Ivoclar Vivadent hosts successful Competence in Esthetics symposium

By DTI

VIENNA, Austria: Digitalisation has changed the dental industry and new technologies have entered dental practices and laboratories faster than predicted. Following the dynamics of this development, dental manufacturer Ivoclar Vivadent highlighted this topic at its Competence in Esthetics symposium recently held in the Austrian capital of Vienna.

For the third time, Gerhard Schiller, Senior Director for Austria and Eastern Europe at Ivoclar Vivadent, and his team succeed in drawing participants from all over the world to the symposium. More than 36 countries registered for the event, which is traditionally hosted at the Austria Center Vienna conference venue. An additional 300 people joined as day visitors to attend the presentations of the 21 speakers.

Many speakers at the symposium were pioneers in terms of digitalisation and have used several generations of devices and technologies and shared their experiences via numerous clinical cases that they treated using either a fully or mixed digital approach.

What changed with the advent of CAD/CAM? What are the strengths and weaknesses of this technology? At the event, there was a general consensus that CAD/CAM is an intelligent tool rather than a solution in itself. That CAD/CAM facilitates day-to-day work and makes it easier for dentists and dental technicians to overcome the barriers of time and space was proven by a number of presenters who work as a team across different countries, among them Dr Stefan Koubi from France and dental technician Hilal Kuday from Turkey, as well as Dr Florin Cofar from Romania and dental technician Lotar Stumpf from Ireland.

At the symposium, new state-of-the-art software was introduced that in the future will allow users to see different versions of their restoration in a virtual mirror and modify it with a swapping motion, like on a smartphone. A demo version of the program is already available and was shown at the event.

At present, treatment teams may use mock-ups that are milled or printed to give their patients a clearer sense of what their prospective smiles may look like. Dr Irena Sailer and dental technician Vincent Pehmer presented a case in which they offered their patient three different mock-ups to try in a perfect aesthetic version, a version with a diastema and another one in which teeth #12 and 22 were rotated around their axes. These digitally prepared mock-ups facilitated the conversation with the patient and made it possible for her to choose her own prospective smile. The mock-up of her choice was then finalised using digital technology. “This is as easy as copy and paste,” said Pehmer.

Dental technicians can expand their digital library with every clinical case by storing scan data. Over time, this results in an extensive collection of tooth shapes that can be used in the planning of other cases. The Cofar–Stumpf team knows how to use the library to their advantage. Both team members have studied the dentition of many patients and have turned the basics of aesthetics upside down when it comes to shape and symmetry. Their result proves that the shape of the face does not always conform to the shape of the tooth and some asymmetry may be present—especially in the case of smiles that appear natural and beautiful. “It’s all about harmony and individuality and not about perfection in form and symmetry,” explained Cofar. When the team members use their library of nature in the digital planning process, they blend the anterior and posterior teeth of different cases. In the process, the teeth are scaled in size but never distorted, because that would affect the optical result adversely.

Especially for Ivoclar Vivadent events and lectures, the company developed the IV Events app. During the Competence in Esthetics 2017 symposium, the app provided information about the presentations and speakers, and allowed users to rate them using the star system used on social media. The app also gave participants the opportunity to pose questions to the presenters, and questions of broad interest were discussed on stage. The discussions were moderated by Dr Thomas Bernhart (scientific chairman of this year’s event) and Laurent Schenck (Senior Director of Global Communications and Strategy at Ivoclar Vivadent).

US dental software provider first to deliver voice-assisted ordering

By DTI

NEW YORK, USA: The next step in artificial intelligence advancement within dentistry could be just around the corner. Awrel, the dental software solution provider for web, mobile and voice platforms, has recently unveiled their Awrel Partner Portal. According to the company, this new technology enables dental supply companies and laboratories to supply their customers with intelligent, voice-guided ordering services for implants, supplies and equipment.

The capabilities of the new technology reportedly enable companies to extend their order processing capabilities beyond the current paper-, web- and mobile-based methods to environments that deliver next-generation, conversational voice experiences. Additionally, companies will be able to custom label their offerings, define unique workflows and create company- and product-specific conversational exchanges.

“We’re very pleased to be the first dental software provider to deliver voice-assisted, hands-free ordering,” said Dr Arnold Rosen, Awrel founder and CEO. “With this technology, dental care providers will see improved productivity and quality while suppliers and labs will accelerate their sales processes. This is a definite win-win.”

The system is designed so that the person placing the order can respond to product-specific prompts from a voice-powered agent or chat-bots. Each subsequent interaction follows an intelligent, protocol-based conversational flow. After the order is completed, it can be sent via message to the supplier or laboratory, or the system can be customised so that it can flow directly into an existing electronic ordering system.

“We soon realise that dentistry could logically benefit from next-gen voice assistants. This is a logical extension of our offerings,” said Rosen. “As a prosthodontist, my hands serve as the tools of my trade. I’d rather they be working to create a great smile than typing orders into a computer or cellphone. With voice technology, my hands are free to work and put my focus where it belongs—on the patient.”

Companies using Awrel’s voice capabilities can also provide their customers with Awrel’s ready-to-download texting and collaboration tool for HIPAA-compliant sharing, and the storage of messages, images, documents and scans.
Stay CALM! Planmeca algorithm improves imaging quality

By DTI

HELSINKI, Finland: Patient movement is among the most significant challenges to CBCT imaging, producing artefacts that can compromise the quality of the image.

According to Finnish manufacturer Planmeca, an end-user solution to this problem was in the company’s sights for some time and has now finally been addressed with Planmeca CALM.

The algorithm analyses and compensates for patients’ movement, eliminating the need for re-takes and thus improving the quality of and the time needed for imaging in dentistry. Recounting the development process of CALM (Correction Algorithm for Latent Movement), Planmeca 3-D imaging specialist Mikko Lilja explained the mechanism of the solution. "In tomographic reconstruction, the assumption is that the measurements—in this case the CBCT x-ray projection images—are geometrically consistent with one another, but when a patient moves, the data no longer adds up, which shows in the reconstruction."

To avoid these disruptions, Planmeca CALM restores the consistency of the X-ray measurements by tracking the movement of the patient. The algorithm works with all volume and voxel sizes and adds only between 10 and 60 seconds to the overall reconstruction time, the company stated. The function can be run either after the scan is complete or before exposure to ensure that the volumes are already corrected when they are accessed in the Planmeca Romexis software.

"In the past, dentists would send their unsatisfactory images to the manufacturer for reconstruction or just redo the entire scan, but with Planmeca CALM this is now a thing of the past. We are proud to be the first dental manufacturer to provide a solution for motion artefact correction to the end-user," Lilja said.

For dentists, the CALM feature is especially valuable when imaging restless or livelier patients, such as children, individuals with special needs or elderly patients. "Even in cases where you might not typically think there has been significant movement, Planmeca CALM can noticeably enhance the image and enable seeing more details," Lilja concluded.

Western Australia to change restrictive CBCT ownership regulations for dentists

By DTI

PERTH, Australia: CBCT imaging is changing the way dental practitioners can visualise the oral and maxillofacial complex, as well as teeth and the surrounding tissue. Despite being regarded as beneficial for practitioners and patients alike, owing to a restrictive licensing policy, the technology is only available to a minority of dental practitioners in Western Australia. However, this regulatory framework is set to change, according to the Australian Dental Industry Association (ADIA).

Although each state and territory takes a different regulatory approach to owning CBCT equipment, in terms of outcomes, there is broad alignment across all of them—with the exception of Western Australia.

"ADIA welcomes news that the Radiological Council of Western Australia looks set to remove the restrictions on CBCT ownership in that state," said ADIA CEO Troy Williams. "Owning and operating CBCT equipment in Western Australia is currently limited to dentists registered with the Australian Health Practitioner Regulation Agency (AHPRA) in the specialty of dentomaxillofacial radiology—a criterion that only very few dentists fulfill. In a senate committee hearing on 9 November, the ADIA CEO pointed out that, of the about 1,780 registered dentists in the state, almost none satisfy the requirement to own and operate CBCT equipment.

Once in force, the regulatory changes will allow AHPRA-registered dentists who have successfully completed a recognised CBCT course to be eligible for a licence to own and operate CBCT equipment. According to the ADIA release, the requisite courses are offered by the dental schools at the University of Queensland and the University of Adelaide and by a private provider.

"This outcome is entirely consistent with what ADIA has argued for over many years. It’s actually five years ago this month that ADIA met with the then Minister for Health to progress this reform and we’ve naturally discussed it in the past with the current Minister, Roger Cook," Williams commented.

It has not yet been announced when the new legislation will be put into force.
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Fixed and removable implant restorations: A solution for every arch

By Dr Paresh B. Patel, US

Introduction

When a patient presents with an edentulous arch or terminal dentition, implant treatment can be provided that improves not only form and function, but also quality of life. For patients desiring better masticatory capability, stability, aesthetics and comfort than a conventional denture can offer, both removable and fixed implant restorations are superior alternatives. While the appropriate implant solution can vary depending on the patient’s oral health, anatomy, quality and quantity of bone, and financial resources, full-arch prostheses have progressed to the point where virtually every patient can have his or her teeth restored.

Although fixed implant-supported restorations offer the highest levels of stability, function and patient satisfaction, removable overdentures also offer a dramatic improvement over conventional complete dentures. Both treatment options effectively mitigate the bone resorption that occurs after the loss of teeth, helping to preserve the oral and facial structures and, by extension, the self-confidence of the fully edentulous patient.

Determining which solution is appropriate requires a careful evaluation of the individual patient’s circumstances and desires. Even when an implant overdenture is delivered, the prosthesis can eventually be converted to a fixed restoration. As evidenced by the case that follows, in which one arch is restored with an implant overdenture and the other with a Brux-Zir Full-Arch Implant Prosthesis, practitioners today have a great deal of clinical flexibility.

Whatever prosthetic approach is adopted, immediate, life-changing relief can be provided to patients suffering from terminal dentition or an uncomfortable, poorly functioning conventional denture.
Case presentation

A 47-year-old male presented with terminal dentition in both arches resulting from periodontal disease and severe caries (Figs. 12–14). The patient had already lost many of his teeth, and the dentition that remained had been rendered unstable by his periodontal condition (Fig. 2). He had saved up enough money for a fixed implant restoration for his upper arch, for which he desired the most functional, lifelike prosthesis possible. While he could not afford such a restoration for both arches, he wanted a retentive appliance for his mandible, with the option of later upgrading to a fixed prosthesis.

The patient accepted a treatment plan in which his maxilla would be restored with a BruxZir Full-Arch Implant Prosthesis and his mandible with an Inclusive Locator Implant Overdenture. Fabricating his maxillary restoration from monolithic zirconia would ensure maximum long-term durability. This was important considering the relatively young age of the patient, who would not have to worry about his maxillary prosthesis succumbing to fractures, chips or stains. His mandibular appliance would be held in place by connecting to the implants via Locator attachments (Zest Dental Solutions), which are an economical means of improving prosthetic retention and stability. The overdenture caps that connect to the Locator attachments would be incorporated in the prosthesis chairside—though it should be noted that many clinicians elect to have the laboratory handle this step.

The surgical phase of treatment called for the extraction of the patient’s remaining teeth, followed by the immediate placement of eight dental implants. Cone beam computed tomography (CBCT) scans were taken to help determine the optimal placement of the implants within the available bone and away from the patient’s vital oral anatomy. Evaluation of the CBCT scan determined that there was sufficient height, width and quality of bone to place the implants in the appropriate locations and angulations via freehand surgery. Four ø 3.7 mm Inclusive Tapered Implants (Glidewell Direct) would be placed in each arch to support the fixed maxillary restoration and the removable mandibular prosthesis. At the surgical appointment, the patient’s remaining teeth were removed, and a flap was raised to visualise the socket sites and areas of implantation. Bone levelling was performed on the patient’s upper arch to elevate the patient’s smile transition line above the upper lip.

The maxillary ostomies were positioned to facilitate an all-on-4 configuration, with the posterior implants tilted to maximise the anterior–posterior spread, avoid the sinuses and accommodate the patient’s bone limitations (Fig. 3). Ostomies were created for the placement of four mandibular implants, as opposed to the minimum of two required for a Locator overdenture. This would enhance retention of the overdenture while affording the possibility of upgrading to a fixed restoration at a later time. After the creation of the ostomies, the implants were placed (Figs. 4a & b).

Fig. 6: Conventional dentures were fabricated in advance of the surgical appointment so that they could be immediately converted to serve as temporary appliances during the healing phase—Figs. 7a & b. Same-day conversion of the maxillary denture to an immediate fixed prosthesis was achieved by adding multi-unit temporary cylinders using self-curing acrylic and trimming the appliance into a horseshoe shape—Figs. 8a & b. Note the dramatic change in the appearance of the patient, who left with chairside-converted dentures in place on the same day as surgery, including a screw-retained fixed provisional for his upper arch—Fig. 9. Post-op panoramic radiograph illustrates an all-on-4 configuration of maxillary implants and axial placement of the mandibular implants, which would facilitate a passive fit of the mandibular overdenture—Figs. 10a & b. The patient returned 14 weeks after implant surgery, and healing of the peri-implant tissue had progressed nicely. —Fig. 11a-c. Transfer copings were attached to the maxillary multi-unit abutments, and an open-tray impression was made to serve as the basis for the working cast the laboratory would use to begin designing the restoration. Note that a closed-tray impression was taken for the mandibular implant overdenture—Figs. 12a & b. For the recording of jaw relations, a mandibular wax rim was designed to seat over the Locator attachments, while a screw-down wax rim was created for the maxilla—Figs. 13a & b: The maxillary wax rim was screwed into place through the temporary cylinders, while the mandibular wax rim was seated over the locator impression caps.
During the try-in appointment, the maxillary set-up included temporary cylinders so that the set-up could be attached to the implants during evaluation. The maxillary set-up included recess wells so that it could be seated over the locator attachments and soft tissue. — Figs. 16a–c. The maxillary and mandibular wax set-ups were tried in to evaluate fit, aesthetics, occlusion and function. — Figs. 17a–c. Individual sections of the implant verification jig were seated and locked together before being picked up in the open-tray final impression, which was made using a custom tray and Capture PVS material (Glydewell Direct) — Figs. 18a & b. The final mandibular implant overdenture was designed to seat over Locator attachment analogues situated in the mandibular cast. This would allow the overdenture caps that engage the Locator attachments to be picked up chairside. — Figs. 19a & b. CAD software was used to design the definitive prosthesis for the patient’s maxilla based on the final impression and approved wax set-up. Accu epilot was created in the precise positions needed for passive fit. — Figs. 20a & b. The provisional implant prosthesis was milled and seated on the master cast to verify proper fit, as well as the interocclusal relationship with the opposing implant overdenture.

Sufficient primary stability having been achieved, the Inclusive Tapered Implants placed in the patient’s maxilla could be immediately loaded. Thus, the maxillary tray was trimmed and modified chairside to connect to the multi-unit abutments through temporary cylinders (Figs. 7a & b). This would satisfy the patient’s desire to leave the surgical appointment with a fixed, fully functional maxillary prosthesis in place. Note that the two most distal molars were removed to minimise the cantilevers and the forces transmitted to the implants during osseointegration. Healing abutments were placed on the mandibular implants to begin developing the transmucosal passages.

The mandibular immediate denture was then modified and relined to seat over the implants during healing. This approach provided the patient with same-day temporary restorations, and he walked out of the office with properly functioning teeth for the first time in many years. The effect this had on the patient’s comfort, function and appearance was immediate and profound (Figs. 8a & b). The final radiograph taken after seating the temporary appliances confirmed excellent positioning of the implants (Fig. 9).

The patient returned after 14 weeks of healing for stability of the implants and health of the soft tissue to be evaluated. Removal of the temporary appliances revealed excellent tissue health around the healing abutments of the mandible and multi-unit abutments of the maxilla (Figs. 10a & b). Polyvinylsiloxane (PVS) impressions were taken to begin the restorative process (Figs. 11a–c). Because multi-unit abutments and healing abutments were placed on the day of surgery, the restorative process began above the tissue level, without any need for secondary surgery or anaesthesia. The restorative protocol for both prostheses included wax rims and set-ups, which the laboratory produced on the working casts fabricated from the impressions (Figs. 12a & b). The maxillary wax rim incorporated temporary cylinders through which screws could connect to the dental implants. The mandibular wax rim was designed to seat over Locator attachments. At the next appointment, the wax rims were seated, the jaw relationship was recorded using a conventional denture technique and a bite registration was taken (Figs. 13a & b). A PVS wash impression of the mandibular arch was also taken with the wax rims and Locator impression caps in place (Fig. 14). This would aid the laboratory in designing an overdenture that fully rests on the tissue instead of the implants. The case was returned to the laboratory, and wax set-ups were produced (Figs. 15a–c). During the try-in appointment, the wax set-ups were evaluated to confirm the vertical dimension of occlusion, interocclusal relationship, phonetics, aesthetics, malocclusion, arrangement of the teeth, tooth colour and shape, incisal edges and function (Figs. 16a–c).

After final approval of the wax set-ups, the restorative protocols for the two prostheses diverged, as the laboratory moved directly to the final implant overdenture from the approved wax set-up, while the process for the BruxZir Full Arch Implant Prosthesis included an implant verification jig, custom final impression and provisional implant prosthesis. These extra measures were taken to make absolutely certain that the definitive prosthetic design was accurate before milling the final restoration from monolithic zirconia. The implant verification jig was attached to the implants so that a precise final impression could be taken (Figs. 17a–c). The custom tray provided by the laboratory was filled with PVS material and seated over the implant verification jig. As the PVS material set, the relative positions of the implants represented by the verification jig remained fixed, ensuring an extremely accurate final impression.

The approved wax set-ups and final maxillary impression were returned to the laboratory so that the final mandibular implant overdenture and maxillary provisional implant prosthesis could be produced. The final mandibular appliance was fabricated on the master cast and included recess wells in which metal housings with overdenture caps would be cured chairside (Figs. 18a & b). These denture caps provide retention and stabilise the prosthesis during speech and masticatory functions for the patient’s mandible. The laboratory moved directly to the definitive implant prosthesis. These additional measures were taken to ensure that the definitive prosthetic design was accurate before milling the final restoration from monolithic zirconia. The implant verification jig was attached to the implants so that a precise final impression could be taken (Figs. 17a–c). The custom tray provided by the laboratory was filled with PVS material and seated over the implant verification jig. As the PVS material set, the relative positions of the implants represented by the verification jig remained fixed, ensuring an extremely accurate final impression.

The approved wax set-ups and final maxillary impression were returned to the laboratory so that the final mandibular implant overdenture and maxillary provisional implant prosthesis could be produced. The final mandibular appliance was fabricated on the master cast and included recess wells in which metal housings with overdenture caps would be cured chairside (Figs. 18a & b). These denture caps provide retention and stabilise the prosthesis during speech and masticatory functions for the patient’s mandible.
The interocclusal relationship was tried in and worn for a trial period, thus ensuring an accurate prosthetic design.

A new master cast of the maxilla was produced based on the custom open-tray final impression. The new master cast and final approved wax set-up were scanned. A virtual model was generated, upon which the fixed monolithic prosthesis was designed using CAD software (Figs. 21a & b). Because this digital model was based on the final impression with the verification jig, screw access holes were created in precise alignment with the positions of the maxillary implants. The resulting design was used to mill a provisional implant prosthesis from polymethyl methacrylate (PMMA, Figs. 22a & b). This appliance was tried in and worn for a trial period, thus ensuring an accurate prosthesis design.

The provisional implant prosthesis is an essential element of the restorative process, as significant adjustments cannot be made to the final restoration once it has been milled from BruxZir Solid Zirconia. At the following appointment, the Inclusive Locator Implant Overdenture was seated and checked for proper fit, function, and support from the soft tissue. The provisional implant prosthesis was then screwed into place, and its tooth positioning, function, and aesthetics were verified (Figs. 21a & b). With both appliances in place, the interocclusal relationship was checked (Figs. 22a & b). Minor occlusal adjustments were made directly to the maxillary provisional implant prosthesis, as PMMA is easily modified. Slight alterations were also made to the mandibular implant overdenture. Block-out shims and the retentive overdenture caps were then seated over the Locator attachments (Figs. 23a & b). Quick Up self-curing acrylic was used to pick up the denture caps and fill in the minor voids between the denture caps and recess wells of the prosthesis. The metal housings of the overdenture caps were seated over the Locator attachments. — Fig. 24: Quick Up self-curing acrylic was used to pick up the metal housings in the overdenture and fill in the minor voids between the denture caps and recess wells of the prosthesis. Note that, in many cases, the dentist elects to have the overdenture caps processed by the laboratory — Fig. 25: The block processing inserts were replaced with the appropriate retentive caps, which are colour-coded according to strength. — Fig. 26: The patient with the final Locator overdenture and the maxillary provisional implant prosthesis in place — Fig. 27: The definitive maxillary restoration was milled from BruxZir Solid Zirconia, incorporating the slight adjustments that were made to the PMMA provisional appliance — Figs. 28a & b. The final BruxZir Full-Arch implant prosthesis completed a dramatic oral reconstruction for a patient who presented with terminal dentition, restoring form, function and quality of life.

The provisional implant prosthesis was digitally fabricated with precision (Fig. 27). As an exact reproduction of the test-driven provisional, the definitive prosthesis fitted perfectly and offered the aesthetics and function the patient had come to expect (Figs. 28a & b). The final restoration effectively addressed the unique circumstances of the case, providing the most durable, stable prosthesis possible for his maxilla and mandibular restoration that greatly improved prosthetic retention and could be upgraded to a fixed prosthesis should the patient’s situation change.

Conclusion

Practitioners now have the clinical flexibility to offer patients a wide range of treatment options, from entry-level, economical restorations like the Inclusive Locator Implant Overdenture to the fixed, highly durable BruxZir Full-Arch Implant Prosthesis. There is a viable means of treating nearly all patients, whatever their oral health, needs, and finances. Given the life-changing benefits of implant therapy and the straightforward restorative protocols of today, all patients should be offered this service to confront the challenges presented by complete edentulism.

Dr Paresh B. Patel is a co-founder of the American Academy of Small Diameter Implants and has worked as a lecturer and clinical consultant on dental implants for various companies. He has been in private practice in Lenoir and Mooresville in North Carolina in the US since 1998 and can be contacted at pareshpateldds2@gmail.com.
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