case report
Simple and efficient crown fabrication with an advanced CAD/CAM system

clinical technique
TRIPOD—A new protocol for immediate loading of complete implant-supported prostheses

practice management
Connectivity in the dental world
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I would like to encourage everyone—dentists, dental technicians and industry—to participate in this exchange.

Yours sincerely,

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Product Manager
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Immediate restoration in the fully edentulous maxilla region

This clinical case required optimal implant placement based upon a restoratively driven treatment plan and guided surgery. To achieve this goal, we made use of CT scans, SimPlant (Materialise Dental) planning software, the new Zimmer Guided Surgery Instrumentation and the new Immediate Smile model (Materialise Dental). The patient was a 49-year-old female in good health, completely edentulous in the maxilla and wore a complete upper denture. On the lower, she wore an implant-retained overdenture.

The planning phase for the case began with a CT scan utilising the i-Cat and the Dual Scan protocol (Materialise Dental). The patient’s existing denture was transformed into a scan prosthesis by gluing eight Dual Scan Markers onto the surface. A radiolucent bite index was made to secure the prosthesis in the correct position.

The patient was first scanned in the i-Cat 17–19 while wearing the scan prosthesis and the bite index. In a second scan, the scan prosthesis was scanned alone. The resulting CT data was loaded into SimPlant, and the scan prosthesis was superimposed upon the study using the SimPlant Dual Scan wizard (Figs. 1a & b).
Using SimPlant, the optimum implant positions were determined, based upon available bone, a minimum of 3 mm between implants, and the design of the final restoration (Figs. 2a & b). The resulting treatment plan was submitted to Materialise Dental for fabrication of a SurgiGuide and an Immediate Smile model.

I received the Immediate Smile model, which contained a duplicate of the scan prosthesis, a bone model with a silicone soft tissue, and a mucosa-supported SurgiGuide. The bone model came with eight openings corresponding to each of the eight implant positions as designed in the SimPlant plan and corresponding exactly in size to the dimensions of Zimmer analogues.

The bone model came with a screw fixation system, which allowed me to recover the analogues. The silicone soft tissue on the model also corresponded to realistic soft tissue. I also received written drilling instructions and a prolongation report detailing the depth and size of each osteotomy.

Zimmer analogues were placed in the Immediate Smile model (Fig. 3). The duplicate of the scan prosthesis was used to mount the bone model with the soft tissue on an articulator (Fig. 4), giving correct orientation and vertical dimension. This made it possible to fabricate a provisional that would be used for immediate loading following implant placement.

The mounted model was then used to create an orientation jig for the SurgiGuide (Fig. 5). The jig assured that the SurgiGuide was positioned in the mouth exactly the same way as the scan prosthesis had been positioned in the mouth. This is a very important step for a mucosa-supported SurgiGuide because of the flexibility of the soft tissue (mucosa). Both the duplicate of the prosthesis and SurgiGuide fit perfectly onto the Immediate Smile model, al-
The surgical guide was placed in the patient’s mouth, and the tissue was punched utilising a tissue punch (Figs. 6–8). Then, the surgical guide was again oriented in the patient’s mouth with the orientation jig created on the articulator and stabilised with three SurgiGuide fixation screws (Fig. 9). Utilising the Zimmer Guided Surgery Instrumentation and Guided Surgery drills, all eight osteotomies were created and completed using minimally invasive flapless surgery (Figs. 10 & 11). The Zimmer guide is a SAFE system, accurately providing for depth and size.

The right and left molar (teeth #3 and 14) osteotomies were created short of the maxillary sinus. Then, using the new Sinus Crestal Approach Kit (Zimmer), I extended these two osteotomies into the left and right maxillary sinuses. Alloplastic bone (Puros, Zimmer) was placed into the sinus cavity through the osteotomy and spread using the paddle-shaped spreading bur. Then, all eight implants were placed. Each had initial stability exceeding 35 Ncm.

I decided to immediately load only the six implants that did not involve the sinus cavity. Therefore, healing heads were placed on implants #3 and 14, and non-engaging titanium temporary cylinders were placed on #5, 6, 8, 9, 11 and 12 (Fig. 12). The provisional, which the laboratory fabricated, was attached to the titanium cylinders using cold cure acrylic, thus creating a screw-retained provisional (Figs. 13 & 14).

A post-operative CT scan showed how accurately the eight implants had been placed in the bone using a mucosa-supported SurgiGuide with orientation jig (made on the Immediate Smile model; Figs. 16a, b & 17). The accuracy and success of this case were achieved through CT scanning, SimPlant planning with restorative model overlay, the Zimmer Guided Surgery Instrumentation and the Immediate Smile model. The surgical guide allowed for minimally invasive surgery and greatly reduced surgery time. The Immediate Smile model also reduced chair time by allowing for fabrication of the temporaries well in advance of surgery. The final restoration for this case is a milled zirconia, screw retained appliance.

Acknowledgement
Laboratory procedures and photographs were provided by Dr Marcelo Silva.

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Simple and efficient crown fabrication with an advanced CAD/CAM system

Author: Dr Brian Buehler, USA

Unlike earlier generations of in-office systems that presented clinical challenges, today’s technology and materials are cost effective and efficient. Past systems lacked advanced software to control the tool path accurately and design a restoration, and inadequate scanning technology made it difficult to detect the delicate margins created during tooth preparation. The lack of advanced material sciences also contributed to a number of clinical challenges experienced with early CAD/CAM technology, and dentists struggled to properly seat CAD/CAM-processed restorations. To address the clinical challenges experienced with early CAD/CAM technology, manufacturers have developed systems that offer many advantages, including greater cost effectiveness, simplicity and efficiency.

The CEREC system

Amongst this new generation of CAD/CAM systems is CEREC (Sirona), which was developed to address many concerns dental professionals had regarding the set-up of conventional CAD/CAM software and machines. The milling chamber is now separated from the image capture and design hardware, allowing dental professionals to simultaneously design one restoration while milling another. With significantly higher speeds and greater memory, CEREC 3-D design software allows users to view tooth designs as they would if evaluating traditional stone models.

Today’s CEREC system includes a light-emitting diode (LED) camera (CEREC Bluecam, Sirona) for greater accuracy and higher quality images than previous infrared-emitting camera systems, and the recent addition of CEREC Connect (Sirona) allows impression and restoration information to be digitally acquired and transmitted over the Internet to dental laboratories. Laboratories can then fabricate restorations using the CEREC inLab System (Sirona).
The CEREC MC XL system (Sirona) is a powerful and accurate low-noise chairside CAD/CAM milling system that offers simplicity and efficiency for processing single-tooth restorations in six minutes and quadrant restorations in three to four minutes in a single appointment.1-3

The CEREC MC XL demonstrates precision and accuracy within the range of +/- 25 µ and the 7.5 µ milling resolution creates restorations with improved fit and smoother surfaces.1-3 Additional features include automatic software downloads, simple display guides and network connectivity, and the milling chamber design enables easy block clamping without tools.1-3

**Material considerations**

To address CAD/CAM material concerns, manufacturers have developed new ceramic materials that provide improved strength and aesthetics.5 These newer ceramics withstand CAD/CAM processing without chipping or fracturing and can be brought to full contour during milling to improve fit and function.5 Dentists can choose adhesive bonding or conventional cementation when seating these restorations, which ensures that case requirements are met.5 Improvements to cementation and adhesive systems have also enabled dentists to provide a strong bond between the restoration and underlying tooth substrates.1,4

**IPS e.max CAD**

Composed of 70% by volume needle-like crystals in a glassy matrix, lithium disilicate glass-ceramic (IPS e.max, Ivoclar Vivadent) offers many improvements to previous generations of ceramic materials.5 Available in a pressable format (IPS e.max Press) or for CAD processing (IPS e.max CAD), the material demonstrates strength values between 360 (Press) and 400 MPa (CAD).8 IPS e.max also demonstrates lifelike optical qualities that enable dentists to create highly aesthetic and naturally appearing restorations in a variety of cases.6 The versatile material is indicated for anterior and posterior restorations, including thin veneers (0.3 mm), minimally invasive inlays and onlays, partial crowns and crowns, implant superstructures, three-unit anterior/ premolar bridges (press only), and three-unit bridges (zirconium-oxide-supported IPS e.max CAD only).6

**Case presentation**

A 53-year-old male patient presented after undergoing recent endodontic treatment on tooth #13 (Fig. 1) and was unhappy with the tooth’s appearance. Along with decay on the adjacent dentition, tobacco stains were also present because the patient was a smoker (Fig. 2). Although the patient requested that treatment be confined to only tooth #13, after a routine head, neck and oral cavity examination, the patient was informed of multiple treatment needs and advised that a comprehensive treatment plan should be started as soon as possible.

**Treatment plan**

The patient brought to the office the endodontic report from his other clinician, advising that a good prognosis was expected from his endodontic treat-
ment. Although the report did not detail the possible need for crown lengthening or gingivectomy procedures, these were areas of diagnostic concern in this case. However, biological width encroachment did not appear to be an issue during cleaning and probing.

To address the patient’s concern with the aesthetic appearance of tooth #13, high-translucency and high-strength, lithium disilicate glass-ceramic would be CAD/CAM processed into a crown. Milled to as thin as 300 µm axially, the lithium disilicate crown would instil a contact lens effect on the gingival–facial margin of tooth #13.

The crown would then be bonded in place with an adhesive that demonstrates high radiopacity to ensure that excess cement was not inadvertently left behind, specifically in the deep distal margin in this case. The adhesive bonding agent also ensured that cementation was predictable. When complete, the tooth would appear natural and indistinguishable from the surrounding dentition.

Clinical protocol

After thorough examination and prophylaxis, tooth #13 was prepared for restoration with a CAD/CAM (CEREC MC XL) processed lithium disilicate crown (IPS e.max CAD) and the temporary material removed. A specialised mouthpiece (Isolite, Isolite Systems) was placed intra- orally to ensure total isolation was achieved (Figs. 3 & 4).

Prior to scanning, the tooth #13 preparation, the surrounding dentition and the soft tissues were sprayed with a CAD/CAM powder (Fig. 5). The anatomical form of the dentition and soft tissues was then captured using an LED scanning unit (CEREC Bluecam). After scanning, 3-D software (CEREC 3D) was used to design the desired crown contours and occlusal relationships. A prefabricated high translucency lithium disilicate block (IPS e.max CAD) was then milled chairside (CEREC MC XL) into a crown for tooth #13 (Fig. 6). Lithium disilicate was the material of choice in this case because it demonstrates high strength and lifelike optical properties.

The crown was tried in the patient’s mouth over the tooth #13 preparation to evaluate fit, contour and anatomical harmony (Figs. 7 & 8). Upon confirmation of proper fit and function, the crown was removed, cleaned and dried. Stains were then placed on the crown surface to mimic the tobacco stains on the surrounding dentition. However, it was decided that cervical stains to mimic the decay on the natural dentition would not be placed. After staining, the lithium disilicate crown was crystallised and ready for immediate seating (Fig. 9). The specialised mouthpiece (Isolite) was repositioned in the mouth to isolate the tooth during cementation.

Dual-curing luting composite (Multilink Automix, Ivoclar Vivadent) was used to seat the crown. Indicated for use with metal, all-ceramic, metal-ceramic and composite restorations, the luting composite offers a strong hold on all surfaces and is available in transparent, yellow or opaque shades to ensure proper aesthetics are
achieved. Additionally, the cement does not need to be protected from ambient light during mixing and placement.

Prior to application, the primer liquids (Multilink A/B) were mixed in a 1:1 ratio. A micro-brush was used to apply and lightly scrub the primer mix on the preparation enamel and dentine for 15 seconds. The priming agent was allowed to set on the enamel and dentine for 30 seconds, after which time air was used to evaporate the primer solvents. Because the primer is self-curing, light-curing was unnecessary.

The luting composite (Multilink Automix) was extruded from the mixing tip and placed directly on the inner surfaces of the lithium disilicate crown (Fig. 10). The luting composite was placed carefully to ensure that all internal surfaces were fully covered. The lithium disilicate crown was then seated on tooth #13 and slight pressure applied (Fig. 11).

A micro-brush was utilised initially to remove excess cement from the interproximal spaces and cervical areas of the crown (Fig. 12). Further pressure was applied with dental forceps to ensure the crown remained seated in the proper position during initial clean-up (Fig. 13). While still applying pressure to the seated crown, excess cement between the interproximal areas of the crown and surrounding dentition was removed with dental floss (Fig. 14). After flossing, the crown was cured with an LED curing light (bluephase G2, Ivoclar Vivadent) on the buccal, mesial, lingual and distal surfaces (Fig. 15). The interproximal spaces were then flossed to ensure that all excess cement had been removed (Fig. 16).

Upon completion of the case, the CAD/CAM-processed lithium disilicate glass-ceramic crown cemented with the dual-curing luting composite demonstrated excellent fit, function and strength (Figs. 17–20). Additionally, a post-operative radiograph confirmed that all excess cement had been removed and excellent internal/marginal adaptation achieved (Fig. 21).

The patient was very pleased with the aesthetics of the crown, which appeared natural and indistinguishable from the surrounding dentition. Further, the patient was pleased that he did not have to return for another appointment because the chairside CAD/CAM system allowed the restoration to be scanned, designed, milled and seated in a single appointment.

**Conclusion**

I use the CEREC CAD/CAM system almost exclusively in my practice because patients appreciate the quality, immediacy and not having to return for additional appointments. Restorations milled with CEREC demonstrate the form and fit required for restoring even the most challenging cases. Patients also enjoy the high aesthetics and strength of lithium disilicate glass-ceramic IPS e.max that has been milled with CEREC.

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

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**about the author**

**Dr Brian Buehler** has been practising dentistry for more than 20 years. He received his DDS from the University of Southern California’s School of Dentistry in Los Angeles and his BA in Economics from the University of California, Los Angeles. Buehler has worked as a beta-tester for both Sirona and E4D. He still works as an advisor to Sirona in product development and placement.

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**Figs. 18–20**. The final restorative result demonstrates excellent fit, function and lifelike aesthetics. **Fig. 21**. The final radiograph confirms that proper internal and marginal adaptation has been achieved, along with complete removal of excess cement.
Researchers develop software to improve attachment for dental crowns

Between July 2009 and July 2010, 477,060 dental crown treatments were done in Sweden. Chalmers researchers calculated that the treatments cost more than US$258 million, of which a large proportion was paid from tax monies through dental health insurance. A crown manufactured in a laboratory costs around US$760.

When a treatment is necessary, dentists first have to grind down the patients’ teeth to which the crowns are to be attached. This is a handicraft job that is entirely dependent on the individual dentist’s eye and skill. However, according to the Swedish researchers, dentists will soon benefit from a computer program being developed at the initiative of Nobel Biocare, Swiss-based provider of innovative restorative and aesthetic dental solutions. The researchers are now planning to run clinical tests. "With our software, you can feed in the existing tooth’s measurements, done by laser scanning the tooth,” explained Chalmers researcher Evan Shellishear. "The software then calculates how much of that tooth should be ground down, and the output is a 3-D model of the optimal shape of the tooth. You also get a 3-D animation showing precise suggestions for manoeuvring the grinding tool in order..."
to achieve the objective without colliding with the teeth or mouth parts.

The software is based on advanced mathematical models and on state-of-the-art visualisation technology. The researchers have based their work on international guidelines on how teeth should be shaped before being fitted with dental crowns. The guidelines cover the ratios between the height and width of the tooth and the extent to which a layer needs to be ground down in order to leave enough space for the crown, for example.

The researchers report they have converted every guideline into an equation, dividing each tooth into 10,000 sections. From that, the software performs an optimisation, leaving as much of the tooth as possible. “Most dentists are very skilful, but no human being can achieve this sort of optimisation as efficiently as a computer program,” said Chalmers researcher and dentist Matts Andersson. “If the tooth does not have a good fit with the crown, bacteria can accumulate in the gaps, resulting in caries and loosening of the teeth. A bad fit can also lead to problems with the jaw joint—or to the dental crown simply falling off.”

According to the researchers, their new method should therefore reduce the risk of such problems. It would also shorten the time needed for treatment and save large amounts of money.

“I estimate that the treatment sessions would be 10 per cent shorter,” said Andersson. “That would result in savings of US$27 million per year. However, the biggest benefit would probably be an improvement in quality, increasing the life of the dental crowns and reducing the number of remakes.”

The researchers have also produced 3-D software that dental students can use for learning how to grind teeth. Currently, students have no access to simulation programs with defined objectives. “There are other simulation tools available but the main contribute of our simulator is that we have defined objectives i.e. the student can immediately see how close they get to the optimal result, and they know what to aim for,” Chalmers researcher Staffan Björkenstam told CAD/CAM.

The research into tooth grinding is based on methods originally produced for vehicle manufacturing and derived from automatic path planning for industrial robots, something that production researchers and mathematicians at Chalmers are working on jointly with the motor industry.

The project is a cross-disciplinary collaboration, financed by Nobel Biocare and VINNOVA, a Swedish government agency that administers state funding for research and development. The collaboration partners are the Department of Product and Production Development at Chalmers, the Fraunhofer-Chalmers Research Centre for Industrial Mathematics, and Nobel Biocare.

Editorial note: A 3-D animation demonstrating the precise manoeuvring of the grinding tool is available on www.dental-tribune.com/articles/content/id/6619 or simply scan the QR code with your smartphone.

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TRIPOD — A new protocol for immediate loading of complete implant-supported prostheses

Authors_ Dr Jean-Nicolas Hasson, Dr Jacques Hassid & Dominique Fricker, France

Immediate loading of complete maxillary implant-supported bridgework is an increasing request by patients who have high aesthetic and functional demands and attach great importance to a neat appearance and their self-image. Since 1977, positive results have been obtained in immediate loading, but these were limited to mandibular, bar-retained removable dentures. In 1997, Tarnow et al. published a study showing similar results for maxillary and mandibular full-arch, implant-supported bridgework, and, more recently, the focus has turned to the development of computer-based techniques for improved results.

Highly sophisticated technical tools such as NobelGuide (Nobel Biocare) and the SAFE SurgiGuide (Materialise Dental) have entered the market and related techniques such as All-on-4 (Nobel Biocare) are being promoted to help meet patients’ demands. All techniques are based on full maxillary bridgework with a screw-based retention. The screw-retained bridgework allows all procedures to be performed during the treatment, i.e. impression taking, bridge modification and repair for aesthetic or functional purposes.

Amongst the more challenging difficulties in carrying out such a therapy is implant positioning, especially for a single crown in the anterior region. Precise placement is essential in achieving good aesthetics, phonetics, function and cleanability. Most of the time, implant placement has to be within the limits of 0.5 mm (Fig. 1). Another factor to consider is the possible loss of alveolar bone after tooth extraction, leaving a minimal residual volume, and thereby increasing the difficulty of the procedure.

The positioning of implants depends on the guide’s positional accuracy in a definitive place at the time of the surgery and on the accuracy of the guide itself. In the case of NobelGuide, accurate positioning depends on the patient’s ability to bite reproducibly and precisely, with even gingival thickness and consistency, and assumes that bone shows a similar degree of hardness at different screw-retention sites. Unfortunately, as recently reviewed by Schneider et al. and de-tailed by Valente et al., the deviation between entry point and orientation consistently differs between the planned and actual position of the implants. This generally accounts for the results obtained by guides used in flapless surgery. Other failure factors may be related to poor cooling ability during the drilling procedure.

As cited above, inaccuracies may arise from the positioning of the guide or of the patient, or be related to the radiological technique itself. In the case of flap-
less surgery, the position of the guide is conditioned by the thickness and consistency of the underlying soft tissue, as well as the patient’s ability to bite precisely in a replicable manner. In addition, there is always some degree of patient movement during the CT scan, which can hardly be controlled, an in-accuracy termed a “mechanical artefact”. Of course, any study performed on cadavers or models cannot reproduce this particular radiological aspect.9,10

Other inaccuracies are related to the radiological equipment itself and include geometric, hardening and threshold artefacts. Geometric artefacts are related to the ability of software to reconstruct a 3-D space based on the serial addition of 2-D images that are filtered by the software.11,12 Hardening artefacts are due to the different densities of adjacent objects. An X-ray beam is composed of individual photons with a range of energies. As the beam passes through an object, it becomes stronger, that is, its mean energy increases because the lower-energy photons are absorbed more rapidly than higher-energy photons.13 The last significant artefact, the digital artefact, is due to the segmentation masks that are used to obtain volumes. In order to obtain a mask, an interval of radiodensity is defined by using the Hounsfield values at both ends of the tissue(s) under interest. By using this method, an area of lower or greater density can be discarded and missed in the final volume. This may be particularly true when digitally producing a surgical template based on hard or soft tissue. Finally, images produced by available techniques are too unreliable to be used directly for this type of treatment.

We propose a new protocol in this article with the aim of reducing inaccuracies in terms of reliability, aesthetics and function.

_TRIPOD:_

Description of a new clinical technique

Initially, a treatment plan is performed to evaluate a case adequately, propose alternate solutions and decide whether the patient is a suitable candidate for a fully implant-supported maxillary bridge. This requires a first assessment that includes a possible wax-up and a radiographic stent for visualising the crown position on the CT scan, as well as an evaluation of a potential need for bone- and soft-tissue augmentation procedures. Patients often present with their own cement-retained bridgework on natural teeth in place that, when adequate, may be used as a reference guide for implant placement. It is essential to evaluate the implant site in the maxillary bone precisely. In order to perform these measurements, a Positioning TRIPOD and a Computing TRIPOD need to be determined.

The term “Positioning TRIPOD” is used to denote the selected pre-existing three fixed points (Figs. 2a–c) in the mandible or maxilla, which can be based on:

- teeth that are sufficiently stable to support the surgical guide during surgery;
- implants placed in posterior areas;
- temporary mini-implants that will be removed at the end of surgery.
The choice of appropriate bases for the Positioning TRIPOD is critical for its accuracy. Owing to its compressibility, soft gingival tissue has to be avoided. Problems with remaining teeth may arise owing to advanced periodontal disease causing excessive mobility. In some cases, temporary mini-implants are used, but often the amount of maxillary residual bone is so reduced that these implants only interfere with definitive implant placement. Nevertheless, they may be useful when no other alternative is available. Anecdotal cases in which there is sufficient bone for temporary and definitive implants at the same time have been reported, but are rare. The best choice is to use posteriorly placed implants before inserting anterior implants. In this case, an extremely precise positioning is not required, since the large volume of the corresponding teeth provides some degree of freedom to the laboratory technician designing the prostheses. These posterior areas often require some bone reconstruction (such as sinus lift or onlay bone grafts), thereby prolonging time to loading. The corresponding implants will then ensure the most precise positioning not only for radiographic templates and surgical guides, but also for the occlusal guide and impression tray, since all these parts will be screw-connected to these previously placed and osseointegrated implants.

In order to transfer the planned implant position from the planning software to the surgical guide, a Computing TRIPOD is necessary. This Computing TRIPOD is made with three SKYplanX reference pins (bredent) placed on the radiographic template with the reference plate (Fig. 3a). The patient is scanned with the radiographic template fixed on the Positioning TRIPOD. The position of the standardised X-ray opaque reference pins is detected by the software, building the Computing TRIPOD (Fig. 3b), and used to calculate the implant coordinates (Fig. 4). This data is then set in the transfer table (Fig. 5a) to place the drill sleeves accordingly and transfer the radiographic template to a surgical guide (Fig. 5b).

Some days prior to the full-arch surgery, once an adequate TRIPOD has already been planned and initial implants placed, an initial impression (Fig. 6) will be taken for the model to prepare the impression tray, occlusal guide, surgical guide from the radiographic template, and the provisional prostheses. The surgical guides are produced in sterilisable resin with radiopaque sleeves (DéPlaque). Special attention is given to the impression tray that will extend to all maxillary surfaces, but room for the impression material is exclusively limited to the planned implant sites. They must be ready at the time of surgery.

On the day of the surgery, the practitioner begins by reducing all remaining crowns that would interfere with the surgical guide, which is then placed on teeth or preferably screwed onto previously placed implants, forming the Positioning TRIPOD (Fig. 7). A CT is performed to verify all drilling sites. If any modification has to be done, there is still time to adjust the drill sleeves to suitable positions and to re-sterilise the guide.

The next step is the transfer of the occlusion to the articulator. Usually an occlusion guide is engineered before surgery and screwed into a suitable position. It
is then adjusted and some silicone material is added to ensure a perfect bite (Fig. 8). The transfer is made to the articulator before starting surgery. It is sometimes possible to retain a molar with compromised prognosis until the definitive prosthesis is placed, thereby keeping a reference point of initial occlusion.

When all materials are sterile, surgery can be initiated under the usual conditions. The flap is raised, the remaining teeth planned for extraction are removed and the surgical guide is placed on teeth or screwed onto implants. Holes of 2.0 and 2.8 mm are drilled through the sleeves using the VECTOdrill (Thommen Medical) with a smaller tip fitting in and following the prepared drill hole. Control of the depth is visual, since depth marks on the drills can be easily seen on the facial aspect of the surgical guide. Speed and torque are according to the manufacturer’s instructions. Cooling is performed on the facial side (Fig. 9); the flap is maintained properly by the guide on the palatal side.

Once the drilling has been completed, the surgical guide is removed and the last step of implant site preparation is done using implant-specific drills, bone spreaders or piezosurgery inserts. The choice of the implant relies not only on the diameter, but also on the implant length and profile to achieve the best possible implant stability. Implants with advanced surface technology, providing additional security in the early healing phase such as the super-hydrophilic Thommen implant lines ELEMENT (cylindrical profile) and CONTACT (conical-cylindrical profile) with INICELL (Thommen Medical), are preferred. In order to perform immediate loading, the implant should be inserted with a minimum torque of 25 Ncm. If the bone provides poor primary stability, then a two-stage approach is required to ensure proper osseointegration before placing the prostheses. VARIOmulti abutments (Thommen Medical) are connected to the implants by selecting proper width, height and angulation. Next, impression copings are connected to the VARIOmulti abutments and bone-grafting material such as BioOss (Geistlich) is then spread on the facial bone in order to avoid facial bone resorption. All synthetic bone graft material is covered by a thin and long-lasting membrane such as BioGuide (Geistlich), and flaps are sutured with particular attention to ensuring wound closure.

The impression tray is connected to the initially placed implants and silicone material is injected into the tray around implant transfers where room has been allowed for the impression material (Fig. 10). Once the impression tray has been removed, protective caps are positioned on the VARIOmulti abutments in order to maintain gingival spacing during the last laboratory prosthetic phase. A panoramic X-ray is performed to ensure proper positioning of implants and abutments, and to ensure that no radiopaque sterile silicone material remains.
The maxillary plaster model is trimmed to leave space for abutment analogues and plaster is poured to fill this open space after the impression tray has been secured to the trimmed model (Fig. 11). The modified model simultaneously shows two parts: the first part corresponding to the initial impression and the other corresponding to the second impression (Fig. 12). The provisional prostheses are fitted to the model and occlusion is validated. When this laboratory phase is over, the protective caps are removed, and the prostheses are screwed into position (Figs. 13a & b). If done well, occlusal adjustments should be minimal, even perhaps none being required. Temporary caps on VARIOmulti are filled with temporary light-cured material to close the screw channel and the patient is advised to treat the temporary bridgeworks carefully.

Sutures are removed after ten days. Aesthetics is re-evaluated three months after surgery, before initiating the final prostheses, owing to subsequent loss of tissue volume. Additional temporary bridgework is often required to ensure that the final aesthetic will be adequate before proceeding with the definitive prostheses.

_Discussion_

There are multiple technical benefits of the TRIPOD procedure. Precision implant placement is achieved by removing positional and mechanical artefacts, particularly when the actual surgical guide is screwed onto stable implants. In other words, there is no movement evoked by a bite variation or tissue differences, and if the patient moves during the CT scan, the guide moves with the anatomical structures. However, there is no way to conquer geometric, hardening or digital artefacts. There is still room for a small degree (<1 mm) of freedom in implant placement and, if necessary, final correction can be done after the initial drilling with the 2.8 mm drill. This results in a maximum freedom of approximately 0.7 mm in diameter for a final implant site with a diameter of 3.5 mm. However, considering that the last drill at the centre is just half of this value, this freedom corresponds radially to 0.35 mm, providing an opportunity to adapt the implant site preparation to anatomical conditions slightly. This distance of 0.35 mm is sufficiently important to become particularly significant for leaving some buccal bone, but it is still sufficiently small to be handled by the dental technician for ideal prosthetic screw placement. Nevertheless, the initial implant placement cannot exceed this limit, which requires very precise initial drilling and an additional step to verify that the surgical guide is actually suitable for use.

Compared with flapless techniques, open flap surgery not only allows the visual capacity opportunity for controlling bone site preparation, but also retains precious keratinised tissue that is important for both marginal tissue stability and volume. The patient’s reaction to this procedure, with its associated pain and discomfort, still has to be examined in future studies.

Another benefit of this procedure is that sterility is maintained throughout the surgery, since all materials used can be sterilised, which is not the case with common guides such as NobelGuide or the SAFE SurgiGuide, which are both made of a stereolithic resin and are currently not capable of undergoing sterilisation. In addition, the precision of the procedure allows the impression tray to remain unmodified—and thus sterile—throughout the surgery.

Yong and Moy state that implant loss in their study was probably primarily related to the absence of proper cooling ability with NobelGuide use, since most of the late implant failures involved long implants in cases in which the guide was used directly at the gingival contact. Indeed, only the rear part of the drill (thus far from the tip) can be cooled efficiently, and this probably makes the cooling procedure ineffective. In contrast, during the TRIPOD procedure described, the guide is placed on the gingiva at the time of fabrication, leaving an open space for cooling at the time of the open flap surgery. In addition, the bone becomes visible, which allows the practitioner to visualise the depth marks of the drill right at the crestal ridge, making the instrumenta- tion less expensive and easier, as no special drill with mechanical depth limitation is required. Site preparation may be modified through piezoelectric bone surgery, since this device can grind bone on a particular wall from the previous drilling, in contrast to conventional drilling, which grinds all walls from the previous drilling, with a preference for softer tissue, which results in facial bone perforation. In some situations, one
might also consider changing from drills to bone spreaders; this would compact the surrounding bone and provide additional stability to the corresponding implant. Finally, the implant could be adapted to a recipient site by choosing an appropriate diameter, length and even profile (e.g. from conical to conical-cylindrical) once site preparation has almost been completed.

The previously placed implants provide not only useful precision to implant site preparation with the guide, but also essential stability to immediately loaded bridgework in an area where stability in the initial healing phase is probably vital to success. Most patients are already older, with a history of periodontitis, tooth loss and associated impaired medical conditions, and possibly reduced healing capacity. Therefore, it is of major interest to be able to assess the healing capacity by the stability of previously placed implants, before undertaking a full-arch maxillary bridge immediately loaded on implants, preferably with advanced surface technology. Most of the cases require some sort of bone grafting in the posterior area and this technique leaves time for initial healing before occlusal loading. In fact, some of the implants could be subjected to immediate loading, while others—the most critical in terms of bone volume availability and location—could be loaded according to a classical schedule. This should be considered when making a comparison with other procedures with surgical guides.

The INICELL surface of Thommen Medical implants showed more bone-to-implant contact and a higher removal torque at two weeks than unconditioned implants did. This aspect should be particularly useful in the early stages of healing and providing additional stability in this crucial phase. In addition, this company provides implants of various diameters, length and profiles to satisfy various implant site requirements and which provide the best possible stability.

**_Conclusion_**

The TRIPOD protocol is based on our latest clinical experience. It utilises CBCT and the vast developments of implant placement planning software and computer-guided implant dentistry. The efficiency of the technique must still be validated by analysis of implant survival in different clinical environments, specifically investigating adequate positioning between planned and final implant position, and the need to verify the surgical guide after the learning process has been completed. Finally, a study on patients’ satisfaction with the procedure in terms of pain and aesthetic outcome needs to be performed. We must still determine whether the benefits of open flap surgery in combination with surgical guides outweigh the related discomfort and pain for the patient: does this pose a major problem for patients, is the final aesthetics improved by preserving keratinised tissue, and does such a technique fulfil expectations, considering that bone volume loss is often difficult to limit in these areas?

The proposed TRIPOD procedure is certainly more labour intensive than current flapless guide systems, since a flap has to be raised and no definitive prosthesis is placed right after surgery. Nevertheless, it is also more versatile because maintaining or increasing bone volume is considered in the treatment plan and is adapted to the individual situations. The risk of failure is considerably reduced by connecting immediately placed implants to osseointegrated implants. Furthermore, this procedure allows use of the last millimetre, as typical cases show reduced bone volume and require the widest and longest implants within anatomical restrictions. Although knowledge and close collaboration with the laboratory technician are required, this procedure adds fundamental security and predictability for success, and can certainly be adapted to different practice situations and one-day procedures._

*Editorial note: A complete list of references is available from the publisher.*
We live in a time in which things are changing exponentially and the way that we go about doing business is drastically evolving. The Internet has become a major player in businesses that never thought that it could apply to them. Instead of battling the Internet with a long stick and keeping it out of the dental industry, it has always been our philosophy to leverage it in new and innovative ways that can be used to the advantage of health-care professionals worldwide.

After a lot of research and brainstorming, we discovered that the real reason that people are online and using products is because of a little thing called connectivity. Many people are online because it allows them to connect and engage with other people who have similar ideas, views or interests. We knew that our mission of serving as a communications and learning hub was lacking, as we were not serving every aspect of our clients’ needs in this area of dentistry. This led to a few feverish weeks of programming, writing and networking to bring you the latest suite in the ‘Hub’.

Introducing My Dental Buddies!

My Dental Buddies is a network of dental bloggers, community members and dentists, who can collaborate to provide information to the dental community at large. This free initiative is a social network that allows users to connect and engage with fellow dentists around the world! This is a huge opportunity to learn in a collaborative and innovative way to increase your efficiency and effectiveness in your own personal practice.

In one day, more than 100 million people signed onto Facebook. Twitter generated more than 300 million tweets. Approximately 3 million people ‘checked in’ to their current location and 35,000 hours of video was uploaded to YouTube. The Internet is an extremely busy place for all of that to happen in a single day!

You may ask why that is relevant to you. Fantastic, you say, more teenagers are uploading pictures of the
party they went to last night. You may be thinking that this massive amount of sharing has no more value than the latest episode of Jersey Shore. However, this is where you may benefit from a change in perspective! Although social media started as just that, a place to socialise, it has expanded into a massive enterprise that has since evolved into a realm with numerous applications for anyone in the world.

Let us take a few minutes to really dig into what social media is and why it can benefit YOU. Who cares about how it can benefit Lady Gaga or President Obama. I want to know how it can benefit ME in my life and why it is such a big deal.

Unfortunately, this time around our good friend Wikipedia let us down. Wikipedia defines ‘social media’ as “the use of web-based and mobile technologies to turn communication into interactive dialogue.” Okay, so that tells us the specifics of what social media does. It allows people to connect online. Well, that’s cool. E-mail did that. Why is social media so special?

Let us bring it down a peg and see if we can gain some further insight. "If you make customers unhappy in the physical world, they might each tell six friends. If you make customers unhappy on the Internet, they can each tell 6,000 friends," Jeff Bezos, CEO of amazon.com, said. WOAH, now that provides a lot of insight! Social media allows people to interact with thousands and thousands of people that they would not have access to otherwise. And they can tell them whatever they want. Uncensored. Fantastic!

So, social media allows people to say whatever they want online without being censored. Social media is a +1 for free speech. However, we still have not answered the question: what does that mean for you? Well, let us go down one step further with some specific examples. If your customers are telling 6,000 people that they are at the dentist and they are lovin’ it—that’s really good. If they are telling 6,000 people that your office is terrible—that’s not so good for you. Being part of the social network and getting involved in communication areas that your patients are in will give you an unprecedented look into your ‘online reputation’ and give you a chance to really see what your patients are saying.

So now we’re spying! Fantastic, just what you want to do in the health-care industry. The news industry recently tried that and the resulting News Corp and James Murdoch phone-hacking scandal has resulted in worldwide embarrassment for both the media industry and the governments in which those companies operated. However, there are more aspects of social media that are very beneficial to you, and not in a creepy kind of way. When people think of social media, their minds immediately jump to huge websites like Facebook and Twitter. While these websites embody the values of social media, they’re not the end-all and be-all of the social media landscape.

Social media is about connecting and collaborating online. Take a look at LinkedIn, tumblr, YouTube and the many other social media websites out there today. These are social media tools. These are social networks. These are YOUR networks. They are places where you can come to connect with fellow people, to collaborate and to LEARN. That is the most important part of all of this! Social media provides an extremely effective medium for active learning, participation and collaboration.

Social media is one major player on the Internet, but it is not the only way that the Internet is changing the dental industry. The Internet has a vast array of resources that are making our world faster paced, more dynamic and more thought-provoking. It is also changing the way that we compete and how we do business. The health-care industry has long been a profession in which competition is not considered
practice management world wide web

a large factor. Many individuals stayed with a healthcare professional for their entire lives and that was the end of it. Once again, the Internet has played a part in upsetting the status quo and changing the way that people view healthcare. Websites like WebMD.com and the online directories of healthcare professionals in different areas have opened up the possibility of competition where one did not exist before. Dentists and other healthcare professionals are starting to have to change the way that they do things in order to compete in this new marketplace.

One of the most important things that dentists do in their practice is selling. Now, this is not the way things have been done in the past. Many dentists still operate under the belief that patients come to them for health care, not to be sold to. However, let’s look at some of a dentist’s vocabulary in sales terms and see what happens:

- _diagnosis:_ which product will work best for the patient
- _case options:_ pitching
- _case acceptance:_ making the sale
- _treatment:_ delivery of product.

Are you still as convinced that sales do not exist in the dental industry? The Internet is responsible for a huge number of changes in the dental industry and as a result health-care professionals are constantly having to be innovative in order to survive in a more competitive and dynamic workplace.

I stumbled across this cool article recently that talks about innovation in the workplace, a fascinating read and very applicable to the dental industry!

This is one area where dentists are currently lacking. It is so easy to fall into a set routine and not think about new or different ways to do things. I mean, why bother? Your practice is making money. Why do you need to be innovative?

Emily Ford, _The Sunday Times_, recently wrote an article on that very topic. Innovation is a huge new part of the dynamic connected world. People are constantly collaborating to come up with more and more innovative solutions to problems and it is important to keep up with this changing environment.

Ford suggested a few tips for innovating at work, which have been given a dental twist to make them especially applicable to your practice.

**Make innovation a priority**

Always look for new ways you can do things, new products you can use and new ways of interacting with your staff and patients. Not only will it make your days new and exciting, it will benefit your practice in the long run too!

**Take risks and embrace failure**

If you buy a new instrument and it does not work, what did you lose? A little bit of time and money? What would have happened if it worked? You may have saved a ton of time, made the quality of treatment increase and made a patient’s ordeal less painful. Do you think that it is worth it? I definitely do! By embracing failure, you can learn new things quickly, learn what works and what does not in your practice, and ultimately help your practice to succeed with the increased knowledge that you will have.
Eyes on the future

Think of it this way: when you know where you’re going, you can figure out the fastest and easiest way to get there. By planning ahead, you can spend time thinking of innovative and new ways of doing things that will make your future endeavours that much easier. By knowing where you’re going, you can constantly be on the lookout for things that will help you get there, making the whole process faster and more efficient.

Foster creativity at all levels

Encourage your staff to do the same as you! Ask them to be constantly thinking about ways they could change the way that they do things. Would something else work better than what they’re currently doing? Could they use a new tool to make their job easier? No one will know the answers to these questions better than them, so have them start thinking about it! Your staff are a huge resource in coming up with creative and innovative ideas in your practice.

Break the rules

Ask a ton of questions! Why do you do something a certain way? Has anyone ever tried doing it another way? We get so entrenched in our beliefs, habits and routines that over time we stop thinking about why we do things and just do them. Bring that back! Question the things you do everyday—ask yourself why you do them and whether there’s a better way. Chances are that you’ll find a few things that will make your practice a more productive and efficient place!

Collaborate across boundaries

Everyone has insights to share. Your receptionist or assistant may notice things that you do not. Get them involved in the process! Chances are that they have some great ideas of things that you could be doing in your practice that you are not. Using your staff effectively is one of the best things that you could do and by involving them in this process you are giving them ownership of the success of the practice and motivating them to make it better!

Innovating does not have to be a one-man show either. The Internet is connecting us in ways that we could not have even dreamed of in the past and it is important to be involved in every way that you can. Although the Internet provides both a valuable resource and fierce competition for your time and your professional career, it is not the only tool for collaboration and shared learning that is out there today.

Here is a new and interesting thought: why don’t you ask your employees for their ideas? Your employees may have a ton of cool and innovative ideas for ways that you could make your practice more efficient and effective. However, they are probably not telling you these ideas! Why not? Well, for starters, you never asked! Many people won’t share their opinions about some things (especially business) because they are scared that they will seem like they do not know what they are talking about. No one likes that feeling!! If your employees know that their ideas are welcome you will probably find them flooding in!

What does this all boil down to? It comes down to connectivity and collaboration. That’s it. Those two simple words are what the future of the dental industry (and every other industry) is going to come down to. The ability to collaborate with other like-minded individuals, share ideas, innovate and ultimately create a better working system are what the Internet, social media and connective sites are all about.

This is what we are about at My Dental Buddies. My Dental Buddies is a connective website for you, for dentists, staff and other health-care professionals in the dental industry. We recognise the importance of collaborating socially and innovating together and want to bring that to you. It is a portal, a blank slate that the users of the site can fill with whatever content they feel is important to them. That is the beauty of the uncensored Internet; whatever is most important to the largest number of people is what gets talked about. We strive to leverage the Internet to make your dental practice the best that it can be. Please help us to do the same!

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

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Exit planning has traditionally been a fairly simple task for dentists. The choices a dentist faced were either winding down the number of days worked, thereby gradually easing into retirement, or working until three to six months before wanting to stop, and then advertising the practice for sale. After negotiations with the buyer, dentists would sell and walk away—much like a house sale. Sometimes there would be a good handover of patients and staff, and sometimes this process would be less than ideal.

More recently, other options for exit planning have become available for practice owners. Over the last three to four years, for example, many dentists in Australia having sold their practices stayed on to work as employee dentists for the new owner. This model in particular has increased in popularity recently with corporate entities often being the buyer. Another model is deferred sale/employee with view, whereby a new dentist (Dr Junior) works for a year as an employee for Dr Senior. If all goes well, a contract is signed for the purchase of half (or even all)
the practice in some years hence. The employed dentist continues to work as an associate, and the transaction is settled after the agreed time. This technique assures Dr Senior both a buyer and extra income from Dr Junior during the years as an employee. Through the incremental percentage technique, after a similar trial period, the practice contracts are exchanged and incrementally each year a further percentage of the practice changes hands from Dr Senior to Dr Junior.

In each case, after the practice is sold, the ex-owner commonly takes the money he made from the sale, goes on a holiday and then invests whatever is left in real estate or the stock market to fund his retirement. For a practice here in Australia grossing say AUS$800,000 per year, if sold on the open market could bring up to AUS$500,000. If that entire sum were used to purchase a residential investment property, one would be lucky to net more than AUS$30,000 per year, and probably less, to fund retirement.

Another way to exit plan and fund a dentist’s retirement is to establish the passive income practice, also known as the “never sell concept”. Using this method, the practice is set up in such a way as to be self-managed, with little effort (1 day/month) needed from the owner when the practice is mature. The profit from the practice can be as high as 30% after payment of all normal expenses and clinicians’ wages.

If maintained as a going concern and run properly, there is no reason to expect a return from the AUS$800,000 grossing practice of less than AUS$200,000 p.a. (and still maintain an asset worth at least AUS$500,000).

Obviously, for this option to work, the practice and the staff need to be trained to be self-managed and to provide a certain level of service and communication. Basically, they would need to have a deep knowledge and understanding of the systems needed to run a practice.

Some degree (the more, the better) of management, leadership and business skills is also required by the owner, including the ability to look at and analyse the right numbers or to motivate key staff members to manage the practice and outperform through the judicious use of incentives, including well-designed bonus systems. As the owner dentist is no longer present full-time in the passive income practice, there also needs to be regular training in communication and the provision of service, i.e. clinical training.

There definitely needs to be more than one clinician. Rarely is there sufficient profit over and above the employee dentist’s wage (40% after lab) to warrant running the practice as a business with such a small staff.

There are plenty of horror stories out there, especially after the global financial crisis, of retired dentists needing to return to practice because the practice sale did not fund their retirement the way they expected it to. The never sell concept represents a new way of looking at the asset that is your practice and how it can bring you returns long after your clinical career comes to an end.

**About the Author**

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If you are smart enough to be a dentist, you are smart enough to be interesting

Author: Dr Paul Homoly, USA

Have you ever imagined yourself a leader in advancing digital restorative dentistry to our profession? When you attend seminars and listen to speakers, do you ever think, “I can do that?” Considering the surge of interest in digital dentistry and the technology advances happening every day, if you are ready to get up in front of an audience, lead a study club, or teach/mentor one-on-one, there is no better time than now to get started.

The Sirona Speakers’ Academy

In December 2010, I partnered with Sirona Dental Systems to host the Sirona Speakers’ Academy, a speaker-development programme created to advance digital, restorative dentistry and digital imaging. Speakers, experienced and inexperienced alike, attend a three-day workshop to learn the structure and delivery of presentations that encourage listeners to take the next steps to bringing digital restorative dentistry into their practices.

The academy’s curriculum is based on the successful principles of influence I have taught for the last two decades. Here, in a nutshell, is an explanation of the way to speak in order to influence your listeners to take action. The examples that follow are for speaking to an audience. However, they also apply to one-on-one conversations with patients, staff, friends and family.

It pays to be interesting

I usually do not watch reality television shows. If I happen to catch a bit of one while channel surfing (…frenzied contestants racing across the wilderness…) I get irritated and think, “Don’t these people have jobs?”

That was my thought when I accidentally caught the finale of 2008’s American Idol. I was about to flip to the Golf Channel when David Cook, the winner of that year’s competition, glided up to the microphone, surged into his farewell anthem and in a heartbeat made it impossible for me to change the channel. So I flopped down on the couch and took my surround-sound volume way up to marvel at it all. As David crescendoed into his final verse a blizzard of confetti showered down. I can easily imagine thousands upon thousands of television audience viewers simultaneously rising up to cheer him on and if it were not for my cat sitting on my lap, I would have been on my feet, too!

When it was over, I switched to the Golf Channel and turned the sound off (no need for a commentator saying someone missed a putt). In the trance-inducing qualities of watching golf, my thoughts return to American Idol. What is it about David Cook, a 25-year-old bartender, that earns him a roaring, standing ovation? How is it that a singing bartender can grip the attention of thousands when you and I have seen leading dental experts speaking at major meetings lose their audience’s interest seconds after they begin to speak?

It happens to us, too. Think about the times when we are speaking to patients about important dental health issues and you cannot help but notice that...
far-away look in their eyes. I came away from that evening of watching American Idol with sharper clarity regarding our careers. It is time for us to change our tune and learn what entertainers build on from day one—it pays to be interesting. If we are smart enough to be dentists, we are smart enough to be interesting.

Get interesting

Listener interest typically is at its peak at the beginning and the end of your talk, with a slump in listener attention in between. This chart shows a typical listener pattern (Fig. 1). Let us say you are presenting a 45-minute talk to a study club. Count on listener attention slumping a few minutes into your talk.

Here is why a listener’s attention slumps:
- They have a lot on their minds.
- They think much faster than we talk.
- The time of day invites slumping.
- They make poor food choices.
- They are in the habit of multi-tasking.

The key to becoming an effective leader/speaker is the ability to create peaks of interest, breaking listeners out of their slumps. Your timing creates peaks of interest with relevant content, in other words, get interesting right before you get relevant. I call it “peak, then point”—peak their interest, then make your point (Fig. 2).

You decide what is relevant based on your experience. This requires much clarity on your part. Too many speakers think that everything is important. It is not. There are many ways to create peaks of interest: humour, storytelling, vocal variety, movement, metaphors and visual aids. The crux of this? Becoming interesting makes you more influential because what you are saying sinks in. Why? Because your listeners are paying attention to you while you are saying it.

Being interesting is the first prerequisite to being influential. Too many dental speakers think their expert content is enough to hold listeners’ attention. You and I know it is not true. Our profession selects its members on our cognitive abilities, not our personalities. Consequently, I know many highly knowledgeable but uninteresting dentists.

Most dentists are really good at following a process. Give us a cookbook and we can make things happen. Here is the cookbook for creating peaks of interest—it is called the Leader’s Pyramid (Fig. 3).

Think of this process as if it is a pyramid with four distinct layers. Each layer represents a specific aspect of the listener’s experience. You build listener interest in the direction of the arrow, starting with connection and ending with content.

The first layer of the Leader’s Pyramid is connection. Connection is when the listener feels he or she is having a personal experience with you. Another word for connection is relationship. The next layer is movement. Movement gives the listener a sense of your confidence. The third layer is dynamics. Dynamics is the sound of your voice that enables your listeners to feel your energy/emotion. The top layer is content. Content is the intellectual value of your talk that creates logical appeal.

Creating peaks of interest

Creating peaks of interest is the heart of being influential. Some speakers have it in their personalities; they are naturally interesting to listen to. For most
Connection

At the base of the pyramid is connection, the most fundamental aspect to creating peaks of attention (Fig. 4). Connection is when the listener feels he or she is having a personal relationship with you. When a listener feels you are connecting with him or her, his or her attention naturally peaks. There are two ways to connect with listeners: eye connection and disclosure.

Punctuated eye connection

Let us start by discussing punctuated eye connection when speaking to a group. Punctuated eye connection is a process where your eye contact with your listeners is linked to the punctuation of your sentence structure. Eye contact is held with an individual listener through an entire thought. It might be a few sentences or an entire paragraph. Then, when the thought is complete, change eye contact to another listener at the punctuation mark: a period, a comma, colon or semi-colon, or a new paragraph.

Too many speakers do not link their eye contact with their thought structure. They spray their eye contact around the room, never making meaningful connection. This distances the speakers from their listeners, thereby minimising the speakers’ influence.

Disclosure

Disclosure is the experience of the listener when he or she discovers a bit of who you are aside from your role as an expert. Disclosure reveals your secondary roles, husband, wife, son, daughter, golfer, hobbies, family, cat lover or Chicago Bears fan. The truth is that you and your listeners are more alike than different. Revealing your sameness is engaging and highly interesting to listeners.

You usually have more in common with listeners in your secondary roles than your primary role. It is the "in-common" bit that listeners feel, creating the positive experience of connection. Consequently, listeners frequently find experts more interesting in their secondary roles than in their primary role.

Looking at the "in-common" experience a little more closely, why do listeners find an expert’s secondary roles so interesting? Because it is in these roles the listener can see a bit of himself or herself, and seeing oneself is always interesting. Seeing oneself in an expert leads to some remarkable outcomes. From the listener’s point of view, seeing himself or herself in the speaker/expert boosts the believability of the expert—seeing leads to believing.

Disclosure and storytelling

Story telling is the most powerful technique of disclosure. Stories offer the most complete way for listeners to learn who you are beyond your primary role. Here is a good example:

Sometimes during workshops I tell a simple story about spending a week at a professional water-ski school, the Benzel Ski Center in Groveland, Florida. It is run by Dave Benzel (six-time world champion) and his wife Cindy (three-time world champion). During the story, I mention that we skied all week being yanked around by muscular, Master Craft competition ski boats on slick ski ponds. The point of the story is how Dave Benzel thinks about winning—"make winning a familiar experience".

During a break after telling this story, a woman attendee approaches, throws her arms around me, hugs me hard and says with weepy eyes, "Oh Dr Homoly, I just loved your water-ski story!' "What did you like about it?" I asked. It is always a good practice to learn why someone likes you. "Master Crafts! You skied behind Master Crafts", she cried. "My brother..."
worked for Master Craft and he just died of leukaemia.” She went on to tell me all about her brother and how much she loved him.

My point here is that you never know what listeners will connect to from your disclosure. My water-ski story is about Dave Benzel’s philosophy about winning, but for her it was about her brother. This is the delicious mystery of not knowing where our influence resides within our disclosure; listeners are selective about what they are influenced by. Because of one, small detail within my story—Master Craft—this woman became my biggest fan.

You tell a story that is meaningful to you and in that story exists a hundred different opportunities for listeners to latch onto something that is meaningful to them. Disclosure is what people are really hungry for and is at the heart of what leverages your ability to be interesting and influential. The stories you tell shape your image in the listeners’ minds, so it is crucial to be strategic and purposeful about the stories you share. You may be like many of the experts I work with who tell me, “I do not have any really good stories to tell.” Yes you do!

Discovering your stories is a matter of imagination and the right coaching. Here’s a quick, six-step process of discovering your story to get you started:

1. Pull together those items that have documented your past, like photo albums, day timers, Outlook calendars, diaries.
2. As you look through your past events, think of the places and people associated with those events that had an impact on you, for better or worse.
3. Think back to those places and people and answer this question: “How did this place and/or these people change me or someone else?”
4. As you answer this question your story emerges. Great disclosure stories are about what we have learned in life, how we learned it and how it has changed us.
5. Do not think your disclosure story(ies) must have an intriguing plot. Plot-centred stories tend to get too long and do not work well for the purpose of disclosure. Think of your disclosure story(ies) as simple memories. Focus more on the people in your story and how the event changed you.
6. Also, do not think your story has to be heroic (“I lost both arms saving orphans from napalm in Vietnam.”), stupendous (“After I came back from Climbing Mount Everest I won Wimbledon.”), or tragic (“... and my fiancé died in my arms at the altar on our wedding day.”). You will be amazed how simple, well-told memories resonate.

Movement

Movement is the second level of the Leader’s Pyramid. It signals confidence, which helps earn attention (Fig. 5). If your movement signals a lack of confidence or sends a mixed message, listeners may be reluctant to act and/or will not pay attention.

Movement is what you do with your body while speaking. Movement includes walking left and right, advancing and retreating, leaping/squatting and body posture. I am not including facial expressions, rotations and hand/arm gestures as movement.

Sources of Energy Listeners Experience

The roles of movement

Movement plays several roles in creating peaks of interest; it
- signals your confidence to the listener;
- adds emphasis to specific content;
- creates authenticity during narratives (stories and memories);
- signals transitions between logical and emotional domains;
- boosts the listener’s experience of connection.

Movement and energy

Movement is one of the things that will hurt you more than help you. When it is done correctly, movement will not make a bad talk good, but done incorrectly it can make an otherwise good talk BOMB! It pays to keep movement under control—less is more. Consequently (and ironically), the most important aspect of powerful movement is knowing the way to stand and deliver with minimal movement.

Minimal movement means not pacing back and forth or advancing and retreating (front to back movement). However, even though I am advocating minimal movement, I will endorse liberal gestures,
rotations and facial expressions. Think conservative movement and liberal gestures.

There are three sources of energy within your delivery that the listener experiences as you speak. These sources are movement, gestures and dynamics (the energy of your voice; Fig. 6). You are your most interesting self when listeners experience the highest energy first from your dynamics, then from your gestures and the least from your movement. Think high-energy voice, medium-energy gestures and low-energy movement.

Dynamics

It is a perfect spring morning. You are up just after dawn. You have all day to yourself; no appointments, no patients, no staff, and best of all you are out of cell phone range—one of the few remaining perks of business travel. You finish a hearty breakfast topping it off with a stout cup of coffee, check out of the hotel and toss your bag into the trunk. Now all buckled up in your rental car, you press the convertible top toggle switch and watch the roof disappear behind you. You punch the gas and charge out onto the road. Your tires chirp and you smile while revisiting those almost forgotten adolescent driving misdeeds. You keep your foot on the gas and within a few heart-beats you are 10 mph over the limit. You tap in the cruise control and your day has started.

You turn on the satellite radio—an oldies station—and that is when you hear it: the song you shared with your first love. Its melody splashes onto your heart, making you feel just like you did so many years ago. At first, you smile, then you sigh. As sweet as the memory is, it also brings lament for the many years that have slipped by too soon. Your love song plays on, setting off primal emotions that stir and dominate your present moment. Soon your sweet song is over. You drive on, your thoughts on the road ahead—yet your day is suddenly better for your re-acquaintance with this old friend of a melody.

Do you see yourself in this story? Has there been a time that a song rekindled strong feelings from a memory? I bet there is. When I hear the song Just you and me by Chicago I get transported back to 1975 when I was ... Well, I will save that story for another time.

My point is that sound, not just songs and music, but sound moves us emotionally. What do you remember/feel when you hear wind and rain, a firecracker pop, or ambulance sirens, or the sounds of a carnival? I do not know what specific sounds move you, but I do know that there is one sound that all of us resonate to—the sound of a voice. The sound of a voice makes us feel—for better and worse. I save short, voicemail messages from my fiancée, Lisa, on my cellphone. When I am stuck in some airport terminal, tired and bitter at air travel, I will listen to an old “I love you” voicemail. When Lisa leaves voicemail messages she sounds like a cartoon character and it brightens my moments.

Dynamics—the sound of your voice—brightens your listener’s moments.

Your voice is powerful

Use the power of your voice to enable audiences, patients and team members to feel your words and be stirred to action. Dynamics is the power of your voice. Dynamics occupies the third layer of the Leader's Pyramid and is a foundational skill that, like the processes of connection and movement, creates peaks of listener attention (Fig. 7).

Notice I introduce dynamics after connection and movement. Before you exert the power of your voice, ensure you have established a relationship through connection and signalled confidence through your movement. The benefits of dynamics—your energy—die on the vine in the absence of relationship and listener confidence.

Words are like coins, they have two sides. One side of a word is its definition and the way it shapes our thinking. The other side is the word’s power to evoke emotion, the way it makes us feel. Dynamics communicates the way we feel about our content to our listeners. The best speakers make people feel as the speaker feels—inspiring listeners to take action. Speaking is like music, except in speech there are narrower changes in pitch and no melody. Composers are intentional in the dynamic expression of every sound.

Dynamic distinction

How interesting would a song be if it had no dynamic distinctions, with few changes in pitch and an unchanging rhythm? Would you buy it? How inter-
Dynamic distinction is about creating contrasts, high volume, followed by low, quick-paced delivery, followed by slow, then your normal tone followed by a regional accent. Contrasts create interest. Contrasts are a good thing.

Your goal is to create dynamic distinctions around the key points of your talk, making them stand out, thereby influencing your listeners. Remember the peak then point process? It is about re-earning listeners' attention just before you make a critical content point: peak their interest, then make your point. Using dynamic distinctions is one of the best tools to peak listener interest right before you make your key point.

The power of the pause

An important aspect of creating dynamic distinctions is the smart use of silence, the pause. The pause serves three purposes; it:
- boosts the effect of other dynamic elements;
- allows your key content to sink in; and
- compels Blackberry addicts to pick up their heads!

Pauses are power boosters to other dynamic elements. I hesitate to use the label pause because of the inference that silence creates an interruption in the energy, emotion, or connection between listener and speaker. In fact, the opposite is true. A well-placed pause amplifies the energy and emotions of dynamics.

Because pauses are the absence of sound, they automatically contrast with all speech sounds. Remember, contrasts create interest. Listeners are influenced during your silence, they make decisions during your silence and they learn and feel during your silence.

Speak the way you feel

So how do you learn to speak with dynamic distinctions that help "both sides of the coin" work? It is easy, sound the way you feel.

Emotions are contagious. If you are authentically excited, aggravated, happy or sad, your listeners will feel it. If you want your listeners to feel your words, you must feel them as you speak them. This is not acting; this is the real thing.

Speaking the way we feel comes naturally to most people. Unfortunately, many dentists have been educated out of being natural. Our 'professional education' makes many of us knowledgeable but uninteresting. However, if you are like most dentists, you can follow a process well. Figure 8 shows a chart that can help you bring dynamic expression to your words, helping your listener to feel as you do.

List your key content points in the left column. Then, in the right column, imagine the way you want your listeners to feel, point by point. The way you want your listeners to feel is the way you need to feel when you deliver the point. If you feel it, your voice will signal the way you feel; you do not have to think about it.

Get started

Digital impressioning, CAD/CAM technology and imaging have come of age—it is no longer your father's technology. Plus, exciting new technologies added to an already successful digital, restorative world are happening every day. This surging interest in digital, restorative dentistry and imaging creates the opportunity for you to inform our profession of these developments. If you ever wanted to speak to groups of dentists and/or laboratory technicians at study clubs, associations and seminars, or if you are already a speaker and want to take your message to the next level, the Sirona Speakers' Academy can help make it happen. Visit www.SironaSpeakersAcademy.com or call +1 800 294 9370 and find out how to get started!_
The **Nordic masters of dentistry**

*Author: Daniel Zimmermann, Germany*

Planmeca president Heikki Kyöstila demonstrating a panel controlling the new automated warehouse. (Photos courtesy of Planmeca, Finland)

_Being a socially responsible company with a clear vision is one thing. Being at the top of the trade for more than 40 years is another. The Finnish dental manufacturer Planmeca is both. Established in the early 1970s, when computer technology promised to open a new world in industrial design, the company was the first to incorporate microprocessors in its dental units. Since then, this idea has spawned a new age for dental technology equipment and has set the standard for a whole industry for decades to come._

Owing to this fact, one might reduce Planmeca’s expertise only to dental units, like the slick and ergonomic Compact i or their flagship product, Sovereign. But over the years the company has also regularly launched a number of sophisticated dental X-ray devices and imaging software onto the market that have become household names not only in dental practices worldwide, but also in rather unlikely places like US military bases. Overall, the Planmeca Group with its six affiliates generates a turnover of €700 million worldwide (according to own estimates), a number that puts them easily on par with other dental industry giants like Sirona Dental Systems or KaVo.

It may seem unusual that all this success happened to be and is still generated from a rather unremarkable site in Herttoniemi, an old industrial district 10 kilometres east of Helsinki’s city centre. There, the company recently completed the expansion of its premises by more than one third to almost 50,000 square metres, an area so large that it could now accommodate more than seven football fields. Besides administrative offices, the new shiny glass façade that reflects the Nordic blue sky on sunny days hides buzzing production facilities and a fully automated warehouse with robotic forklifts on the ground level.

“Planning the building started only in April last year, and despite the extremely rough winter conditions, construction stayed on schedule,” said Heikki Kyöstila, President and owner, looking back on the last 18 months. “With the new production premises, we can respond to the increased demand more effectively.”

The 65-year-old Finn and hobby golfer, who founded Planmeca in 1971 as a small-scale import business and has remained its president and that of its medical device subsidiary Planmed ever since, envisions a bright future for his company, especially in view of the number of new products launched at the International Dental Show in Cologne, Germany, this year. The centrepiece of this recent market initiative is its Digital Perfection Integration concept, which, according to Planmeca, offers a revolutionary means of combining data collected from different 3-D imaging devices to provide dental surgeons with more detailed clinical knowledge in the pre- operative phase.

Hardware-wise, dental professionals recently saw the launch of two new versions of Planmeca’s cone-beam volumetric tomography unit ProMax3D that now provides an extended selection of 3-D volume sizes, ranging from 34 x 42 mm to 16 x 16 cm,
and comes with an integrated 3-D face scan unit called ProFace, allowing clinicians to capture a realistic 3-D photo of the patient’s face both in standalone mode or in combination with a CBVT scan. According to the Vice-President of Digital Imaging, Helianna Puhlin-Nurminen, the system does not only reduce radiation exposure to patients, but also assures enhanced clinical and aesthetic outcomes.

In addition, intra-oral surface data can now be integrated into dental units with the new Planmeca PlanScan scanner, available as a cart delivery system and with open connectivity, which was designed to allow dentists to capture the complete intra-oral situation of a patient and save it as a 3-D model for immediate design without the need for fabricating a physical model.

All this is brought together in the Romexis software, which has recently been expanded with a stand-alone application for iPhone and iPad devices for clinicians to access and share 2-D and 3-D images via mobile networks worldwide. With the iRomexis application, for the first time dentists have also a free native application with true 3-D surface model rendering in the palm of their hands, the company said.

For Kyöstila, however, this is only the beginning of a new age in dentistry. According to him, it all comes down to his company’s solution-oriented thinking and passion to achieve and perfect work-flow for dental surgeries.

“We believe the best way to design cutting-edge products that really meet the needs of our customers is to listen to them closely,” he concluded.

“Observing and learning from their workflow helps us to understand the significance of the smallest details that can make a world of difference to the user.”

Outside view of the expanded premises with the large glass façade.

The new premises including the warehouse shown here are larger than seven football fields combined.

**_about the company_**

**Planmeca** products are currently exported to over 100 countries worldwide. Besides the company with the same name and Plandent, the Planmeca group comprises dental tool maker LM Instruments as well as Opus Systemer, a practice management software company, and Triangle Future Systems.

**Planmeca Oy**

Asentajankatu 6
00880 Helsinki
Finland

www.planmeca.com
CAMLOG Foundation has announced that the fourth International CAMLOG Congress will be hosted in Lucerne from 3 to 5 May 2012. The event will take place at the city’s architecturally impressive Culture and Congress Centre under the motto *Feel the pulse of science in the heart of Switzerland*.

Scientific and technical precision have long been synonymous with Switzerland. The country is not only unmatched in watch technology, but also at the forefront throughout the world in various other areas of technology. This includes medical technology, in which Switzerland is traditionally well represented—not the least by Basel-based CAMLOG Biotechnologies, parent company of the internationally successful CAMLOG Group.

The CAMLOG Foundation engages in targeted support of gifted young scientists, the promotion of basic and applied research, and continuing training and education to promote progress in implant dentistry and related fields in order to better serve the patient. As part of its scientific mission, the CAMLOG Foundation has assumed patronage of the International CAMLOG Congresses, which are held every two years.

During next year’s congress, many recognised speakers will present on a variety of scientific and technical topics with regard to state-of-the-art implant dentistry. Congress participants will have the opportunity to increase their academic knowledge on the one hand and to improve the clinical results in their daily practice on the other, the CAMLOG Foundation said.

CAMLOG will introduce international participants to the latest developments in implant dentistry in traditional Swiss surroundings and a most memorable ambiance. The city of Lucerne lies at the heart of Switzerland both topographically and emotionally.

Under the motto *Let’s rock the Alps!* the CAMLOG party will be held on the evening of 4 May, and, owing to an overwhelming demand, on the evening of 5 May. The popular event will be held at the unusual altitude of 1,600 metres above sea level, offering a sensational view of the Alps.

Participants can register now for the congress at www.camlogcongress.com.

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**CAMLOG Foundation**
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**CAD/CAM**

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col@bellacenter.dk, T +45 32 47 21 25

Travel information
Bella Center is located just a 10 minute taxi drive from Copenhagen Airport. A regional train runs from the airport to Orestad Station, only 15 minutes drive.

Check in at Bella Center’s newly built hotel
Bella Sky Comwell is Scandinavia’s largest design hotel. The hotel is an integral part of Bella Center and has direct access to Scandefa. Book your stay on www.bellasky.dk

www.scandefa.dk
Innovation Days at Sirona

Dental equipment dealers from all over Europe and Canada visited Sirona during the month of September. The dental industry’s technology leader had invited its distribution partners to attend three Innovation Days in Bensheim, Germany. In the presence of around 350 guests, Sirona inaugurated its newly built Center of Innovation and presented its new products. Each of these two-day events kicked off with a gala in the Center of Innovation’s foyer. Product presentations alternated with performances by a variety of renowned artists. The second day was devoted to a series of interactive workshops, at which the attendees were able to expand their knowledge of Sirona’s products and technologies.

The Innovation Day for guests from UK, Ireland and Scandinavian countries took place on 12 September. Terry Patuzzo, Sales Manager for the UK, Ireland and Iceland, demonstrated his talents as an entertainer as he guided the attendees through the gala programme. The German star chef Alexander Kunz impressed guests with an exquisite menu.

In his speech, Thomas Scherer, Vice-President of Sales in Europe and Canada, described the innovation process at Sirona: “We exploit the synergies between different technologies in order to develop new approaches—for example, integrated implantology, which combines the benefits of dental CAD/CAM and 3-D X-ray imaging. In order to exploit the potential for innovation we rely on the new Center of Innovation, where developers from all the various departments can work under one roof and exchange ideas. However, the resultant products would be impossible without our distribution partners. Our innovations are the outcome of their trust and belief in Sirona’s capabilities.”

All the divisional development departments are now housed in the Sirona Center of Innovation. The foyer provides the venue for a temporary exhibition that guides visitors through the development of Sirona’s latest technologies and products. Over the past six years, Sirona has invested more than US$250 million in R&D—equivalent to between 6 and 7 % of sales revenues. The company employs more than 230 engineers and scientists in the field of research and development.
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International Events

2012

AO Annual Meeting
1–3 March 2012
Phoenix, AZ, USA
www.osseo.org

Nobel Biocare Symposium 2012
21–23 March 2012
Gothenburg, Sweden
www.nobelbiocare.com

IDEM Singapore
20–22 April 2012
Singapore
www.idem-singapore.com

SCANDEFA
26–28 April 2012
Copenhagen, Denmark
www.scandefa.dk

ITI Congress Germany
27 & 28 April 2012
Cologne, Germany
www.itio.org

CAD/CAM & Computerized Dentistry
International Conference
3 & 4 May 2012
Dubai, UAE
www.cappmea.com

IACA
26–28 July 2012
Hollywood, FL, USA
www.theiaca.com

FDI Annual World Dental Congress
29 August–1 September 2012
Hong Kong, China
www.fdiworldental.org

AAID Annual Meeting
3–6 October 2012
Washington, DC, USA
www.aaid-implant.org

EAO
10–13 October 2012
Copenhagen, Denmark
www.eao.org/eao-congress

Greater New York Dental Meeting
23–28 November 2012
New York, NY, USA
www.gnydm.com

2013

International Dental Show
12–16 March 2013
Cologne, Germany
www.ids-cologne.de

FDI Annual World Dental Congress
29 August–1 September 2013
Seoul, Korea
www.fdiworldental.org
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.

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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.

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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).

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Questions?

Claudia Salwiczek (Managing Editor)
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