Team players: function and esthetics

A systematic approach to full-mouth rehabilitation with all-ceramics

IPS e.max Smile Award 2016: The following article describes the complex full-mouth rehabilitation of a female patient who consulted our practice because she was dissatisfied with the appearance of her smile. A reliable and efficient approach made the most of the interplay of esthetics and function and all-ceramic materials.

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Esthetics and function – these two requirements are inseparable in restorative dentistry. The case outlined in this article highlights just how tightly these two aspects are connected. The patient primarily wanted the treatment to enhance her appearance. The dental team, however, could not fulfill these esthetic demands without taking into account the functional considerations. Their aim from the time of the treatment planning stage was to achieve a harmonious result. The extensive prosthetic work required a systematic treatment approach.

Case presentation

The young female patient consulted our dental practice about a smile enhancement. Her upper and lower anterior teeth were severely abraded and stained (Fig. 1). Moreover, she had received inadequate restorations in the past. The metal-reinforced bridges in the posterior region did not provide suitable function and esthetics. The patient was dissatisfied with the entire situation (Fig. 2). The unesthetic appearance of her teeth was an embarrassment to her, especially when she smiled.

Diagnosis and planning

The first general diagnosis was based on the needs of the patient. Furthermore, specific aspects of the situation were assessed. A corresponding diagnosis was made and the patient was presented with a preliminary treatment plan. In accordance with our protocol, the plan focused on attaining a satisfactory balance between the functional and esthetic requirements. Furthermore, mainly additive measures were planned, which would make the treatment minimally invasive. The clinical diagnosis revealed the extent of the damage. Severe abrasion had considerably shortened the front teeth, which showed well-defined wear facets. The vertical dimension of occlusion was clearly too low. The patient’s smile line was not ideal and therefore, it negatively impacted her expression. The patient was in good general health. She did not complain of any temporomandibular joint pain or of tight jaw muscles. In the development of the final treatment plan, we first concentrated on the functional requirements. In the process, we established that the vertical dimension of occlusion needed to be raised by one millimetre and a new occlusal scheme created. Therefore, we proposed the following steps: stabilize the situation with the help of long-term temporaries before starting the prosthetic treatment; place two implants to close the gaps left by the loss of tooth 46 and 36; restore the dentition with all-ceramic crowns, bridges and veneers (IPS e.max Press, Ivoclar Vivadent) and provide the patient with a bite guard to protect the teeth after the treatment. The patient agreed to this plan.

Prosthetic pretreatment

Portrait pictures and video clips showing the patient when she is speaking and smiling constituted important diagnostic tools in the treatment process. They provided us with valuable information for the design of the diagnostic wax-up. Impressions were taken for the fabrication of the molds. A facebow record was taken for the skull-related transfer of the situation into the articula-
The functional requirements of the line, mid-line and the buccal corri-
thetic parameters, such as the smile suit the face of the patient. The es-
teeth were designed in such a way mension of occlusion. The anterior 5) was created. The teeth were built compared with the original state.

The premolars and molars for receiving the prosthetic restora-
tions have given her new zest for life. Functional principles, excel-
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Next, the ceramic restorations were etched with 5% hydrofluoric acid for 20 seconds. They were cleaned in an ultrasonic bath and dried. Their contact surfaces were silanized (Monobond Plus). Thereafter, a bond-
ing agent (3M Scotchbond) was applied. The individual ceramic components were temporarily stored in a contain-
er which protected them from light and contamination. Then the teeth were conditioned. A rubber dam was placed and the teeth were carefully air-abraded with aluminium oxide (0.50 microns). Subsequently, phos-
phoric acid gel (17%) was applied and thoroughly mixed off after a reaction time of 15 to 20 seconds. The prepa-
riation was dispensed to the extent that a slightly moist shimmering dentin surface was visible. The ap-
plication of the bonding agent (Syn-
tact) followed. The restorations were placed with the light-curing luting composite Variolink Veneer (Ivoclar Vivadent). The veneers of the two central incisors were seated and then fit was checked. Then one resto-
ar was removed and was placed on both sides. Before the restorations were light cured for the last time, the margins were coated with glycerine gel to prevent the formation of an inhibition layer. We removed excess with fine diamonds and polishers and then we polished and smoothed the margins. After the final exami-
nation, we checked the esthetic and functional parameters in particular (Figs 11 and 12). We provided the pa-
tient with a protective bite guard and then released her from the practice.

Result
Esthetic results that work. The all-
ceramic restorations look complete-
ly natural in the patient’s face. Her facial expression has completely changed. The young woman appears relaxed and enjoying her new smile (Fig. 13). The first recall examination took place three days after the res-
torations were placed. At that stage, the condition of the soft tissue was excellent. It had fully adapted to the ceramic surfaces (Figs 14 and 15). The success of the treatment was confirmed after the sixth month and the twelve-month recall (Fig. 16).

Conclusion
Sound functional principles, excel-
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standing materials system teamed up to fulfill the patient’s ardent wish for a smile makeover. The restora-
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Full range of product offering for dental technicians at Dentsply Sirona

By Dentsply Sirona

As the world’s largest manufacturer of dental products, Dentsply Sirona has a variety of intelligent solutions that have been developed to meet the requirements of dental laboratories. Thanks to the combined power of the business units Dentsply Sirona CAD/CAM, Dentsply Sirona Prosthetics and Dentsply Sirona Implants, these solutions include both materials and devices for conventional and digital workflows. The result is a variety of solutions that can be tailored to meet the requirements of dental laboratories. Dentsply Sirona technicians can find the entire world at their fingertips. By Dentsply Sirona, technicians can find the entire world of dental technology under one roof, and can take advantage of products and workflows that have been co-ordinated with each other.

As one of the central subjects in the area of modern dental technology, CAD/CAM-supported production of dental restorations for the laboratory is playing an ever more important role. With its three business units – CAD/CAM, Prosthetics and Implants – focusing on dental technology, Dentsply Sirona possesses concentrated competence in dental technology and offers solutions for all steps within this production process. This brings clear added value to the dental laboratory as it combines specialists for the digital workflow and the inhouse production of restorations: one for dental materials and one for the centralized fabrication of abutments and implant-supported structures. In this way the whole process from impression taking to the final restoration can be handled with products from Dentsply Sirona – while still allowing for the freedom to include components from other open CAD/CAM systems. In all branches of dental technology, Dentsply Sirona’s innovation leadership is a benefit to the lab.

Software updates for new possibilities

The current software updates include Lab CAD SW 16.0 and InLab CAM SW 16.0 which are perfect examples of such possibilities. They expand the range of indications and provide new functions for an even more efficient computer-aided production process that is oriented towards dental requirements. Now, for the first time, occasional splints and individual impression trays can be designed with the InLab software via the new plugin InLab Splint in the “Removal of Dentures” module. The new InLab Check plugin is being used in dentistry for the first time. The program supports the user via the FEM analysis of the restorations designed for critical stress-sensitive areas, and visualizes them. With screw-retained bridges and bars at the implant level, there is an additional indication that makes the immediate synergy effect with the central production service from Dentsply Sirona useful for the laboratory. In addition, the accurate infoX scanner and the Atlantic FLX 5.0 and body InLab SW users can scan cases for all major implant systems for ordering of Atlantic superstructures. Additional new production possibilities arise from the milled manufacturing of one-piece individual titanium abutments with the InLab MC X 9.0 mill using unit. The CLS/SLM function for implant restorations with screw channels from other CAD software has been expanded to include the current InLab CAM SW 16.0.

New opportunities with Atlantic solutions

The Atlantic solutions line offers a range of digital services that are continuously developed. The possibility to order Atlantic abutments and Atlantic suprastructures via the Dentsply Sirona lab-design software enables new opportunities for the dental laboratory to offer more implant-based restorations to the dentist. The latest innovation from Atlantic is the Atlantic CustomBase solution for single tooth screw-retained restorations. It combines an Atlantic Abutment and an Atlantic Crown with a screw access hole. The crown is cemented to the abutment extracorally and screw-retained into the implant, avoiding potential complications caused by excess cement. The Atlantic Crown can be ordered as a physical crown or as a digital unique file. The digital file is either a “ready-to-null crown” that can be imported directly into the InLab-CAM SW or an Atlantic Core File. This file includes the abutment designed by Atlantic, which can be used by the lab team as the basis for their own crown design. The Atlantic CustomBase solution is available in gold, titanium, and isodens with all major implant systems. In addition, the Atlantic patient-specific superstructure has state-of-the-art design software and additive manufacturing of titanium and cobalt-chrome implant-retained fixed restorations.

High performance materials for new materials

Materials are also a part of the range of products from Dentsply Sirona, along with the new denture base material Luticon HPFA (High Impact Pour Acrylic) that is being presented at the IDS. This new denture base material offers extraordinarily high strength, color stability and fitting accuracy. At the same time, the material specialist also has a new development in the area of zirconia for the ceramic sector: Ceramic xtre and a level of translucency that is around 15% higher than that of Cercon xtre. Ceramic xtre provides the dental laboratory with an even better level of aesthetics, particularly for monolithic restorations. True-Ceram Technology ensures a pronounced level of color reliability and reproducibility. As was the case with the Cercon hf, the Ceramic xtre blanks are available in pre-colored variants in the classic 16 VITA colors and in white. Thanks to the new design format (98 mm disks), the new material can be used in all common open CAD/CAM systems, and is also available as a 35 mm disk for processing in the brain expert and brain expert milling units.

Here, the benefits of the combined level of dental expertise that Dentsply Sirona possesses come into effect. Along with high-performance materials such as Cercon, with the 5-axis milling unit InLab MC X5, the company can also provide a machine that can be used to process standard disks. This production unit is also compatible with an additional new material option for the digital workflow: the sintering metal disk inCoris CCB now enables dental technicians the option to mill using non-precious metals in their laboratory’s own InLab MC X5. Here, the expansion of the range of indications to include long-span work, across four units in particular has shown itself to provide added value. As a result, an even larger number of cases can be handled using this processing method that is quicker, cleaner and more cost-effective in comparison to the casting method.

Conventional procedures, new chances

But the path of progress does not necessarily always move from analog towards digital. Using the example of an additional ceramic innovation from Dentsply Sirona, i.e. Celtra Press, it is clear that benefits for the dental laboratory can equally result from a contrary development. This is actually a material version of the zirconia-reinforced lithium silicate (ZLS) Celtra Diao that had been developed for CAD/CAM processing. As the name suggests, Celtra Press is now suitable for the traditional press method. Hence the benefits of the special micro-structure of ZLS can now also be used in this processing method that is used in nearly every laboratory. This includes a particularly high strength of over 500 MPa as well as outstanding mechanical and light-optical properties that in particular achieve a profoundly near-natural chameleon effect. The system components that have been specially matched with the new material ensure rapid processing and outstanding results when using Celtra Press. The Celtra Press Investment material is partially responsible for the fact that only a minimal mouting layer is formed during pressing, and this layer is removed by sandblasting during devestring. The Celtra Ceram veneering ceramic is available to the laboratory for esthetic individualization.

In addition to this variety of interesting new products, Dentsply Sirona’s range of products of course also includes just as many long-established materials and hardware and software solutions. They allow the laboratory to benefit from workflows and products that have been coordinated with each other with a particularly wide range of indications.

Due to various certification and registration periods, not all products are immediately available in all countries.

References
1 For details see the Atlantis implant compatibility charts - ZVITA is a registered trademark of Vita Zahnfabrik H. Rauter GmbH & Co. KG, Bad Säckingen.