Nobel Biocare brings latest innovations to Lisbon

The Mucointegration concept, edentulism and a new implant system in focus at EAO.

This year, Nobel Biocare opened a new chapter for implant dentistry with the launch of new surfaces and the introduction of the new Nobel Biocare N1 implant system. Visitors to the EAO have the opportunity on Friday, 27 September, to view these groundbreaking innovations and discover more about them during an engaging symposium and through interactive hands-on sessions.

Sharing their expertise at the industry symposium will be Dr Tristan Staas and Prof. Gabor Tepper, two of the leading implant clinicians in Europe. They will provide exclusive insights into how Nobel Biocare N1 is set up to revolutionise patient care. In order to address some of the shortcomings of current protocols, the recently introduced system was designed from the ground up according to biological principles and keeping patient needs in mind. Going beyond this new implant design, Nobel Biocare N1 is also redefining site preparation with the introduction of the OsseoShaper, an innovative alternative to conventional drilling protocols. Experiences from over 24 months of clinical evaluations of the Nobel Biocare N1 concept with an early ambassador group have already indicated promising results in terms of the method’s effectiveness.

Embodying the Mucointegration concept, Nobel Biocare’s Xeal and TiUltra surfaces will be available on the Nobel Biocare N1 implant system from the start. With the help of their specially tailored surface chemistry and topography, the system’s implants and abutments will benefit from optimised tissue integration. These new surfaces are already available for Nobel Biocare’s On1 and Multi-unit Abutment, as well as for NobelActive and NobelParallel implants, and are backed by the latest evidence published in Clinical Implant Dentistry and Related Research.

During the symposium, Staas and Tepper will be joined by the world-renowned clinician Dr Paulo Maló from Portugal, who will demonstrate how the NobelPro Line helps clinicians to master even the most challenging cases and treat more edentulous patients. The Nobel Biocare-sponsored symposium will take place on 27 September from 17:15 to 19:15 in the main auditorium of the Lisbon Congress Centre. Attendance is free with registration for the congress, and visitors are invited to come early to secure their seats.

Attendees interested in developing their practices further can take part in two hands-on sessions held by Nobel Biocare on Friday. In addition to a morning session on immediate restorations led by Staas, Tepper will demonstrate in the afternoon how to achieve optimal primary stability for immediate restorations in all bone densities through different drill protocols.

Those who wish to attend the workshops are invited to visit the Nobel Biocare booth at EAO 2019 to find out whether seats are still available.

Nobel Biocare, Switzerland
www.nobelbiocare.com/eao
Hall 2, Booth C15
**President of Portugal welcomes attendees at EAO 2019**

Opening ceremony promises attendees an engaging learning atmosphere.

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**“Using cell therapy for bone regeneration is promising”**

An interview with Prof. Kamal Mustafa, University of Bergen, by Franziska Beier, DTI.

Prof. Mustafa, you gave a lecture titled “Are stem cells the implants of the future?” On what did you focus during your presentation?

The potential and value of stem cell-based therapies were explored in the early 1990s when therapeutically relevant tissue-supportive cells such as mesenchymal stem cells (MSCs) were applied for the regeneration of skeletal tissue. This new approach using cell therapy for bone regeneration is promising and could be used as an alternative to the classic gold standard treatment and could be used as an alternative to the classic gold standard treatment.

Could this method of bone replacement be used for other areas of the human body?

Yes, autologous cells are harvested from bone marrow, expanded and cultured for two weeks in two cell manufacturing centres in Germany and France. Afterwards, they are delivered to the eight clinical centres in five European countries and implanted in patients in combination with biomaterials. The procedure has been reported in our recent publication by Gjerde et al. from 2018, which was part of the EU REBORNE project.1

Is this stem cell treatment less invasive than the standard bone transplant?

The patients tolerated the treatment very well, as described and reported in the previously mentioned study. The data generated from the clinical trial demonstrated that bone marrow stem cells expanded successfully in the laboratory and, combined with synthetic bone substitute biomaterial in the patient to augment mandibular bone, induced significant new bone formation. The generated bone volume was adequate for dental implant installation. Healing was uneventful. The patients were satisfied with the aesthetic and functional outcomes. No side effects were observed.

Could this method of bone replacement be used for other areas of the human body?

Yes, a good example of using the method to repair long-bone defects has been demonstrated and reported in a study by GiménezBarrena et al. from 2018.2 This interventional clinical trial was also part of the REBORNE project and performed to evaluate the feasibility and safety of autologous expanded MSCs from bone marrow associated with bioresorbable microporous biphasic calcium phosphate granules; MBGP+.BMG

References:


“Implant therapy in the aesthetic zone is fraught with pitfalls”

An interview with Dr Homa Zadeh, periodontist from Los Angeles, California, by Franziska Beier, DTI.

With his presentation, Dr Homa Zadeh contributed to a session that considered the theme “Should we avoid implants in the aesthetic zone?” in the EAO 2019 scientific programme. He is a diplomate of the American Board of Periodontology and a past President of the Western Society of Periodontology. In a short interview with Dental Tribune International, Zadeh discussed the challenging aspects of placing implants in the aesthetic zone and the accompanying expectations of the patient.

How do patients’ expectations of implants in the aesthetic zone vary from their expectations of implants elsewhere in the oral cavity?

Any therapy in the anterior maxilla has very little leeway for error because the outcome is directly visible by the patient and others. Implant therapy in the aesthetic zone is extra challenging, because the outcome is a reflection of both the surgical and the prosthetic therapy performed.

You gave a lecture titled “Placing implants in the aesthetic zone”. On what topics did you focus during your presentation?

My presentation focused on the decision-making process as the most important aspect of implant therapy in the aesthetic zone. There are dozens of decisions that have to be made that can affect the outcome. The bases on which those decisions are made were the focus of my presentation.

What are the pros and cons of implants in the aesthetic zone, and what are the specific challenges of placing implants in the aesthetic zone?

Implant therapy in the aesthetic zone is fraught with pitfalls, such as the variability of healing of tooth extraction sockets, as well as the variability of peri-implant mucosal changes. Implant installation is far more challenging in the anterior maxilla compared with other oral sites, whether implants are placed in extraction sockets or in healed sites. The combination of biological variability in outcomes, as well as technical challenges, can increase the likelihood of a negative outcome. However, rather than avoiding implants in the aesthetic zone altogether, it is important for clinicians to perform a thorough risk assessment in order to understand the risk factors and risk indicators that can influence the outcome. Important risk factors discussed included the alveolar bone phenotype of the extraction sockets (i.e. thin is less than 1 mm and thick greater than 1 mm) and the mucosal phenotype. Also, the 3D implant position has to be based on both anatomical and prosthetic guidelines. By recognizing all of these elements of risk, it is possible to manage them by proper decision-making and to maximize the predictability of the outcome.

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As the percentage of older people in the population is growing, the number of elderly people depending on dental implants is increasing. Dental Tribune International spoke with Prof. Jocelyne Feine from the Faculty of Dentistry at McGill University in Montreal in Canada about the challenges of implant procedures in older people and how patients can contribute to the healing process. On 26 September, Feine spoke about the topic at the EAO 2019 congress.

Prof. Feine, you gave a lecture on identifying the best treatment options for older patients. On what topics did you focus during your presentation?

I shared with the audience the factors that edentate older patients consider to be important regarding their prostheses. With that information, consideration of the most appropriate types of prostheses and number of implants was discussed.

Why is implant treatment in elderly patients possibly more challenging?

Elderly adults tend to have many chronic conditions and often take numerous medications that can interfere with the osseointegration process. They may also have physical restrictions that may make maintenance of oral hygiene difficult.

How can elderly patients who have received dental implants contribute to the rehabilitation process?

This is an interesting question, since we usually think of rehabilitation as the responsibility of the clinician. However, unless the patient is motivated and able to maintain his or her oral hygiene, treatment will fail. Thus, it is important for clinicians to assess their older patients’ motivation, as well as their ability to clean their mouths, the abutments, etc.
Researchers from the University of California, Los Angeles School of Dentistry have developed a new hydrogel that shows high porosity and effectiveness in promoting tissue repair and regeneration. The study findings suggest that the next generation of hydrogel systems could greatly improve current biomaterial based therapies to repair bone defects in the near future.

Hydrogels are biomaterials that are made up of a 3D network of polymer chains. Owing to the network’s ability to absorb water and its structural similarities to living tissue, it can be used to deliver cells to defective areas to regenerate lost tissue. However, the small pore size of hydrogels limits the survival of the transplanted cells, their expansion and new tissue formation, making this less than ideal for regenerating tissue.

One material that has been of interest in the field of biomaterials is naturally occurring mineral clay. It has become an ideal additive to medical products and has no reported negative effects. It has been shown to be biocompatible and is readily available.

Clay is structured in layers and its surface has a negative charge. This unique layered structure and charge were important to the research team, as the hydrogel they used had a positive charge. When the hydrogel was inserted into the clay layers through the process of intercalation chemistry, the end result was a clay-enhanced hydrogel with a much more porous structure, improving bone formation.

Once the researchers had produced the clay-enhanced hydrogel, they used the process of photoinduction to turn their new biomaterial into a gel, which would make it easier for it to be injected into the mouse model. The mouse model had a nonhealing skull defect into which the researchers injected the clay-enhanced hydrogel. After six weeks, they found that the model showed significant bone healing through its own naturally occurring stem cell migration and growth.

When asked by Dental Tribune International what the study results mean for dentistry and, specifically, for implantology, lead author Dr Min Lee, Professor of Biomaterials Science at the university answered: “This research will help us develop the next generation of hydrogel systems with high porosity for better bone repair and could greatly improve current bone graft materials.”

Injectable combinations of living cells and bioactive molecules using hydrogels would be a preferred medical application to treat unhealthy or damaged areas of the body rather than more invasive surgery. Future research is planned to investigate how the physical properties of nanocomposite hydrogels affect the migration of cells and their function, as well as the formation of blood vessels.

“Our nanocomposite hydrogel system will be useful for many applications, including therapeutic delivery, cell carriers, and dental and craniofacial tissue engineering,” concluded Lee.

The study, titled “Microporous methacrylated glycol chitosan-montmorillonite nanocomposite hydrogel for bone tissue engineering”, was published in *Nature Communications*.

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*Image: Microscopic image of regenerated bone.*
Dr Ismael Khouly, Associate Director of Periodontology and Implant Dentistry at Bluestone Center for Clinical Research at the New York University College of Dentistry in the US and his colleagues found that the prophylactic use of antibiotics has no influence on the prevalence of post-surgical dental implant complications in patients who are healthy overall. Khouly was so kind as to answer DTI’s questions on the topic.

“Dr Khouly, why did you focus on this topic for your study?”

We decided to focus our systematic review on this topic because of the absence of current clinical guidelines for antibiotic prophylaxis in dental implant placement procedures, the misuse and overuse of antibiotics, and the risks associated with their prescription.

“While reviewing the medical literature, I noticed that existing guidelines on antibiotic prophylaxis in surgery, such as hip and knee arthroplasty, are often based on postoperative infection. Therefore, we decided to focus our systematic review on antibiotic prophylaxis to prevent surgical wound infection in dental implant surgeries rather than to prevent implant failure only.

“Would you say that antibiotics are generally prescribed too often?”

Unfortunately, antibiotics are often overprescribed in an arbitrary manner and mostly unnecessarily in dentistry, according to a recent study published in JAMA Network Open. This is important because around 10% of the antibiotics used in the US are prescribed by dentists. Therefore, we must develop clinical guidelines for the rational use of antibiotics based on evidence and reduce the misuse of antibiotics.

How can dentists be made aware of this situation?

Every clinician involved in dental implant surgery procedures should take care not to overlook confounding variables while prescribing antibiotics in dental implant placement surgeries. Clinicians should understand that postoperative complications in implant dentistry, such as postoperative infection and implant failure, are most likely multifactorial and involve different risk factors which could be related to the clinician, the environment, or the patient. Moreover, early implant failure may be caused by reasons other than postoperative infection, such as confounders from the surgical procedure as stated in a study by the International Team for Implantology Antibiotic Study Group.

What would you recommend to dentists regarding antibiotic prescriptions for future implant surgeries?

Especially in implant dentistry, the improved results for bone repair and healing. The researchers used microscopic eggshell particles to reinforce gelatin-based hydrogels, which then served as stable 3D scaffolds for growing osteoblasts. Camci-Uenal said that this technique can be applied to treat and repair bones in patients who have suffered injuries due to aging or cancer and other diseases, as well as to reduce the incidence of dental implant placement procedures. However, and as stated in our study, “It is our recommendation that until such evidence becomes available, clinicians evaluate the benefits (or lack thereof) of antibiotic prophylaxis for each patient given medical history and surgical complexity and seriously consider reviewing the past for overall healthy patients, as well as risks associated with administration of antibiotics.”

References:

**Eggshells may help heal teeth and bones**

**New research could help to tackle tooth loss and regeneration**

**“Antibiotics are often overprescribed in an arbitrary manner and mostly unnecessarily in dentistry”**

An interview with Dr Ismael Khouly, New York University, by Franziska Beier, DTI.

*Eggshells could play a role in bone grafting and other medical procedures.*

**New research has shed light on the mechanism behind the formation of the periodontal ligament. The researchers found that the Notch signalling pathway, which is known to be activated in stem cells and cancer, is instrumental in periodontal ligament development. The findings will help scientists work towards regenerating the tissues that support teeth.**

The study was conducted by researchers from the universities of Plymouth and Geneva and focused on rat and mouse molar teeth. They found that lamin A, a cell nuclear protein, is a direct target of the Notch pathway. Lamin A is best known for its mutated form progeria syndrome.

**Could you tell us more about lamin A?**

Lamin A is instrumental in periodontal ligament development and the molecules we have identified in this study can be applied to treat and repair teeth and tendons, she added.

“This is the first study that uses eggshell particles in a hydrogel matrix for bone repair,” noted Camci-Uenal. “We have already filed a patent application for it earlier this year. We are very excited about our results, and we anticipate a lot of impactful applications of our invention.”

The study, titled “Eggshell particle-reinforced hydrogels for bone tissue engineering: an orthogonal approach”, was published in Biomaterials.

**Can you explain how your research could help to tackle tooth loss and regeneration?**

Uncovering the involvement of lamin A in periodontal ligament formation, the scientists have gained a better insight into how molecules function during tissue regeneration and how the process could be affected during disease.

“The periodontal ligament starts to properly hold the tooth in the jawbone when a tooth breaks out and becomes functional,” said co-author Dr Bing Hui, Associate Professor in Oral and Dental Health Research at the University of Plymouth’s Peninsula Dental School. “Understanding the mechanisms of how periodontal ligaments develop and the molecules that assist the tissue becoming mature is really important for our understanding of tissue regeneration and repair,” he continued. “The next steps are for us to see if and how the molecules we have identified in this study can be translated into a human-only model and, in turn, how they are affected in both healthy and diseased conditions.”

“We believe that our findings are an important stepping stone to better dental treatments in situations where antibiotics are unnecessary, as well as risks associated with administration of antibiotics.”

**If you had to summarize your research, what would it be?**

“A recent study has examined regulation of periodontal ligament maturation at the molecular level.”

**Further research and development could help to regenerate bone tissue that could lead to combat situations. The 3D structure can be used to grow not only bone for bone grafts but also cartilage, teeth and tendons, she added.**
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list of exhibitors

Company | Hall/Booth
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3SHAPE | 2/B35
ACE | 1/C07
ACTEON GROUP | 1/H03
ALFA GATE | 3/J01–K03
ALPHA BIOTECH | 2/B14
AMERICAN DENTAL SYSTEMS | 1/H13
ANTHOZY | 2/023
ASEPTICO | 2/007
AVIENT IMPLANT SYSTEM | 2/D10
B & B DENTAL IMPLANT COMPANY | 2/D08
BEGO IMPLANT SYSTEMS | 2/B43
BIOTECH DENTAL | 1/G10
BIONNOVATION BIOMEDICAL | 2/020
BIONTEK | 1/G10
BLUE M | 1/G06
Biotus BIMATERIALS | 2/A15
BREDENT GROUP | 2/D14–D16
BRESMEDICAL | 1/G13
BTI BIOTECHNOLOGY INSTITUTE | 2/B19
CARESTREAM DENTAL | 2/C33
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CURAPROX | 1/F19
D | 1/G17–G19
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DENTSPLY SIRONA | 2/C27
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DR-KIM CO. | 2/002
E | 1/F18
ENS ELECTRO MEDICAL SYSTEMS | 2/C31
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EXAKTUS | 2/B08
EXODENT | 2/A02
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IBIS IMPLANT | 2/C51
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IMPLANCE DENTAL | 2/C08
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W | 2/C02
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Y | 1/G21
YUNNUI MEDICAL DEVICE | 2/A10
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ZIMMER BIOMET | 2/C38

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OSTEOBIOL GTO: A NEW STEP TOWARDS EXCELLENCE IN BIOMATERIALS

At the beginning of this year, Tecnoss Dental, a leading biomaterials manufacturer based in Italy, launched a new bone substitute which combines innovative and advanced biotechnology, providing implantologists and periodontists with a grafting solution with improved surgical handling and predictable regenerative results. OsteoBiol GTO is endowed with all the characteristics of the ideal biomaterial for bone regeneration. This pioneering product is able to promote the three biological processes which guide bone regeneration: new bone apposition, neo-angiogenesis and progressive resorption of the scaffolding material, in order to promote adequate new bone formation. Tecnoss is showcasing GTO at this year’s EAO congress.

GTO is a dual-phase biomaterial, because its granules contain both mineral and organic components. The preservation of collagen within the original xenogenic cortical and cancellous bone matrix induces a physiological biological response by the patient’s bone tissue. Collagen has several significant advantages for bone regeneration, all scientifically well documented: it stimulates mesenchymal stem cell differentiation into osteoblasts, it is chemotactic and it stimulates neo-angiogenesis and the absorption and subsequent release of growth factors. All these important biological benefits have determined the scientific rationale behind Tecnoss’s 20-year long research and development effort to produce a full range of collagenated dual-phase bone substitutes.

The development of GTO is the last step of the process of continuous improvement by Tecnoss, starting with Apatos Cortical, a very osteoconductive but slowly resorbed scaffolding biomaterial. The first real breakthrough innovation has been Gen-Os, which is the precursor of all the dual-phase products. The outstanding OsteoBiol mp3 then followed as the first pre-hydrated bone substitute, packed in a ready-to-use syringe. In 2016, OsteoBiol TSV Gel, the thermosensitive viscosity resorbable gel which is used to create a sticky bone mix with Gen-Os, was launched. GTO combines all of the company’s experience and expertise in a unique product which is extremely versatile and achieves outstanding biological performance.

GTO has an ideal viscosity, which means that it is very sticky and easy to adapt to the recipient site, making it a great option for treating various types of complex bone lesions. Its syringe formulation means that it is ready to use and is directly injectable into bone defects, making its handling easy and quick. GTO has been conceived as a universal biomaterial for use with OsteoBiol Evolution membranes or Lamina to protect the graft. Its stickiness and stability are useful for horizontal augmentation procedures (e.g. wall defects, where the crest is resorbed) and for socket preservation cases with compromised bucal plates. During sinus lifting, GTO can be applied directly through the bony window, helping the stabilization of implants in case of immediate placement. GTO can also be successfully used to treat peri-implant lesions, dehiscences and severe intra-bony defects.

The product is already available in all EU countries and in other European markets where the OsteoBiol product line is distributed. For further information, visit www.osteobiol.com/contact.

ACTEON Imaging Suite precision software, which is compatible with both Windows and macOS operating systems; the unit provides advanced functionality. Intuitive image handling and predictable surgical handling and the unique solution facilitates diagnosis. For patients, this means that X-Mind prime does not end there! With its intelligent wall-mounted system, the unit adapts easily to all office space configurations. Using X-Mind prime provides true comfort to practitioners in their daily practice. The unit is also remarkably easy to use: the patient is positioned face to face with the technician while in operation, and the simplified control panel located under the chin support allows simple and accurate handling. Automatic chin support recognition, based on the type of operation selected, allows error-free patient positioning. This represents significant time-saving.

Acquiring X-Mind prime is more than just buying a device. ACTEON believes the quality of its customer service is every bit as important as the quality of its products. The group provides personalized support based on each practitioner’s needs and specific situation. A pioneer in the manufacturing of innovative and less invasive dental imaging solutions, ACTEON is expanding its panoramic and CBCT product line with X-Mind prime. The device is an all-in-one solution that integrates 2D and 3D imaging and combines all of the group’s high-tech expertise with its service quality.

Attendees of EAO 2019 are invited to discover the new X-Mind prime 3D at ACTEON’s booth.

ACTEON, France
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Hall 1, Booth H03-H05

X-Mind prime is the latest addition to ACTEON’s CBCT digital imaging product line. It blends cutting-edge technology with ease of use in a compact design. With X-Mind prime 3D, high-tech is at your fingertips with tools for accurate diagnosis and complete treatment planning. It is a lightweight and compact system that can fit into any dental office. ACTEON is showcasing its new product at EAO 2019.

X-Mind prime is a complete solution that combines 2D and 3D technologies. Using a single sensor, practitioners can quickly and easily switch between modes. With these features, X-Mind prime offers a wide range of possible examinations, 24 options for panoramic and 32 for CBCT, covering many clinical applications, including implantology, enodontics, and temporomandibular joint and sinus imaging. Practitioners can also scan 3D objects such as plaster models and silicone impressions, opening up new possibilities.

Hence, all dental practices can now offer their patients 3D imaging and expand their clinical applications with this solution.

There are just a few of the possibilities that X-Mind prime offers. Furthermore, when equipped with the PIONEERING TECHNOLOGY 2019: X-MIND PRIME 3D IS THE PERFECT PROFESSIONAL SOLUTION

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OSTE...
The INVERTA implant represents the latest breakthrough technology from Southern Implants and is designed for optimizing aesthetics in maxillary anterior extraction socket sites. At EAO 2019, the company is showcasing its newest product. The INVERTA implant features a novel Body-Shift design that addresses challenges many clinicians face with immediate anterior implant procedures. **The innovative design of the inverted coronal segment of the implant allows for a chamber for bone growth to be created, thereby enhancing the ability to obtain natural looking aesthetics.** The wider apical portion allows the implant to achieve the primary stability critical in immediate placement.

INVERTA also incorporates proven features from Southern Implants’ other implant product lines, such as its SInergy Surface with decades of clinical research and high-strength Grade 4 pure titanium, which provides exceptional fatigue strength. The new implant is available with the popular deep conical internal and external hex connections. For treatment flexibility, INVERTA is available in a straight configuration and 12° Co-Axis, the latter offering built-in Subcrestal Angle Correction without using angled abutments, resulting in greater facial soft-tissue volume and providing ideal screw-retained restorative options.

Dr Pär-Olov Östman, a respected opinion leader who practices in Falun, Sweden, commented on the innovative implant design: “To be able to use INVERTA implants in aesthetically challenging cases gives me a predictable outcome with limited buccal recession and healthy soft tissue.” The following clinical research articles on INVERTA have been published and more articles are expected to be released throughout 2019 and beyond:

Similarly to the way in which a GPS system guides a driver, Navident by ClaroNav guides clinicians by using the CBCT image as a map. It offers surgeons an easy-to-use, accurate, highly portable and affordable means of planning restorations and implant placements.

With Navident 2, clinicians will no longer need to do a special extra scan. They can use the diagnostic scan already available for the patient. The stress of stent making is also gone because a stent is no longer required. Trace and Place (TaP) is a game-changing development for dynamic navigation. With TaP, the Navident workflow is streamlined, efficient, user-friendly and seamlessly integrated into the daily practice.

“Trace and Place is a real tipping point for dynamic navigation guidance,” said user Dr George Mandelaris, a periodontist from Chicago in the US. “It has streamlined and simplified the workflow in both the diagnostic and surgical phases to allow state-of-the-art technology to be an everyday component of my surgical implant practice. I cannot imagine going back!”

Implantology specialists who have used Navident 2.0 experienced negligible operator stress, improved time efficiency and an increase in patient acceptance. The accuracy offered by the new version, combined with the need for minimal tissue manipulation, is conducive to a shorter and better recovery process for patients, according to the company.

Clinicians are invited to learn from masters and interact with their peers at ClaroNav’s booth at this year’s EAO meeting.

ClaroNav, Canada
www.claronav.com
Hall 2, Booth C09

Simplified Workflow with TaP (Trace Registration) ... which can be performed in a single appointment

**Plan**
Plan restorative-driven implant placement on a laptop

The restoration and implant placement plan is created using the CT image data, optionally with added intraoral scans or any other surface data (STL files). The plan can be modified at any time, even during surgery. Navident is compatible with any implant size and type available on the market.

**Trace**
Register the CBCT scan to the patient by selecting 3-6 landmarks on the screen and tracing around those landmarks in the mouth with a tracer tool.

The registration process that formerly involved making a thermoplastic stent, taking an additional CBCT scan with a significant opportunity for irrecoverable user error, has become an efficient, user-friendly and easily repeatable 2 minute process.

**Place**
Drill and place the implants under dynamic guidance

Following a brief drill or implant calibration, Navident dynamically presents the deviation between the actual/planned position and orientation of the drill/implant, guiding the surgeon to accurately implement the plan.
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Belém Tower
• Where: Avenida Brasilía
• Opening hours: Tuesday–Sunday 10:00–18:30

This Lisbon landmark, built in the sixteenth century on the northern bank of the Tagus river, served as a fortress and ceremonial gateway to Lisbon. It was built during the height of the Portuguese Renaissance and is a prominent example of the Portuguese Manueline style but also incorporates hints of other architectural styles. Thus, both the interior and exterior of the tower offer much to explore and appreciate.

Since 1997, the tower has been a UNESCO World Heritage Site, along with the Jerónimos Monastery. It is often portrayed as a symbol of Europe’s Age of Discovery and as a metonym for Portugal or Lisbon.

Pastel de Belém
• Where: Pastéis de Belém, Rua de Belém 84–92
• Opening hours: Daily 8:00–23:00
• Information: pastedebelem.pt/en/

The Pastéis de Belém bakery started to make its famous tarts of flaky pastry and custard in 1837 according to an ancient recipe from the Jerónimos Monastery. This secret recipe has remained unchanged ever since and is recreated every day, by hand, using only traditional methods. Besides the Pastel de Belém, the bakery offers other specialities.

Banksy exhibition
• When: 14 June to 27 October
• Where: Cordoaria Nacional, Avenida da Índia
• Opening hours: Monday–Friday 10:00–19:00 | Saturday 10:00–20:00
• Information: www.banksyexhibition.pt/en/

Cordoaria Nacional—which is in close proximity to the Lisbon congress centre—is hosting the “Banksy: Genius or Vandal?” exhibition, the first big display in Portugal of the artist who revolutionised contemporary art and whose identity remains unknown.

The immersive exhibition features more than 70 creations, lent by international private collectors and galleries, and includes original pieces, sculptures, installations, vid...
The experience begins with an audiovisual presentation, specifically created to welcome visitors to the exhibition, that reveals clues about the mysterious artist and highlights the most important pieces. Among the most recognized works of the exhibition is the original serigraph of the series Girl with Balloon.

The European Heritage Days 2019 will explore the theme of arts, heritage and leisure. The theme is intended to highlight the many facets of heritage linked to the arts, as a source of entertainment and leisure, allowing other dimensions of daily life to be lived and inviting an exploration of the tangible and intangible components of art and leisure.

Street performances, concerts, theatrical shows, contemporary cinema and digital art are just some of the art forms marking this event, which will take place at a number of venues, including the MAAT (Museum of Art, Architecture and Technology), O’culto da Ajuda, the Museu Nacional de Arte Antiga and the Museu do Oriente. Entry is free.

Santa Casa Alfama 2019 festival
• When: 27 and 28 September
• Where: Different venues in Alfama
• Information: www.visitlisboa.com/en/events/santa-casa-alfama-19

Santa Casa Alfama is a music festival that celebrates authentic and traditional Portuguese music. For two days, Lisbon’s eponymous district is taken over by Fado musicians and fans of all ages. Fado means “destiny” or “fate” and is a music genre that can be traced back to the 1820s in Lisbon, but probably has much earlier origins. In 2011, Fado was added to the representative list of Oral and Intangible Heritage of Humanity by UNESCO.

The seventh Santa Casa Alfama festival, with ten stages and more than 40 acts, invites music lovers to experience the traditional sounds of Portuguese music surrounded by the beautiful architecture of the oldest quarter in Lisbon.

The performances take place in a wide variety of venues, from churches to museums, at outdoor venues and recreational associations, and provide visitors with a unique artistic range of music, worthy of appreciation.

Useful information for the city of Lisbon
• Time zone: UTC/GMT + 1 hour
• Emergency numbers: Ambulance service/police: 112
• Currency: Euro
• Tourist information: Rua do Arsenal 15 (Monday–Friday 9:30–19:00)

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