special
Designing real smiles with digital tools

case report
Implant-supported immediate restoration in the edentulous maxilla

industry report
Zirconia Reinforced Composite
The natural choice

ATLANTIS™ patient-specific abutments

Give your patients excellent function and natural esthetics. ATLANTIS patient-specific abutments go beyond CAD/CAM to deliver:

- Freedom of choice in implant system and material
- Optimal emergence profiles and soft tissue margins
- Anatomical support for the final restoration
- A simplified restorative procedure

To learn more about ATLANTIS patient-specific prosthetic solutions, contact your local DENTSPLY Implants representative or visit our website.

www.dentsplyimplants.com

For all major implant systems

We have you covered
ATLANTIS abutments are backed by a comprehensive warranty program. For full warranty terms and conditions, visit www.atlantisdentsply.com.
Dear Reader,

Digital technology is one of the fastest-growing market segments in dentistry; digital processes are increasingly determining everyday practice in dental offices and laboratories and seem to be changing dentistry and dental market forever.

In recent years, an increasing number of dental companies have released innovations in digital hardware, software and consumables, such as 3-D imaging, CAD/CAM and intra-oral devices.

As a response to the market needs Dental Tribune International (DTI) in collaboration with Unione Nazionale Industrie Dentarie Italiane (UNIDI), the Italian dental industry association, held the first Digital Dentistry Show (DDS) at the International Expodental in Milan. The event was the first of its kind, being solely dedicated to digital dental technologies. Over the course of three days, DTI and major industry partners offered visitors to the fair comprehensive information on the latest developments and product innovations in the field of digital technologies.

DDS provides comprehensive information on the latest digital technology and is targeted at dentists, dental technicians and representatives of the dental industry. In contrast to the conventional booth-based presentation of products, DDS is showcasing digital innovations through a combination of sponsored live product presentations, hands-on workshops, discussion sessions, an exhibition and a printed guide, offering participants a dynamic and interactive education experience.

The next Digital Dentistry Show will be held in Rimini in Italy from 21 to 23 May 2015 as part of the Amici di Brugg dental trade fair. Moreover, we are planning to stage another DDS in October 2015 in Shanghai. Plans are also underway for an international edition of the show in Berlin in June 2016.

Digital dentistry is already here, technology is what differentiates a modern dental office from a conventional one, increases patient flow, and advances diagnostic and treatment outcomes, which ultimately leads to increased revenues.

Yours sincerely,

Torsten R. Oemus
President Dental Tribune International

Torsten R. Oemus
03 editorial

Dear Reader

Torsten R. Oemus

special

06 Designing real smiles with digital tools

Drs. Eduardo Mahn, Gustavo Mahn, Carlos Cáceres, Luis Bustos & Christian Coachman

industry report

12 Zirconia Reinforced Composite—a universally applicable material with many prosthetic uses

Maximilian Kolms & Julia Goethe

case report

16 Permanent implant prostheses

Drs. Arzu Tuna, Umut Baysal & Rainer Valentin

20 Double crowns made of a new high performance polymer

Drs. Rolf Vollmer, Martina Vollmer, ZTM Michael Anger & Dr. Rainer Valentin

32 Implant-supported immediate restoration in the edentulous maxilla

Dr. Fernando Rojas-Vizcaya

36 Paving the way for a patient-friendly, minimally invasive approach in alveolar ridge augmentation

Dr. Yasmin Bucheckert

industry news

40 Planmeca ProMax CBCT with CAD/CAM technology: the perfect combination

Planmeca

42 DENTSPLY Implants expands into new markets

DENTSPLY Implants

44 3Shape TRIOS recognised with “Best of Class” Technology Award

3Shape

45 Adentatec

Competence in Dental

Adentatec

46 One streamlined flow

Nobel Biocare

meetings

48 International Events

about the publisher

49 submission guidelines

50 imprint

Cover image courtesy of Adentatec GmbH (www.adentatec.com).
What does efficiency mean to your business?

- Newly introduced one-step and cost-effective implant restorations, titanium base and full-contour crown were added to Straumann® CARES® X-Stream™’s 1 scan, 1 design and 1 delivery
- Directly veneerable TAN Abutment for a quick path to your final restoration
- New CARES® Screw-retained Bridges and Bars increase treatment flexibility
- Ability to connect your CADCAM system to Straumann® CARES® Prosthetics – no additional investment or training required, visit: www.straumann.com
Dental materials and clinical procedures have changed dramatically in the last decades. Probably the major advances that have occurred during the last two decades have been in the fields of implantology and adhesive dentistry, but the main revolution is the development of digital dentistry. Although these changes have certainly made diagnostics and certain procedures easier, the basics, such as function and the biological aspects, remain essential. At the same time, we have experienced major improvements in ceramics and composites, helping us to fulfil our patients’ aesthetic demands.

A basic prerequisite for these indications is an in-depth understanding of the facial and dental aesthetic parameters. The clinician needs to understand the challenges that each clinical case presents and has to be able to develop an appropriate treatment plan that approaches the case from a multi-disciplinary perspective. Tooth proportions need to be considered in relation to gingival aesthetics and in relation to the facial appearance. It is pointless to make the most beautiful direct veneer if the contours or the texture do not match that of the adjacent teeth or the gingival zeniths are clearly not symmetric and visible. As an example, if we add a tilted occlusal plane or a maxillary tooth midline shift in relation to the facial midline, the results can be frustrating.

Another important aspect is the proper analysis of the patient’s smile and display (Figs. 1 & 2). When photographs are taken, people tend to be shy, especially at the beginning and even more so if the person taking the photographs is not a professional photographer and the setting is a dental practice. Figure 3 shows the intra-oral view, where, besides the obvious diastema and the hypomineralised...
areas of both central incisors, the major discoloured areas of both mandibular lateral incisors, which were certainly in need of some sort of treatment, are apparent. It is important to try to make a video while conversing with the patient about normal daily issues to avoid overlooking aspects that need to be considered in the treatment plan. The conversation will relax the patient and evoke natural smiles and laughs in response to something humorous or silly that we might say. Figure 4 shows the differences between the social smile we achieved with our traditional photographs (Figs. 1 & 2) and the
spontaneous smile, which was captured during dynamic recording. In this particular clinical case, had we based our treatment plan on the social smile photograph, we would have failed to visualise the display of the mandibular incisors, which showed unpleasant stains.

The next step was to analyse the patient from the facial perspective based on the details of her teeth. The digital smile design (DSD) concept diagnoses aesthetic problems from a facial perspective and, based on a simplified digital analysis of a few photographs, proposes treatment options and assists with communication between the various specialists in the team.

The first step is to draw a horizontal and a vertical line. The photograph is centred, moved and rotated until the bi-pupillary line is horizontal. The facial midline is subsequently ascertained. Then the same lines are superimposed on to a similar photograph, which has also been centred, but this time taken with lip retractors in place (Figs. 5a–c). The same photographs are then magnified and analysed (Figs. 6 & 7). The upper lip line is re-created and then superimposed on to the photograph taken with lip retractors in place as reference of its position (Figs. 8 & 9). Then the tooth proportions are measured and their ideal contours are drawn (Figs. 9 & 10a). The isolated situation can be seen in Figure 10b. A photograph taken from the 12 o’clock position is used for the analysis of the labio-palatal position of the teeth and superimposed on to the analysis done previously (Fig. 11).

Once the clinician is clear about the treatment possibilities and limitations, a digitally designed mock-up can be created. This procedure reduces chair time dramatically and increases patient acceptance. Owing to easily accessible software such as Microsoft PowerPoint and Keynote, these effects are easily and quickly created by anyone with minimal training. Recently, new software has been released that simplifies the procedure even more, DSD software for iPads (www.digitalsmiledesign.com). The procedure is based on overlapping certain areas of the teeth in the manner previously described. The result can be seen in detail in Figure 12 and the display in Figure 13. A comparison from the facial perspective between the preoperative situation, the traditional mock-up and the digital mock-up can be seen in Figure 14. Traditional indirect mock-ups are made from a previously created wax-up from the laboratory. First, an impression is taken and a stone cast is then fabricated. Afterwards, the technician waxes the necessary teeth depending on the instructions given by the clinician.

The next step is taking an impression from that wax-up. The excess is removed and a flowable self-or dual-curing composite material (usually bis-acrylic based) is applied to the silicone guide and then placed in the patient’s mouth. After a few minutes, the excess is removed and the patient is able to see the changes and the clinician is able to evaluate the proposal directly in the mouth. Generally, photographs are taken of the new situation and analysed. The option of a digital mock-up is much simpler. Once the final forms have been created, a photograph is superimposed on to them, and the texture of the new teeth is created. As seen in Figure 14, the results of the traditional and the digital methods are similar and it is difficult to differentiate between them.
The protocol is based on photographs and videos that are taken during the first appointment. The analysis is performed, and eventually the case is discussed with the team if necessary. Once the presentation is ready, the treatment plan is presented in a visually attractive way to the patient (Fig. 15). Finally, whether to use ceramic or composite restorative materials is considered depending on different factors. Our philosophy is based on the minimally invasive concept. As long as we can provide the patient with the same aesthetics, durability and predictability of ceramics, we will select composites. In cases in which many teeth are involved, multiple diastemas are present or occlusal imbalances may jeopardise a successful outcome and major changes need to be made, our choice leans towards ceramics. Whatever approach is chosen, it is of paramount importance for the clinician to understand the ceramic
and/or composite system he or she is using. In this particular clinical case, the ceramic system used was IPS e.max Press and the composite system was IPS Empress Direct (both Ivoclar Vivadent) because of its simple layering concept, its natural-looking shades and long-lasting gloss. The correspondences between the shades of both systems make them easier to combine.

Once the treatment plan has been accepted by the patient, the treatment begins with preparation and demarcation in order to be as conservative as possible (Fig. 16). Figure 17 shows the detail of the hypomineralised areas of the mandibular lateral incisors. The areas were excavated with a red-coloured bur (Komet Dental) and etched with phosphoric acid. ExciTE F (Ivoclar Vivadent) was used as a bonding agent, and IPS Empress Direct Dentin A1 and Enamel A1 were placed using a novel instrument called OptraSculpt Pad (Ivoclar Vivadent).

The maxillary teeth were prepared and impressions taken. Figure 20 shows the six veneers fabricated by master dental technician Victor Romero (Santiago, Chile). Then they were tried-in with a specially designed glycerine-based paste, components of the Variolink Esthetic cementation kit (Ivoclar Vivadent). Figure 21 shows how dramatic the change in value can be with this type of cement. This procedure is especially helpful when one or two veneers are seated, and the value needs to be slightly corrected in order to match them to the adjacent teeth. The veneers were then bonded and the final result can be seen in Figure 22, where the preoperative situation is shown against the similar results achieved with the digital mock-up compared with the final outcome. Figures 23 and 24 show the integration of the six maxillary ceramic veneers and the two direct composite restorations performed on the mandibular lateral incisors at the three-month follow-up. All this work was integrated from the facial perspective, as seen in Figure 25. The satisfied and spontaneous patient can be observed in Figure 26.
THE NEW 2014-2015 COLLECTION

EXPERIENCE OUR ENTIRE COLLECTION ON WWW.CROIXTURE.COM
Zirconia Reinforced Composite—a universally applicable material with many prosthetic uses

Authors: Maximilian Kollmuß & Julia Goeke, Germany

Introduction

CAD/CAM technology opens up a wider spectrum of new materials for use in dental prosthesis. For a long time, it was not possible to treat patients with distinctive bruxism with highly aesthetic, tooth-coloured restorations. Extremely sensitive ceramics posed a constant risk of fracturing under the strain of the high forces that come with parafunctions.
This newly developed material is a combination of highly durable plastic and zirconium dioxide, which principally combines the positive features of both material groups: the acrylic content ensures a certain elasticity to the material which ideally imitates the natural elasticity of the periodontium. This is particularly beneficial with implant treatments for ensuring an even distribution of chewing forces. The addition of zirconium dioxide improves the mechanical strength of the restoration and ensures an optimal abrasion stability without the risk of exposing the antagonist to excessive forces.

The case report presented in this article is an example of the difficulties encountered when treating patients suffering from parafunctions.

Case report

The 55-year-old patient made a dental appointment, having noticed a sharp edge for quite some time by his implant crown in the upper jaw, region 15, which had been there for quite some time. The clinical examination concluded that there was a fracture in the metal-ceramic implant’s palatal veneering. Furthermore, the patient appeared to have noticeable evidence of grinding on the majority of teeth. When asked, the patient admitted to grinding and pressing his teeth, particularly at night.

The implant had been inserted in July 2010 and indicated an inconspicuous percussive resonance with no signs of a peri-implant infection. A x-ray was carried out as a safety precaution and similarly showed no pathological findings.

It was discussed together with the patient that a new implant crown should be fitted, using a material better suited to the patient. At this point, the option of a new, innovative material came to mind: a highly durable acrylic, reinforced with zirconium dioxide (Tizian Zirconia Reinforced Composite, Schütz Dental).

After the fractured crown had been removed, the situation was as follows with uninflamed mucosa:

Fig. 6. Scanned model with simulated abutment.

Fig. 7. Finished crown with antagonist construction.

Figs. 8 & 9. Finished restoration on the master model.
An impression was made using an especially customised tray and a corresponding impression post, which fitted with the implant. The situation was then transferred to the master model using an individual gingival mask and a scan of the model was made using the Tizian Smart-Scan system for a CAD reconstruction of the crown. The crown was constructed on Tizian Creativ RT-Software, which lets you take the most natural occlusal surface into account.

Following this, the crown was milled out of Tizian Zirconia Reinforced Composite in the milling machine (e.g. Tizian Cut 5 smart, Schütz Dental).

Next, the crown was veneered with a veneering composite (dialog Occlusal, Schütz Dental) following the Cut Back technique.

The restoration was prepared for the screw joint using a bonding base for full ceramic restorations.

After the crown had been fitted, the approximal contacts checked and minimal corrections were made to the occlusion, the crown was polished. Then the crown was definitively integrated using a torque wrench at a speed of 35 Ncm.

The screw was then secured with a highly aesthetic composite (NanoPaq Composite, Schütz Dental) and the screw channel was fastened.

Taking note of the patient’s existing ceramic restorations, the patient was advised to have a bite tray made.

In order to monitor the success of their prosthetic treatment, the patient was asked to attend a follow up appointment every six months.

Conclusion

With the zirconia reinforced composite from the company Schütz Dental, the option of a highly aesthetic material for treating implants and patients suffering from parafunctions is now available. Thanks to the material’s physical properties, the dot-shaped chewing forces are evenly spread across the whole restoration. The final pictures show the harmonious integration of the restoration into the patient’s current situation. Excellent material properties ensure a high level of comfort for the patient, as well as high stability and durability of the restoration.

Editorial note: This report is not intended as a user manual. Please consult the user manual for the systems and materials mentioned above. All rights lie with the treating dentist.

authors

Maximilian Kollmuss and Julia Goeke
Poliklinik für Zahnheilkunde
Dental Clinic of the University of Munich

Dental technician:
MDT Robert Kollmuss
Dentaltechnik Kollmuss GmbH, Munich, Germany
Maestro 3D DENTAL System
Innovative solutions for dental applications
www.maestro3d.com

OPEN 3D DENTAL SCANNER

Attachment designer  Label designer  Brackets module  IPR
Interproximal reduction

Models Builder module  Clear aligner module  Crown & Bridge

www.maestro3d.com
In the past ten years, CAD/CAM restorations have been established as standard in implant prostheses. The advantages of such restorations include the chairside use of full ceramics and digital impressions. Owing to the introduction of ceramic blocks with prefabricated twist-proof screw channels, the workflow for the chairside manufacture of individual hybrid abutments and hybrid abutment crowns can be applied in daily practice. By means of the cases reported in this article, the indications, suitable materials and attachments, and related studies are discussed.

Case reports

Case 1

In September 2013, a 35-year-old patient came into our practice for the first time. The general anamnesis found no peculiarities. She complained of pain in the second quadrant. The clinical and the radiological examination found that tooth 26 was not worth preserving (Fig. 1). The patient was subsequently informed of the treatment options, which were revision of the root canal filling, and a second root resection and extraction with subsequent im-
planted. Finally, tooth 26 was extracted and implantation followed 12 weeks later (4.3 mm x 9 mm CAMLOG implants; Figs. 2–4). We decided against closed healing and the implant was closed with a flat gingiva former (2 mm). With this, a further operation to expose the implant could be avoided.

Chairside workflow

Ten weeks after implantation, the prosthetic restoration was performed in one session without a physical model. A digital impression was taken by means of CEREC Bluecam (Sirona Dental Systems). Since no exposure of the implants was necessary and there were no open wound edges, we were able to use the powder for the scanning procedure without any concerns (Fig. 5). After the insertion of the CAMLOG TiBase (Sirona Dental Systems; Fig. 6), which served as the titanium adhesive abutment for the chairside-manufactured hybrid abutment crown made of lithium disilicate (IPS e.max, Ivoclar Vivadent), the appropriate scan body (Sirona Dental Systems; Fig. 7) was placed on the TiBase. Before taking the impression, the placement of the TiBase was radiologically controlled (Fig. 8).

The virtual construction was created by means of CEREC Software 4.2 (Sirona Dental Systems) and was built up similar to the crown’s construction. An advantage of the virtual construction is the more flexible control of the emergence profile. The pressure on the gingiva can be adjusted individually, and displacements of about 5 mm have proven to be unproblematic.

Further parameters, such as minimum strength and position of the screw channels, should be adjusted and included in the construction according to the manufacturer’s instructions. The manufacture of the hybrid abutment crown was achieved with the CEREC MC XL milling unit (Sirona Dental Systems; Fig. 9). After the colour determination, the low translucency A2 A16 (L) ceramic block was selected.

After glazing and colouring, the crystallisation or combination firing was done (Programat CS, Ivoclar Vivadent). The monolithic polished abutment crown was then extra-orally attached (Multilink Hybrid Abutment, Ivoclar Vivadent) to the TiBase (Fig. 10). The hybrid abutment crown was screwed in and the
screw channel was sealed with PTFE tape (3M ESPE) and composite (IPS Empress Direct, Ivoclar Vivadent; Fig. 11).

Cases 2 and 3

Figures 12 to 18 illustrate the cases of the second and third patients. Both patients were treated following the same treatment plan described in the first case.

Case 2 demonstrates the prosthetic restoration of an implant in region 26 (Fig. 12). Figures 13 and 14 show the try-in of the hybrid abutment crown before crystallisation firing. After the try-in, the polished ceramic crown was glazed, coloured and filled with auxiliary firing paste (IPS Object Fix Putty, Ivoclar Vivadent; Figs. 15a–c). Case 3 shows restoration in region 15 (Figs. 16–18).

Discussion

Restoration using CAD/CAM methods has been established as standard in implant prostheses. Besides the industrial manufacture of materials and the consequent high quality, the individualised, tooth-coloured design of the emergence profile and...
case report  _CAD/CAM restorations

Be inspired by nature. The “Bionic Restoration“.

Tizian Zirconia Reinforced Composite

- For **final restorations** such as crowns and bridges
- Suitable for milling in conventional open CAD/CAM systems
- **Gentle** on both the TMJ and antagonists
- Excellently suited for **implant-supported** restorations and treatment of CMD and Bruxism patients

Further information:
www.schuetz-dental.com
Double crowns made of a new high performance polymer

**Authors** Drs Rolf Vollmer, Martina Vollmer, ZTM Michael Anger & Dr Rainer Valentin, Germany

**Double crowns** in form of telescopic or conical crowns have been used for many decades in dental prosthetics. In the beginning of dental implantology prosthetics, there were still doubts about the transfer of these constructions on the implant-supported dentures. However, in the practical application more and more telescopic or conical prosthetics recently prevail.

**Introduction**

In the 70s and 80s, the bar restoration on implants was the first choice e.g. by Ledermann (1979). Over the years, more and more telescope or conical crown applications have been described for implant-supported dentures. From the experience of the author it is clearly determinable that a double crown restoration in the mandible with four implants and secondary crowns is indicated. For example, they would provide very good and stable long-term results in electroplating technique (Figs. 1a & b).

The alternatives offered in form of attachments of various kinds stabilise the prosthesis more or less depending on the condition of the jaw. However, these attachments are usually inferior in fixation compared to a double crown restoration. Especially, one-piece implant systems—possibly with implants reduced in diameter and length—with simple ball retaining elements, such as rubber rings, are absolutely inappropriate in terms of a later change of the superstructures. A restoration with double crowns is more complex for both the dentist and the technician with regards to efforts and costs. In the following, a new technique is described using prefabricated parts and a new material combining the advantages of telescopic or conical crown technology with the ease of processing and manufacturing. The application should possibly be done as chair side alternative, which is reasonably priced in the dental laboratory. For fixed detachable prostheses, new possibilities for avoiding screw retention are also described.

---

**Figs. 1a & b** Individually made telescopic crowns with secondary parts electroplated in “passive fit” technology glued to a metal frame.

**Figs. 2a & b** Telescopic crowns on IMC cylinder implants (Dr. Nikola Laux 1984).
1 Year Clinical Masters™ Program in Aesthetic and Restorative Dentistry

November 12-15, 2014, a total of 4 days in Dubai (UAE)

On location sessions, hands-on in each session + online learning and mentoring

Learn from the Masters of Aesthetic and Restorative Dentistry:

registration information:

November 12-15, 2014
a total of 4 days in Dubai (UAE)

Session fee: € 3,450
(you can decide at any time to complete the entire Clinical Masters Program and take the remaining session)

contact us at tel.: +49-341-484-74134
email: request@tribunecme.com

Details on www.TribuneCME.com

Collaborate on your cases
and access hours of
premium video training
and live webinars

University of the Pacific
you will receive a
certificate from the
University of the Pacific

Latest iPad
with courses
all registrants receive
an iPad preloaded with
premium dental courses

50 c.e. credits

tribune group gmbh is the ADA CERP provider. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

tribune group gmbh is designated as an Approved PACE Program Provider by the Academy of General Dentistry. The formal continuing dental education programs of this program provider are accepted by AGD for Fellowship, Mastering, and membership maintenance credit. Approval does not imply acceptance by a state or provincial board of dentistry or AGD endorsement.
case report _double crowns

_Historical development of double crown systems

From literature it is known that Starr was probably the first who reported, in 1886, about a removable bridge made of double crowns. In English literature Peeso (1924) reported about possible applications of the double crown systems. In Germany it was Häupl in 1929 and Böttger in 1961. The breakthrough of double crown systems took place in Germany in 1969 with Körber (1988) who advocated the use of conical crowns with a defined angle of convergence. Over the decades the conical crown has become known as "German crown" which refers to the frequent use in the German-speaking area until today. According to Körber (1988) double crown systems should include, among other things, exactly fitting pillar integration, secondary splinting with an axial directed periodontal load and firm support during function which is easily removable for hygienic reasons. Furthermore, the production should be as efficient as possible and a high economic effect should arise by a very long survival rate, which can be expected.

Körber (1988) distinguishes telescopes according to their form:

_Cylindrical telescope:_ It hardly tolerates technical inaccuracies and is therefore, according to Körber, classified as problematic in manufacturing.

_Cone-shaped telescope:_ With regard to the fit there is a high tolerance, it allows production with a low error rate.

_Resilience telescope:_ Primary and secondary parts should have some backlash in the occlusal region in order to have some space on top of each other under load. The telescope should only undertake the functions of friction and indirect connection of the retaining teeth (bracing).

**Definition of the cone angle for double crown systems**

The three systems—the telescope crown, the conical crown and the resilience telescope—are double crown systems, which differ by the type of fit and adhesion. The determining factor for the strength of adhesion is according to Heners (1990), the convergence angle.

In the early days of implant dentistry one was still sceptically about the use of double crown systems on implants. At this time, as one of the first colleagues the dentist Dr Nikola Laux from Hamburg, Germany, introduced the use of telescopic crowns on implants (IMC cylinder implants) in 1984 (Figs. 2a & b). In 1996, two of the authors (Vollmer, R. and Vollmer, M.) provided a mandibular removable prosthesis with six implants and telescope crowns with secondary parts made of Teflon already (Figs. 3a & b).

Convergence angle α value at various double crowns:

- Telescopic crown: \( \alpha = 0 ^\circ \) (clearance only)
- Conical crown: \( 0 ^\circ < \alpha < 8 ^\circ \)
- Resilience telescope: \( \alpha \) may only be so large that just an adherence occurs

Largest recommended convergence angle: \( \alpha < 10 ^\circ \) (with double crown systems according to Muhs, 2006)

Advantages of the double crown technique

1. Straightforward extensibility after losing a primary crown.
2. Possibility of extra-oral repairing.
3. Better and easier periodontal hygiene compared to fixed prostheses.
4. Parallelisation of abutment teeth in the case of divergences.

Disadvantages of the double crown technique

1. Complicated, precise and technical manufacturing, high demands on the technician.
2. High costs for the work of the technician and for the material (e.g. use of precious metal, electroplating).
3. In order to achieve aesthetic results, an intensive substance reduction of the abutment teeth must take place. If this is not possible, the result in the anterior areas of the jaws is aesthetically often unsatisfactory.
4. The use of ceramic veneers fusing to the secondary parts in the front area is risky (chipping).
5. Loss of adhesion and pull-off force after a certain time.
6. Missing or difficult possibilities of activation (post electroplating, fabrication of additional attachments).
7. When using an inexpensive base metal (non-precious metal) / Eco-gold combination, corrosion can occur leading to excessive friction.

**The material PEEK—A historical review**

For a long time, plastics were frequently used in the dental field. Light weight, an easy processing ability compared to metals and ceramics, are some of the benefits. The most known plastics are Polyoxymethylene (POM) and Polymethylmethacrylate (PMMA).

PEEK (Polyetheretherketone) is a newer polymer which is also used for medical products since the mid-90s (Fig. 5). The material was developed in 1978 and mainly used for mechanical engineering and in the automobile industry initially. Meanwhile, PEEK is used for the production of biomaterials in medicine, e.g. for artificial vertebral bodies, anchoring screws, artificial
joints etc. Since the original material has a dark colour, it initially appeared to be not suitable for dental applications. However, one succeeded to vary the colour of the material so that it could also be used for temporary restorations and abutments (Kirsch, 2002).

Today the following indications are cited: full crown caps for single crown copings, full anatomical bridges, scaffolds for veneer bridges, primary crowns, inlays, inlay bridges and Maryland bridges. So far, the approval of the material was limited to removable or conditionally removable (screwed) dentures. This means that with the described material metal-free dentures, secondary parts, over structures with combined dentures, implant-supported full crowns in the posterior region and conditionally removable, screw-retained bridges can be realised.

A distinction has to be made between pure PEEK and PEEK with additives. Recently, industrially manufactured blanks (Fig. 4) are available with an authorization for definitive and removable dentures (e.g. dental discs "Tizian PEEK Blanks" Schütz Dental Ltd., Germany). The material has no additives and is used in medicine for many years now. Since the highly pure PEEK material contains no additives—such as barium sulfate—it is not visible on X-ray control images (Fig. 6). Other manufacturers, however, use additives such as barium sulfate deliberately for a radiographic display.

Also, a so-called white-PEEK is offered in the field of dental prosthetics from different companies. This material is mixed with up to 20 per cent titanium dioxide which makes the colour lighter or whitish. In this method, the hardness (flexural strength) of the material is raised, but at the same time the sliding property is deteriorated. Another disadvantage is that from the material titanium dioxide ions go in solution and work like a ventilation element after a certain period of wear. This can lead to discoloration of the gingiva. Therefore, pure, medical PEEK for prosthetic parts processing is rather recommended.
case report_ double crowns

**The properties of PEEK**

PEEK is dimensionally stable up to a temperature of about 152 degree Celsius, the material is high melting, about 334 degree Celsius. PEEK is resistant to water and ionising radiation. Therefore, the physical properties do not change even during sterilisation at 170 to 180 degree moist/heat sterilization at 200 degree Celsius/one bar or during sterilisation using gamma radiation. The chemical consistency is very good. It only reacts with concentrated sulfuric acid (H_2SO_4). Therefore, the use in the oral cavity is safe and the material has the CE mark for medical devices. The low specific mass, the elasticity similar to the one of bone, the absence of metals and the toughness, combined with an almost non-existent material fatigue makes the material an ideal partner in prosthetic dentistry and implantology.

**Processing PEEK**

To process PEEK the so-called "semi-finished" base material is needed which is produced in several ways of powders or pellets for later processing. These are:
- Extrusion
- Injection molding
- Selective laser sintering (SLS technology)
- CAD / CAM.

**CAD / CAM technology**

Since the material allows processing using CNC mills very well, the CAD/CAM technology is used to produce the finished parts. Elaborate individual work assignments of the dental technician in the form of scaffold modelling with subsequent individual polymerization can be avoided.

**Tasks and objectives**

The application of the double crown technique on implants will be described in the following. The prior mentioned advantages of the new material PEEK for dentistry should be used for dental implant superstructures by prefabricating standardised parts. The mentioned advantages of the double crown technique should remain and the disadvantages should be largely avoided or allow a reconstruction in a cost effective way.

A system is described to combine the advantages of the already known traditional custom-made double crowns with individually milled primary parts with the advantages of double crowns with industrial prefabrication.

Prefabricated cone parts are used with different angular deviations of the implant abutment (Fig. 7). For these abutments perfectly fitting PEEK caps are manufactured using CAD/CAM technology.

**Different indications and case documentations**

**Case 1: Removable prosthesis on two implants—direct procedure**

The cone primaries can be parallelized in the patient’s mouth without time consuming impression taking and transfer to a model. Only an X-ray control recording to verify the abutment seating is useful. The previously made full mandibular denture (Figs. 8a–c) is marked with silicone at the implant exit points after tissue exposure. Then, the prosthesis is milled (Figs. 9a–c) and adjusted in the patient’s mouth to the implant abutments covered with the PEEK caps (Fig. 10). In doing so, no later tension can arise. Using an acrylic resin,
the PEEK caps are then glued in the patient's denture directly (Fig. 11). This method enables a so-called "passive fit" of the removable prosthesis. Due to the good adaptation of the PEEK material to the primaries a suction effect develops in addition to the friction of the parts. The primary parts can—if necessary—be sandblasted and thus roughened to increase the friction effect. Nevertheless, this is not required in most cases if there are sufficient parallel surfaces. In the present case, in spite of an in the posterior area severely atrophic mandible, one has been able to achieve a very good stabilisation of the removable prosthesis without having the effect of a rotation around the linking axis of the implants.

Case 2: Removable prosthesis on four implants — half-direct procedure

The female 79-year-old edentulous patient had received a new lower denture about one year ago. She was very unhappy all the time, until she had been informed by an acquaintance about the possibility of dental implantation. After appropriate education and measurement of the bone volume, four implants were inserted in the anterior mandible (Fig. 12) to provide a supply with prefabricated titanium primary telescopic crowns and PEEK secondary crowns.

After three months of healing, the titanium copings were then parallelised in the patient's mouth (Fig. 13). The PEEK caps were adjusted to the primary crowns (Fig. 14) and both bite registration and functional impression were made in one step procedure (Fig. 15). In the meantime, the existing prosthesis of the patient was already supplied with two PEEK caps and a soft relining, so that the primary abutments no longer had to be removed.

In the next session, the wax try (Figs. 16a & b) and the tertiary framework try-in was done. After the wax try-in, the secondary PEEK crowns were placed back in the mouth again and the premade model casting reinforcement was tried in. Since the fit was very good, according to the passive-fit method, the gluing of the PEEK abutments with the tertiary structure in the patient's mouth was made with a dual curing material (Fig. 17).
After the removal of the bonded parts, the complete part was reset to the working model (Figs. 18 a & b). There were no deviations or tensions detected. In the dental laboratory, the total work now could be completed so that the integration of the prosthesis was already at the next meeting (Figs. 19 a & b).

The PEEK abutments “run” or glide on the primaries very good. The prosthesis has a very solid tension-free fit and can still be easily removed by the patient. Prostheses pressure points have not occurred.

Case 3: Fixed or removable prosthesis on nine implants—screwing or cementing or none of both?

The female patient’s age was 51 when about 14 years ago, in the year 2000 she received maxillary and mandibular implants. The wish of the patient at that time was not wearing removable parts in her mouth. Later in the maxilla, a fixed ceramic fused to metal bridge restoration was incorporated. In the lower jaw, a 14 unit acrylic bridge metal enforced from one piece was integrated. A retrievability was provided as in the anterior region a larger defect was already present. This region was used to stabilise the interim prosthesis with so-called bicortical screws.

However, since it turned out that after the healing the bicortical screws were absolutely stable and firmly healed, they were left in the jaw and incorporated into the prosthetic construction.

After about ten years, the patient started having problems at the distal right implant which turned out to be loose and had to be removed (Fig. 20). After a small makeover, the existing bridge was then reintegrated.

The implant failure had likely been caused by the so-called medial shift (Fig. 21) of the mandible and the cantilever construction. Sometimes, this effect is also observed in bridges in the mandible, ranging from the anterior region to the wisdom tooth. Especially when the patient is older and the lower jaw shows a decrease of density, it comes to this release or dece menting effect. For this reason, appropriate separation points should also be included in the mandibular
Join the largest educational network in dentistry!

→ education everywhere and anytime
→ live and interactive webinars
→ more than 500 archived courses
→ a focused discussion forum
→ free membership
→ no travel costs
→ no time away from the practice
→ interaction with colleagues and experts across the globe
→ a growing database of scientific articles and case reports
→ ADA CERP-recognized credit administration

Register for FREE!

www.DTStudyClub.com
bridge restorations. Cantilever constructions should be avoided whenever possible.

Over the years, the gingiva of the patient was for whatever reasons much more sensitive and the patient had great fear to lose more implants in the lower jaw. She wore the existing bridge structure only as a kind of a loose removable bridge. Since the design was intended for at least a temporary cementation, it always came to a wear and chipping of the plastic veneers, which could no longer be repaired (Figs. 22a & b). Now, in 2014, the patient is 65 years old and a new treatment-plan with three divided bridges for cementation was suggested. However, she refused and insisted to get a part that is removable or to have the old one repaired, which for technical reasons was not possible. There were different solutions discussed including new primary telescope parts and electroplating technique for the secondary parts. A decision was not made by the patient especially because of cost reasons. The only statement was that she wanted to have something like a removable bridge.

After assessments and parallelism measurements of the existing models in the dental laboratory, it turned out that there was also the opportunity to design a new restoration with the help of PEEK secondary crowns and a tertiary cast framework for acrylic pontics without removing the original abutments (Fig. 23). The patient agreed on this proposal.

First, the PEEK secondary parts, some of which were splinted, were tried in (Figs. 24a–c). The fitting was very good. The model casting reinforcement for the tertiary structure also fitted perfectly (Fig. 25). So the bonding of both (PEEK and metal frame) similar to the previous case was done directly into the patient’s mouth (Figs. 26a & b). In this case, a pick-up impression in the double mixing method was manufactured (Fig. 27). The bite was registered over the tertiary structure. The result was a very good matching, stress-free, removable bridge with a pleasant chewing comfort that meets the needs and expectations of the patient (Figs. 28 & 29).
Case 4: Fixed prosthesis on two implants and three unit bridges—screwing or cementing or none of both?

This 77-year-old patient was already supplied with multiple implants and wanted the gap 23 to 25 to be filled with a fixed bridge (Fig. 30). Since it was a FP 3 option or indication according to C.E. Misch and hygiene deficits of patients had to be corrected with the help of a professional dental cleaning, in this case we decided to manufacture, similar to the previous case, a removable bridge which was neither cemented nor bolted.

The process was corresponding to the case before. The difference was that we were using porcelain fused to metal. The bridge was glued in the mouth to the two PEEK caps (Figs. 31, 32a & b). Now, the patient has a very good chewing comfort. The prosthesis can be removed from the prophylaxis assistant very well. The problem of a cemented bridge with the appropriate cement residues, a possibly too strong adhesion and a difficult retrieve possibility was avoided as well as the disadvantages of screwing. The use of ceramic veneers fused to the secondary parts is possible and chipping avoided (Fig. 33).

Case 5: Removable prosthesis on four implants and Locator® attachments—unsatisfied patient

The patient, aged 81 years, had significant problems with the adhesion and fit of his lower jaw full prosthesis for years. Because of cost concerns a bar or telescoping construction using electroplating was omitted. Although the initially applied two anterior implants with a simple ball connection device ensured a stabilization of the prosthesis, there were always returning pressure sores and points in the posterior region of the mandible.

The patient, aged 81 years, had significant problems with the adhesion and fit of his lower jaw full prosthesis for years. Because of cost concerns a bar or telescoping construction using electroplating was omitted. Although the initially applied two anterior implants with a simple ball connection device ensured a stabilization of the prosthesis, there were always returning pressure sores and points in the posterior region of the mandible.
causing pain. Later, two more implants were placed anterior because of the patient’s request for a better stabilization of his prosthesis. However, the construction on four implants with Locatör® attachments brought only a little improvement. Still, the patient was not 100 per cent satisfied, even though the prosthesis was underlined and perfectly fitting the jaw. Later, to eliminate the tilting movements in the distal jaw area during mastication, two Locatör® were replaced by a prefabricated cone crown system with PEEK secondary parts (Fig. 34).

The immediate stable position and the perfect fit of the mandibular denture were amazing. Finally, the patient got the desired result, which was within his personal budget (Fig. 35).

_discussion_

In recent years, a variety of proposals for affordable dental implant solutions for the patient are made according to Held. If one earlier estimated that four implants are necessary for a stable construction in the mandible, we are confronted with concepts varying from All-on-4® (Paolo Malo) to “All-on-One” (“Better one than none”) e.g. a multicentre study by the University of Kiel, Prof. Dr Matthias Kern. The aim of the study is to provide more and more patients with a cheap and simple reconstruction in limited indications such as a very strong distal atrophy of the mandible. In general, money-saving reduced implant solutions have the disadvantage that the loss of a single implant already leads to a complete redesign and start from the beginning. This has to be considered during the complete planning process. A construction of two implants only with the use of pre-fabricated parts is—at least in the lower jaw—a good compromise between a minimal solution (one implant) with a very restricted indication and an only moderate stabilisation and prosthetic cost effective solutions that are based on at least four implants. The new high-performance polymer PEEK offers in combination with prefabricated conical crowns many ways especially with the use of CAD/CAM technology to expand the prosthetic range on a low-cost basis. The corrosion phenomena when using non precious metals/Eco gold can be avoided.

_conclusion_

The bar prosthetic construction in the mandible propagated by Ledermann (1979) is currently the only scientifically validated indication. Every other described technique still requires further clinical testing and scientific evidence of their suitability.

The here described treatment option should combine the advantages of a high-quality implant restoration with the advantages of low-cost simple fabrication. The use of prefabricated components and the use of a new cost economical material enable well-fitting stable constructions, especially in cases of advanced mandibular atrophy. New indications like cement and screwless fixed solutions are of special interest and very challenging. Ceramic veneers can be fused to the secondary parts also in cases of removable bridges and avoid chipping.

New materials in the implant prosthetics will continue to offer new additional possibilities. Here, the imagination of colleagues for further development is almost not limited. The use of ceramic veneers fusing to the secondary parts in the front area is risky (chipping). There is still much to do. Let’s do it!

Editorial note: A list of references is available from the publisher.

_contact_

Dr Rolf Vollmer  
Nassauer Str. 1  
57537 Wissen, Germany  
info.vollmer@t-online.de

Zahn technik Michael Anger  
Drausstr. 8–9  
53424 Remagen, Germany  
info@ma-fraeszentrum.de
Implant-supported immediate restoration in the edentulous maxilla

Author: Dr Fernando Rojas-Vizcaya, Spain

Introduction

Implant dentistry has become an established form of treatment with good and predictable results for functional and aesthetic reconstruction in cases of masticatory dysfunction. As bone in the maxilla is often soft and sometimes insufficient in volume, the edentulous maxilla could be a great challenge for the treating dentist. The type of treatment chosen is crucial for success, in particular when a fixed immediate restoration is requested by patients. In such cases, successful treatment requires primary stability of the implants inserted and a sufficient number of implants to support the superstructure.1

In addition, exact placement is essential and can be achieved by means of computer-assisted planning. At least six implants are recommended to support a fixed restoration in the edentulous maxilla.2 Moreover, in soft bone, it is necessary to use an implant system that guarantees sufficient primary stability due to its external geometry and its thread design.3
Another precondition for successful treatment is a tension-free fit of the prosthetic superstructure. Also desirable is primary splinting of the implants by the superstructure, which can be achieved with a milled bar restoration. Utilising CAD/CAM technology, highly precise wide-span solutions can be manufactured today with an accurate fit.

Case report

A 69-year-old female patient presented to our practice. Apart from teeth 17 and 27, her maxilla was edentulous. The remaining teeth could not be permanently preserved due to the periodontal status. A removable temporary denture was anchored to the maxillary molars. The patient requested a fixed restoration to permanently restore masticatory function and aesthetics.

The clinical and radiographical examination showed that sufficient bone was available to place implants that would support a fixed restoration (Figs. 1 & 2), and a bar-retained immediate restoration on six OsseoSpeed EV implants was planned. The OsseoSpeed EV implants and the new drilling protocol allow for excellent primary stability, which makes this an ideal treatment solution for this particular case. In addition, the OsseoSpeed surface is especially indicated for use in soft bone applications.
In order to safely and exactly place the implants, the use of a surgical template was planned. The maxillary provisional denture was duplicated and the laboratory created a surgical template from it. The surgical template was used to determine the best prosthetic position for the implants (Fig. 3). After incision and raising a flap, the bone proved to be of good quality and of sufficient volume to ensure a buccal bone wall of approximately 2 mm after implant placement. In all, six OsseoSpeed EV 3.6 S implants were placed in the maxilla. The recommended drilling protocol was followed, using the Twist Drill EV, Step Drill EV and Cortical Drill EV. The implants were inserted with a torque of 25 Ncm, using a contra angle and the Implant Driver EV (Fig. 4). The final installation was carried out manually. Subsequently, 2 mm Uni Abutments EV were manually connected to the implants using the Uni Driver EV (Fig. 5). Uni Abutment EV Temporary Cylinders were placed on the abutments to attach the temporary restoration. The surgical procedure was completed by replacing the soft tissue flaps and suturing around the abutments (Fig. 6).

The existing provisional denture was grinded generously at the level of the temporary cylinders so that it could be safely placed on top of the cylinders. The maxilla was covered with a rubber dam to protect the newly sutured surgical wound (Fig. 7). The reduced temporary denture was secured to the cylinders with self-hardening plastic. Afterwards,
the cylinders were shortened to denture level, and their channels were closed with silicone (Fig. 8). The patient thus received a temporary immediate restoration in one treatment session. Radiographs showed an excellent fit of the abutments and cylinders and a good positioning of the implants (Fig. 9). After osseointegration of the implants, teeth 17 and 27, which could not be preserved, were extracted.

After eight weeks of healing, the temporary denture was removed and the Uni Abutments EV were exposed to prepare for the final impression (Fig. 10). For this procedure, Uni Abutments EV Pick-Ups were connected to the abutments and the impression was made using a customised impression tray (Fig. 11).

When the impression material had set, the pins were unscrewed and the impression was removed. Uni Abutment EV Replicas were attached to the pick-ups in the impression to prepare the master model made from dental plaster stone (Fig. 12). A diagnostic wax-up was created on the model to be able to plan the exact location and dimension of the planned bar structure. The model and wax-up were sent to DENTSPLY Implants manufacturing center, where they were scanned, and the data was transferred to the ATLANTIS ISUS software. Using the software, an ATLANTIS ISUS Hybrid superstructure was designed (Fig. 13). After review and approval of this design by the dentist and dental technician, the framework was milled from a solid block of cobalt-chrome in the DENTSPLY Implants manufacturing centre.

Review of the precise fit was controlled and verified in production as well as referring to the master model (Fig. 14). With the previously created wax-up, the final restoration was completed. The ATLANTIS ISUS Hybrid superstructure was installed to the abutments with a torque of 15 Ncm (Fig. 15). The screw channels were subsequently sealed with composite. The contact area of the denture with the maxillary mucosa was designed in a slightly convex form that prevents air from escaping, avoids phonetic problems and food impaction, and allows for good oral and denture hygiene (Fig. 16). The control radiographs showed the marginal bone to be at the level of the implant shoulder and also an excellent fit of the prosthetic restoration (Fig. 17). Aesthetics and function were ideally recreated and the upper lip was well supported by the prosthesis. The patient was very satisfied with the result (Figs. 18a & b).

**Conclusion**

Restoration of the edentulous maxilla with an implant-supported fixed restoration presents great challenges for the treating dentists. The present case describes how an excellent prosthetic restoration can be created both in terms of function and aesthetics using the ASTRA TECH Implant System EV and an ATLANTIS ISUS patient-specific implant superstructure.

**Editorial note:** A complete list of references is available from the publisher.

**about the author**

Dr Fernando Rojas-Viczaya, DDS, MS
Department of Prosthodontics
University of North Carolina,
Chapel Hill, NC, USA
Director of the Mediterranean Prosthodontic Institute,
Castellon, Spain

**Fig. 17** Periapical radiograph showing the perfect fit of the restoration.

**Figs. 18a & b** Final aesthetic outcome.
Dental implantology is currently one of the most important treatment strategies for the replacement of missing teeth. The aim is to achieve a functionally stable, long-lasting implant, with an aesthetic outcome. Due to the reduced mechanical challenge, tooth loss induces progressive bone tissue atrophy. Thus, it is often necessary to reconstruct alveolar ridges before implants can be inserted.

Autografts

For three-dimensional (3-D) augmentations in cases of extensively atrophic ridges, onlay block grafting is the method of choice. Autologous bone is still considered the gold standard in block grafting. However, the intraoral availability of autologous bone for transplantation is limited. Therefore, bone harvesting from the iliac crest is required in cases of large defects.

Tissue harvesting, however, involves a second surgical site that is frequently associated with potential donor site morbidity and increased risk of pain. Furthermore, the harvesting of bone from the iliac crest is often...
associated with pronounced and long-term neurological symptoms.

_Allografts_

Alternatively, allogenic bone (from human donor tissue, known as an allograft) may be applied to avoid the additional risks that come with harvesting autologous bone. Due to its physiological structure, allogenic bone provides an ideal matrix for revascularisation and new bone formation. Since it is fully resorbable, it supports natural bone remodelling. Moreover, allografts are biocompatible and, like autografts, do not induce immunological reactions.1

Histological studies of the final stages of graft incorporation identified no difference between allografts and autografts.2, 3 The allogenic bone tissue originates from living donors who are undergoing total hip replacement surgery and are willing to donate their femoral heads to support the supply of bone graft material for medical use. Donors have to meet high standard criteria in terms of their health status in order to be selected; systemic and neurological diseases, acute or chronic infections, and existing or past malignancies are only a few of the exclusion criteria.

Every single donor undergoes serological testing to detect the presence of virus antigens by nucleic acid testing (NAT). The donated tissue is processed in a multi-level cleaning process, which removes organic components and non-collagenous proteins from the mineral phase of the bone. This process is also validated for its effectiveness to reliably inactivate potentially present viruses and bacteria. The unique processing of the donor tissue preserves the natural collagen content of the allograft bone, rendering the material with increased flexibility, simple handling, and with more potential applications, compared to synthetic or bovine bone substitutes.

_Classical onlay block grafting_

The most important application for allografts is onlay block grafting; in the 3-D reconstruction of large defects, the block allograft ensures the necessary volume stability during graft incorporation. However, it is crucial during this initial phase of vascularisation and graft incorporation to establish the largest possible contact area between the block and the local bone bed.

During conventional block grafting, a standardised square block has to be manually modified for adaptation to the surface of the local bone during the surgical procedure.
It is a technique-sensitive and time-consuming process. Moreover, the prolonged exposure of the surgical site to saliva and air increases the risk of infection and delayed wound healing.

**Customised allogenic bone transplants for onlay block grafting**

botiss offers a new technology that provides the clinical user with a pre-fabricated, customised allogenic bone block, which is individually designed to match the patient’s defect.

The radiological data is transferred into CAD/CAM planning software that builds a 3-D digital model of the scans (Figs. 3–6, patient data provided by Dr Markus Schlee, Forchheim, Germany). Based on this virtual model, the botiss specialists design the allograft block directly on the virtual defect with...
the use of a digital backward planning concept (Figs. 7–10, patient data provided by Masoud Memari, Budapest, Hungary). Starting with the design of a possible superconstruction, the approximate implant position may be mimicked and virtual implants inserted. If the implants are digitally planned by the clinical user, these data can be transferred and the exact implant positions can be displayed in the 3-D model. The block graft is subsequently designed to fit around the virtual implants, according to the final bone bed needed for stable implant insertion.

_Individually designed in close cooperation between clinical user, CAD specialist, and tissue bank_

The complete planning process is a product of direct interaction between the clinical user, the CAD specialist, and the producing tissue bank. Bone blocks are individually designed to meet the requirements for sufficient augmentation of the alveolar ridge in careful consideration of the soft tissue situation of the patient, which can only be assessed by the attending surgeon himself. The final 3-D version of the bone block is converted into a *.stl file and transferred to the botiss partner tissue bank C+TBA (Cells and Tissuebank Austria, Krems). The block is produced under cleanroom conditions in accordance with pharmaceutical standards. The *.stl file is imported into a CNC-milling machine in which, after a simulated test run (Figs. 11 & 12), the final graft is produced from a partially processed allogenic block.

In surgery, after it is brought into position, the maxgraft bonebuilder block is fixed with regular osteosynthesis screws. Residual gaps can be filled with bone regeneration material and the augmentation site is covered with a collagen membrane before the wound is closed tension-free (Figs. 13–15).

_Reduced surgery time, quick and uneventful wound healing_

The pronounced fitting accuracy of the bone builder block facilitates optimal revascularisation and graft incorporation. The operation time during block grafting is significantly reduced, thereby promoting quick and uneventful wound healing. It also allows the surgeon to focus on the management of the soft tissue, which is the actual key for success.4-6

Due to the significant reduction in operating time, costs and, most importantly, patient morbidity, the unique maxgraft bonebuilder technology paves the way for a patient-friendly, minimally invasive approach in alveolar ridge augmentation._

(Editorial note: a complete list of references is available from the publisher.)

_about the author_

Dr Yasmin Buchaeckert, Senior Product Manager Allografts at botiss biomaterials.

yasmin.buchaeckert@botiss.com
Planmeca ProMax CBCT with CAD/CAM technology: the perfect combination

Now, consider combining this detailed information below the gum line with images from an intraoral scan, capable of capturing the highest resolution of data above the gum line. This combination of CBCT and STL data from CAD/CAM sources gives doctors the ability to provide the required information and tissue leveling for a crown down to an implant plan.

In most cases, the STL data can also be utilized by the lab to create the final surgical guide for placing the implant with unparalleled accuracy and speed. Temporary and final restorative crowns can be milled in-office in a matter of minutes or milled by a lab in as little as 24 hours. Planmeca’s imaging and CAD/CAM technology have captured this concept with the ProMax 3-D family of imaging units and the PlanScan/PlanMill systems, offering doctors the ability to acquire a data set with more detail than ever.

Streamlining the digital workflow

Digital dentistry is streamlining virtually every aspect of the restorative workflow. Traditionally, doctors submit a physical impression to the lab with
the prescription and instructions written out on paper. This is gradually ceding ground to an entirely digital process where the patient’s information and doctor’s instructions are sent to the lab electronically via a digital impression system.

Planmeca PlanScan Restorations can be delivered mere days after the laboratory receives the patient’s intraoral scans, while the Planmeca PlanMill 40 in-office milling unit is making same-day dentistry a reality. The restorations produced by the PlanScan restorative system, along with the combining of the digital impression with CBCT scans, reduce the costs and treatment time associated with replacing a tooth, increasing the demand for digital dentistry exponentially.

For those who want to continue to work with their labs, all of the patient information needed to produce a model-less restoration can be submitted digitally to a dental laboratory. At the same time, clinicians enter the patient’s information and prescription data into their digital impression system’s software prior to submitting each case. Because the Planmeca PlanScan system is an open system and the dental team can send the file in a standard DICOM format, exchanging patient data is easy between most systems through Planmeca Romexis software.

Fig. 3. The ProOne features an easy-to-use color graphic user interface (GUI) with touch magnification for image verification.

__Contact__

Planmeca Oy
Aseentajankatu 6
00880 Helsinki
Finland

www.planmeca.com

Data standardization is essential to driving down costs for patients, doctors and laboratories alike by establishing interoperability between intraoral scanners, CAD/CAM software and other dental systems. Ultimately, having a common standard that allows the disparate systems used in dental care to function as plug-and-play devices rather than requiring pricy IT solutions will reduce the costs of integrating these new technologies into dental practices and maximize the ROI of the equipment.

Planmeca’s CBCT and CAD/CAM imaging systems, along with Planmeca Romexis digital treatment-planning software, are using this idea to improve the efficiency, predictability and cost-effectiveness of dental restorations, making chairside dentistry a lucrative investment for dentists who wish to grow their practice and offer patients the latest in same-day technology.
DENTSPLY Implants expands into new markets

New solution from DENTSPLY Implants: Simplicity without compromise with the new ASTRA TECH Implant System EV

The main objective of the new system is to further improve system logic, robustness and user friendliness. Simplicity without compromise has permeated the evolution of the ASTRA TECH Implant System EV and the new system is a result of the collaborative input and insights from dental professionals throughout the global dental industry.

SIMPLANT with ASTRA TECH Implant System EV

At the European Association of Osseointegration (EAO) Annual Meeting in Rome, Italy, September 25–27, DENTSPLY Implants presented SIMPLANT computer guided implant treatment with ASTRA TECH Implant System EV.
SIMPLANT is a comprehensive system based on 3-D imaging, allowing for precise implant planning and predictable restorative results. Using SIMPLANT with ASTRA TECH Implant System EV unlocks the potential of digital driven crown-down planning and enhances the treatment outcomes for the benefit of the patients. Furthermore, working with a complete digital workflow allows for even greater simplicity and efficiency in the treatment process.

ASTRA TECH Implant System EV highlights:

- Versatile implant assortment;
- Flexible drilling protocol that allows for preferred primary stability;
- User-friendly surgical tray with three inter-changeable overlay options;
- Colour-coded assortment;
- Unique interface with one-position-only placement of ATLANTIS patient-specific abutments;
- Self-guiding impression components;
- One system—one torque.

For more information and highlights of the new ASTRA TECH Implant System EV, please visit the campaign site: www.jointheev.com

DENTSPLY Implants

www.dentsplyimplants.com
3Shape TRIOS recognised with “Best of Class” Technology Award

3Shape’s TRIOS digital dental impression solution has been given the “Best of Class” Technology Award for the second year in a row. Pride Institute presents this honour annually to global products that deliver best-of-class value to dentists and the dental industry.

“3Shape has worked closely with dentists and orthodontists to develop the digital impression solution since its launch three years ago. Practitioners’ feedback has been instrumental in driving the creation of breakthrough technologies in TRIOS, such as shade measurement, high-definition images and colour scanning, as well as improving scanning speed by 40 per cent over the past year. These features are shared with users of the device via unlimited software updates and serve to future-proof the digital impression solution.

“We are seeing a tremendous buzz surrounding TRIOS in the market right now. And we are grateful to Pride Institute and our fellow industry professionals for helping to create the strong interest and for rewarding our efforts in improving patient care and dental technology with the award,” stated Flemming Thorup, President and CEO of 3Shape.

Dr Lou Shuman, President of Pride Institute and creator of the award and its selection process, said about TRIOS: “In this highly competitive category, 3Shape’s TRIOS has once again impressed the panel on many fronts. We are very excited to see 3Shape choosing not to rest TRIOS on its laurels. Since winning last year, they have added many features, like shade measurement and HD image taking. Combining these with TRIOS’ fast and easy scanning and its intuitive interface makes the solution the clear leader and most innovative in the intraoral scanner product category.”

The American Dental Association and Pride Institute presented the awards at their joint Technology Expo at the association’s annual meeting, which was held at the beginning of October in San Antonio in the US.
Adentatec, based in Cologne in Germany, is a global dental company specialising in the production and distribution of non-precious dental alloys on a cobalt–chromium and a nickel–chromium base, as well as CAD/CAM discs on a cobalt–chromium and a titanium base. The medical devices distributed by Adentatec are exclusively produced in Germany and are certified to the highest standards (CE marking and US Food and Drug Administration). Adentatec is committed to the strict implementation of the quality and process requirements of DIN EN ISO 13485 and DIN EN ISO 9001 in relation to the entire manufacturing process.

The company was established in 1997 and its focus at that time was the distribution of sand-blasting material and plaster to dental laboratories all over Germany. In 2003, Adentatec started production of high-quality dental alloys, for which it implemented a quality management system. Its products undergo biocompatibility and corrosion resistance tests, among others, and are manufactured from high-quality raw materials to ensure consistent quality. Adentatec has always given priority to patient health. Since 2005, the company’s export business has increased steadily. Adentatec now has more than 20 agents worldwide who represent its product range.

The company’s brand-name products, such as System KN, System MG and System NE, have long been widely used by dental technicians. Its product range includes plaster, investment material and sand-blasting material. In 2009, Adentatec expanded the range to CAD/CAM discs on a cobalt–chromium base (System NE-Blank and System Soft-Blank). The high-quality discs are available in different diameters and heights, and can be used for all open milling systems. The discs are soft, homogeneous and easily milled. The strong oxide provides excellent metal to ceramic bonding. Importantly, the discs have high corrosion resistance and biocompatibility. In 2012, the company’s CAD/CAM disc on a titanium base, System Ti5-Blank (Grade IV), was launched.

The Adentatec team is always motivated to support their customers as best as they can. The company is represented at many dental exhibitions all over the world to keep in touch with customers and to introduce its products to prospective customers face to face. Adentatec seeks to establish a mutual relationship with its suppliers, customers and business partners.
One streamlined flow

Integrated and efficient treatment workflow gives clinicians and labs the option to connect.

Providing the best in dental treatment care is rarely a one-person show. Collaboration is often essential—and shared responsibilities can actually increase efficiency.

Nobel Biocare’s integrated and efficient treatment workflow connects the NobelClinician Software with the NobelProcera 2G System, NobelGuide and OsseoCare Pro, offering a straightforward process from diagnosis to restoration. The workflow even brings in dental labs using NobelProcera at the planning stage with new scanning capabilities that provide a full diagnostic view.

NobelConnect network, giving you the option to select only what you need for treatment success. Guided surgery is an option at any point during planning with no need for another patient visit.

Communicate convincingly

The visual nature of the digitised treatment plan using NobelClinician is very useful when explaining treatment proposals to patients.
With the NobelClinician Communicator iPad app, the treatment can be presented at the planning stage in a way that is quickly understood by patients and treatment partners alike.

**Predictable outcomes**

The workflow’s integrated approach makes it possible to achieve the functional and aesthetic outcome you planned, while avoiding potential surprises. You can also better estimate the full treatment cost in advance. 

*Editorial note: This article is a reprint from Nobel Biocare News Vol. 15, No.1, 2014 Nobel Biocare Services AG, 2014. All rights reserved. Nobel Biocare, the Nobel Biocare logo-type and all other trademarks are, if nothing else is stated or is evident from the context in a certain case, trademarks of Nobel Biocare. Product images are not necessarily to scale.*

*Disclaimer: Some products may not be regulatory cleared/released for sale in all markets. Please contact the local Nobel Biocare sales office for current product assortment and availability.*

Imagine being able to access your data or easily and securely share your treatment plan with colleagues and partners anywhere.

With NobelConnect, your planning information is securely stored and available in the office, at home or while traveling.

With less work and more predictable treatment, the new integrated workflow offers efficiencies that will help you grow.

**Contact**

Nobel Biocare
Balsberg
Balz-Zimmermann-Str. 7
8302 Kloten
Switzerland

www.nobelbiocare.com/workflow
2014

ADF Meeting
25–29 November 2014
Paris, France
www.adf.asso.fr

Great New York Dental Meeting
28 November–3 December 2014
New York, USA
www.gnydm.com

AAOMS Dental Implant Conference
4–6 December 2014
Chicago, USA
www.aaoms.org

2015

ICOI 2015 Winter Implant Symposium
22–24 January 2015
Orlando, USA
www.icoi.org

150th Midwinter Meeting
26–28 February 2015
Chicago, USA
www.cds.org

Annual Meeting of the American
Prosthodontic Society
26–27 February 2015
Chicago, USA
www.prostho.org

36th International Dental Show
10–14 March 2015
Cologne, Germany
www.ids-cologne.de

Academy of Osseointegration
30th Annual Meeting
14–12 March 2015
San Francisco, USA
www.osseo.org

IMAGINA DENTAL
4th 3D & CAD/CAM Digital Dentistry Congress
1–3 April 2015
Monaco
www.imaginadental.org

BIOHORIZONS Global Symposium
16–18 April 2015
Los Angeles, USA

EuroPerio 8
3–6 June 2015
London, UK
www.efp.org/europerto/
submission guidelines:

Please note that all the textual components of your submission must be combined into one MS Word document. Please do not submit multiple files for each of these items:

- the complete article;
- all the image (tables, charts, photographs, etc.) captions;
- the complete list of sources consulted; and
- the author or contact information (biographical sketch, mailing address, e-mail address, etc.).

In addition, images must not be embedded into the MS Word document. All images must be submitted separately, and details about such submission follow below under image requirements.

Text length

Article lengths can vary greatly—from 1,500 to 5,500 words—depending on the subject matter. Our approach is that if you need more or less words to do the topic justice, then please make the article as long or as short as necessary.

We can run an unusually long article in multiple parts, but this usually entails a topic for which each part can stand alone because it contains so much information.

In short, we do not want to limit you in terms of article length, so please use the word count above as a general guideline and if you have specific questions, please do not hesitate to contact us.

Text formatting

We also ask that you forego any special formatting beyond the use of italics and boldface. If you would like to emphasise certain words within the text, please only use italics (do not use underlining or a larger font size). Boldface is reserved for article headers. Please do not use underlining.

Please use single spacing and make sure that the text is left-justified. Please do not centre text on the page. Do not indent paragraphs, rather place a blank line between paragraphs. Please do not add tab stops.

Should you require a special layout, please let the word processing programme you are using help you do this formatting automatically. Similarly, should you need to make a list, or add footnotes or endnotes, please let the word processing programme do it for you automatically. There are menus in every programme that will enable you to do so. The fact is that no matter how carefully done, errors can creep in when you try to number footnotes yourself.

Any formatting contrary to stated above will require us to remove such formatting before layout, which is very time-consuming. Please consider this when formatting your document.

Image requirements

Please number images consecutively throughout the article by using a new number for each image. If it is imperative that certain images are grouped together, then use lowercase letters to designate these in a group (for example, 2a, 2b, 2c).

Please place image references in your article wherever they are appropriate, whether in the middle or at the end of a sentence. If you do not directly refer to the image, place the reference at the end of the sentence to which it relates enclosed within brackets and before the period.

In addition, please note:

- We require images in TIF or JPEG format.
- These images must be no smaller than 6 x 6 cm in size at 300 DPI.
- These image files must be no smaller than 80 KB in size (or they will print the size of a postage stamp!).

Larger image files are always better, and those approximately the size of 1 MB are best. Thus, do not size large image files down to meet our requirements but send us the largest files available.

(The larger the starting image is in terms of bytes, the more leeway the designer has for resizing the image in order to fill up more space should there be room available.)

Also, please remember that images must not be embedded into the body of the article submitted. Images must be submitted separately to the textual submission.

You may submit images via e-mail, via our FTP server or post a CD containing your images directly to us (please contact us for the mailing address, as this will depend upon the country from which you will be mailing).

Please also send us a head shot of yourself that is in accordance with the requirements stated above so that it can be printed with your article.

Abstracts

An abstract of your article is not required.

Author or contact information

The author’s contact information and a head shot of the author are included at the end of every article. Please note the exact information you would like to appear in this section and format it according to the requirements stated above. A short biographical sketch may precede the contact information if you provide us with the necessary information (60 words or less).

Questions?

Magda Wojtkiewicz (Managing Editor)
m.wojtkiewicz@dental-tribune.com
Gain direct access to unrivaled products.

Be more efficient in your work with the new NobelProcera 2G Scanner. Ultimate precision enables you to process even advanced cases with confidence.

Learn more nobelbiocare.com/2G
Planmeca PlanScan®

The ultimate scanning experience

- The world’s first dental unit integrated intraoral scanner
- Constant chairside access to live scanning data from Full HD tablet device
- Wireless foot control for hands-free operation

Find more info and your local dealer
www.planmeca.com