President of the European Association of Dental Implantologists—BDIZ EDI

Show Preview IDS Cologne 2011

"Electronics and computers are the new focal point of diagnostics and therapy in dental practice"
SINO-DENTAL 2011
June 9-12, 2011
China National Convention Centre  Beijing

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Biggest Dental Show in China
Surgical microscopes allow minimally invasive endodontic treatment.

Dr Christian Gernhardt

With IDS only a few weeks ahead, it is certain that new technologies and developments will bring the field of endodontics another step forward. Endodontic procedures that only require one rotary instrument are causing controversy amongst specialists worldwide. Endodontists are actively discussing the pros and cons of this new procedure in internet forums. So-called single reciprocating file systems have been launched by several dental manufacturers over the last few months.

Originally developed by Canadian and Lebanese scientists, the single file endo concept is claimed to require only one reciprocating file to glide path or initial instrumentation for the majority of root canals. According to the manufacturers, the technique requires working time and fewer cross-contamination attempts among patients, a common problem associated with the use of multiple files.

However, specialists are not so sure. “This trend will trea...” (Source: Koelnmesse/Edited by Daniel Zimmemann, today international)
Orthodontics in practice and laboratories

Field increasingly benefits from digitalization and enhanced diagnostics

“...the scientific and technological advances offer orthodontics and its related disciplines outstanding therapeutic opportunities,” explains Dr Martin Rickert, CEO, Association of German Dental Manufacturers (VDDI—Verband der Deutschen Dental Industrie).

“Similar to other fields in dentistry, digital processes are increasingly finding their way into daily practice or into laboratories where they provide new opportunities for orthodontics starting from patient examinations, the planning and design of therapeutic measures to digital networking,” he added.

(Source: Koelnmesse/Edited by Daniel Zimmermann, today international)

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(Source: Koelnmesse/Edited by Daniel Zimmermann, today international)
Trends

Tooth replacements again key topic at IDS 2011

Osseogenics concepts and implant-supported superstructures on display

At IDS 2011, dentists and dental technicians will have the opportunity to get a comprehensive overview of the latest concepts in implant geometry and materials. Clinical case figures have confirmed a trend towards increasing use of prosthetic implant therapy, especially in Western markets like Europe and the United States. In Germany alone, more than 800,000 implants were placed by dental practitioners last year, a 10 per cent increase compared to 2009. This rapid growth reflects a continuing demand from patients worldwide who are in favour of implant-supported prosthetics. A wide variety of endosseous implants are now available from the industry so that implant-supported prosthetic solutions can be realised for almost every dental indication. Zirconium oxide ceramic is gaining importance because classic implant materials such as titanium and allows for the manufacturing of completely ceramic tooth replacements,买卖互，crowns, as well as peg supported and bridge-supported superstructures.

Standardised abutments are also pre fabricated from titanium or zirconium oxide and can be used for cementable or telescopic restorations. Thanks to modern digital milling processes, an alternative to these prefabricated items that allow the increasing individualisation of superstructures is about to gain ground. Nowadays, one and two-part abutments can already be individually designed at acceptable cost and adapted to the gingival margins in a beneficial manner.

Implant superstructures are increasingly manufactured in industrial milling centres as well as in-house at dental laboratories. Companies specialising in this field are now even offering to design and manufacture complex peg or bridge-supported superstructures which is providing commissioning laboratories with more freedom and the possibility to invest more time and effort in the finishing process. The latest development in this field are optical digital processes that have been developed in such a way that (plaster) models are no longer required. With this procedure, implant prosthetics are calculated directly through a digital scan and manufactured by using a milling process. Due to the increasing networking of its team members including therapists, personnel, dental technicians and industry, implantology is significantly boosting quality management at all process levels.

Progress in implantology is also closely linked to diagnostic developments. Three-dimensional key navigation processes combined with laser scans of plaster models and special design software gives dentists the possibility to plan reliable implant measures. Even in most difficult cases, exact 3D images of the osseous structures can be created by digital volume tomography. In combination with modern planning and design software, implant specialists can obtain stereolithographic guide templates that allow for higher precision during implant bed preparation and insertion. Nowadays, an entire pallet of powerful imaging techniques and user-friendly software compatible to the DICOM standard is available to dental practitioners.

New instruments for implant procedures will also shown at IDS including intraoral dental foreheads, modern cylinder osteotomes, efficient bone mills or complete surgical units for oral and maxillofacial surgery. Optimised methods for retaining the alveolar process, augmentation or alveolar distraction osteogenesis will also be presented.

In addition, the International Dental Show will be introducing latest biotechnological strategies for osseointegration including adult stem cell technology. New developments in bone marrow stem cells will be presented as well as bone replacement, carrier membranes and biologically resorbable bone pegs—partly made of collagen or mucosal membrane material.

Source: Koelnmesse/Edited by Daniel Zimmermann, today international}
Biomaterials and implants stimulate global demand for dental products

New report forecasts compound annual growth rate to reach 6 per cent for both segments

The increasing demand for dental biomaterials and implants is driving the global dental equipment and consumables market. According to a report released by US market research company MarketsandMarkets (M&M), both segments are expected to grow at a compound annual growth rate of 6 per cent—only slightly below the 7 per cent growth rate predicted for all market segments combined. Total market volume is forecasted to reach US$27.6 billion by 2015.

According to the report, the growth of these segments is expected to be highest in North America and the EU, where the generation of ageing baby boomers can afford high-priced dental procedures, including cosmetic treatments and implants. Improved orthodontic products are also in high demand, especially by younger people.

Improvements in the field of dental biomaterials and tissue regenerative material have enabled dentists to offer more natural and long-term dental solutions. The latest technology, such as CAD/CAM, reduces the overall turnaround time for dental procedures, while improving efficiency of dental practitioners further, the report states.

Premium manufacturers are driving the market for dental implants and bone-craft substitutes in countries like China and India, according to iData Research. In a market report, the Canada-based consulting company has forecasted the market volume of both countries for dental implants to exceed US$400 million by the year 2017. Strong double digit growth rates were also predicted for Brazil, another prominent Global Emerging Market.

The rapid growth of dental implants will also drive the market for dental biomaterials and bone-craft substitutes, the report states. The number of procedures using these materials is expected to reach almost 400,000 in both countries by 2017.

“The deregulation of dental care services in China and India has fueled growth of private dental clinics in major urban centers,” said Dr Kamran Zamanian, CEO of iData. “In addition, the low cost of labor has kept implant procedural costs relatively low, promoting dental tourism from countries such as Japan, South Korea and Australia.”

Markets in China and India are currently dominated by few foreign manufacturers such as DENTSPLY Friadent, Nobel Biocare or Straumann. The Swiss-based company particularly has increased its market share in China and South Eastern Asia with the introduction of innovative products including the Bone Level Implant and SLActive dental implant surface technology.

Global business consultant Frost & Sullivan recently awarded the company with its 2010 Asia Pacific Dental Implant Company of the Year Award for superior performance in different areas such as strategic product development.

Europe still holds the largest share of the US$3.2 billion worth global dental implant market followed by the US, Korea and Japan. The market itself is projected to growth by more than 20 per cent over the next five years.