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EAO 28th Annual Scientific Meeting Lisbon • 26–28 September 2019



Congress news

EAO 2019 opening ceremony promises attendees an engaging learning atmosphere.

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Interview

DTI spoke with Prof. Jocelyne Feine from McGill University about the challenges of implant procedures in older people.

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Dental products in focus

The 2019 EAO congress offers an opportunity to see and try out the most current innovations in implant dentistry.

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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



▲ Well-attended Nobel Biocare booth on the first congress day.

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 sys-

tem'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 Nobel-Parallel 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



▲ Prof. Gabor Tepper.



▲ Dr Tristan Staas.

President of Portugal welcomes attendees at EAO 2019

Opening ceremony promises attendees an engaging learning atmosphere.

■ At the opening ceremony, Dr Gil Alcoforado, chair of the 2019 EAO congress, officially announced that the 28th annual scientific meeting is underway. With attendees who have travelled from across Europe and beyond to participate, the congress is designed to impress and 130 speakers will be presenting a wide range of lectures, hands-on workshops and clinical video sessions.

EAO 2019 is being held under the High Patronage of the President of the Portuguese Republic, Dr Marcelo Rebelo de Sousa. As part of this, a video of de Sousa was played during the opening ceremony in which he welcomed attendees and highlighted the country's rich cultural heritage. "Portugal is not just a country with a long and important history, but one with a bright future as well," de Sousa said.

"I wish you not only an unforgettable stay in this country, but also hope that you will come back soon to get to know our culture better," he added.



▲ From left: Dr Susana Noronha and Dr Gil Alcoforado, co-chair and chair, respectively, of the 2019 EAO congress, at the opening ceremony.

The President of EAO, Prof. Henning Schliephake, followed, also addressing the crowd via a pre-recorded video. The focus then turned to Alcoforado and Dr Susana Noronha, co-chair of the congress, who spoke about what they hoped to achieve under this year's theme of "The bridge to the future".

Alcoforado thanked the members of the EAO congress and scientific committees, stating, "It is only through their tireless work that we can have such a large attendance from such a wide range of countries". Over 4,000 attendees overall from more than 80 countries are expected to attend the congress, according to a press release from the EAO.

"This is the first time the scientific meeting is taking place in Lisbon, making it an extra special occasion," said Noronha. "I sincerely hope that this meeting exceeds your expectations and that you all have a fantastic congress." ◀

"Using cell therapy for bone regeneration is promising"

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

■ Prof. Kamal Mustafa from the Department of Clinical Dentistry at the University of Bergen in Norway is sponsoring and leading, together with Dr Cecilie Gjerde (University of Bergen) and Prof. Mariano Sanz (Complutense University of Madrid), a multicentre randomised controlled clinical trial (RCT) on stem cell bone building. This research is part of the European MAXIBONE project, which is investigating whether new jawbone prior to placement of dental implants can be grown with stem cell technology. At EAO 2019, Mustafa presented his research group's work in a session that covered the topic of "New avenues in implant dentistry". He shared insights into MAXIBONE with Dental Tribune International.

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 for the classic gold standard treatment with bone grafts. The promising data from a recent clinical trial in 11 patients in Bergen, as part of the EU REBORNE project, has paved the way for improved, well-designed trials utilising stem cells for mandible augmentation and alveolar reconstruction.

MAXIBONE began at the start of 2018 and will be completed in 2021. What is the current status of the project?

MAXIBONE aims to create personalised bone regeneration by using

culture-expanded autologous bone marrow stem cells and biomaterials. The four-year project started with European funding of €6 million. The large consortium is coordinated by Prof. Pierre Layrolle from the University of Nantes in France and me and gathers 12 partners from six European countries, including academic and research institutes, cell therapy units and companies, among them the global leader of dental implants.

In the project, an RCT of 150 patients will compare the safety and efficacy of autologous cultured stem cells and calcium phosphate biomaterials with autologous bone grafting in alveolar bone augmentation prior to dental implants. In the previous European project, REBORNE, the clinical safety of this regenerative strategy was demonstrated in 11 patients.

How does the process work exactly? Do the stem cells have to be autologous?

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



▲ Prof. Kamal Mustafa presenting at EAO 2019.

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 regenerated 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 Gómez-Barrena et al. from 2018.² This interventional cli-

nical trial was also part of the REBORNE project and performed to evaluate the safety and feasibility of autologous expanded MSCs from bone marrow associated with bio-ceramic (microporous biphasic calcium phosphate granules; MBCP+, Biomatlante) scaffolds in patients with long-bone delayed unions and non-unions (after a minimum of three months from acute fracture). No severe adverse events related to the bone marrow MSCs were reported. The construct of stem cells combined with the biomaterial which was used in our maxillofacial clinical trial was surgically and successfully delivered to the non-unions, and 26 of 28 treated patients were found to be radiologically healed at one year after treatment. ◀

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“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.

tion has to be based on both anatomical and prosthetic guidelines. By recognising all of these elements of risk, it is possible to manage them by proper decision-making and to maximise the predictability of the outcome.

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 be-



▲ A packed audience listens to Dr Zadeh's presentation.

cause the outcome is directly visible by the patient and others. Implant therapy in the aesthetic zone is extra chal-

lenging, because the outcome is a reflection of both the surgical and the prosthetic therapy performed. ◀

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▲ Dr Homa Zadeh delivering his lecture in the auditorium of the Lisbon Congress Centre.

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 posi-

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“We usually think of rehabilitation as the responsibility of the clinician”

An interview with Prof. Jocelyne Feine, McGill University, by Franziska Beier, DTI.

■ 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 op-

tions 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 pro-



Prof. Jocelyne Feine speaking about challenges of placing dental implants in older patients.

cess. 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. ◀

Impressions of EAO 2019

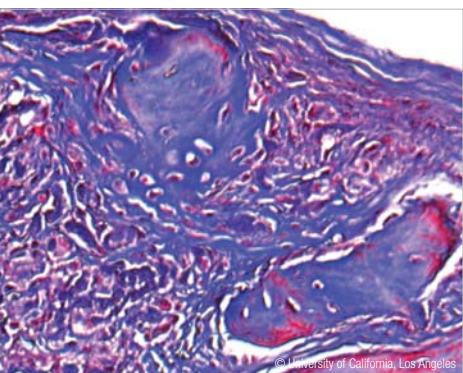


EAO EUROPEAN ASSOCIATION FOR OSSEOINTEGRATION **WELCOME**

New hydrogel shows promise in dental and craniofacial tissue engineering

■ 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 therapeutics 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.



↑ Microscopic image of regenerated bone.

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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“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.

■ The use of antibiotics remains a controversial topic. A recent study¹ investigated the necessity of antibiotics for the prevention of dental implant infections. Lead author Dr Is-



mael 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.

Furthermore, we investigated whether any specific antibiotic regimens with regard to antibiotic compound, dosage and dosing schedule were justified for specific evidence-based clinical guidelines. Our goal was to obtain more information and help clinicians to identify when to use antibiotics, responsibly, in dental implant placement procedures, to identify those clinical situations where antibiotics are recommended, as well as to choose the right antibiotic at the right dose and for the right duration.

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*.² 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.³

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

Bearing in mind the limitations of our systematic review, it seems that antibiotic prophylaxis may not prevent postoperative infections after

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 results of the present paper for overall healthy patients, as well as risks associated with administration of antibiotics.”¹ ◀

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Eggshells may help heal teeth and bones

■ Crushed or pulverised eggshells have many practical uses. They can be used as a natural calcium supplement, a coffee sweetener, a treatment for minor skin irritations and a non-toxic abrasive cleaner, or for garden compost and pest control. Recently, researchers also investigated the use of eggshells as material for bone grafts and for regenerating cartilage, teeth and tendons.

The study, led by Dr Gulden Camci-Unal of the Department of Chemical Engineering at the University of Massachusetts Lowell, found an innovative use for powdered eggshells—which are composed mainly of calcium carbonate crystals—for engineering bone tissue that could lead to

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-Unal said that this technique can be applied to treat and re-

pair bones in patients who have suffered injuries due to aging or cancer and other diseases, as well as those injuries resulting from accidents or

combat situations. The 3D structure can be used to grow not only bone for bone grafts but also cartilage, teeth and tendons, she added.

“This is the first study that uses eggshell particles in a hydrogel matrix for bone repair,” noted Camci-Unal. “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 Science*. ◀

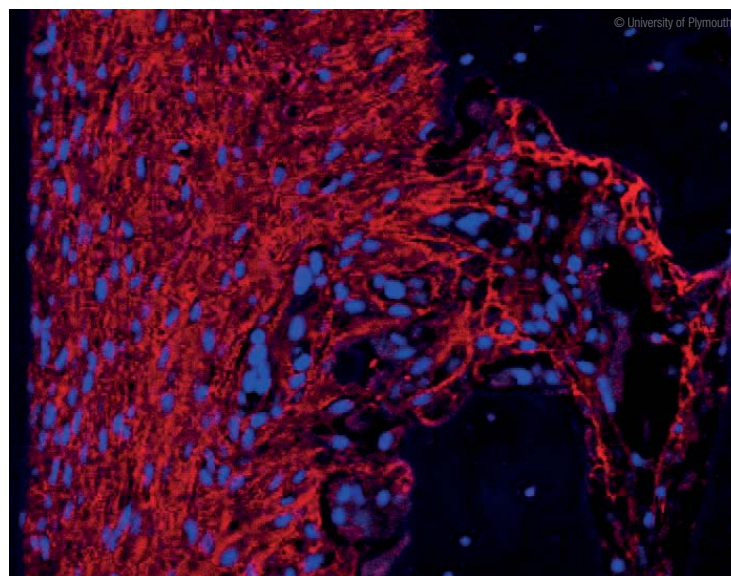


* Eggshells could play a role in bone grafting and other medical procedures.

New research could help to tackle tooth loss and regeneration

■ 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 progerin, which causes the fatal “early ageing” disease called progeria syndrome. By



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

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 Hu, 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 involving the periodontal ligament, such as gum disease (periodontitis), tooth restoration by dental implants or orthodontic tooth movement,” said co-author Dr Balázs Dénes, a doctoral student at the University of Geneva.

The study, titled “Notch coordinates periodontal ligament maturation through regulating lamin A”, was published in the *Journal of Dental Research*. ◀

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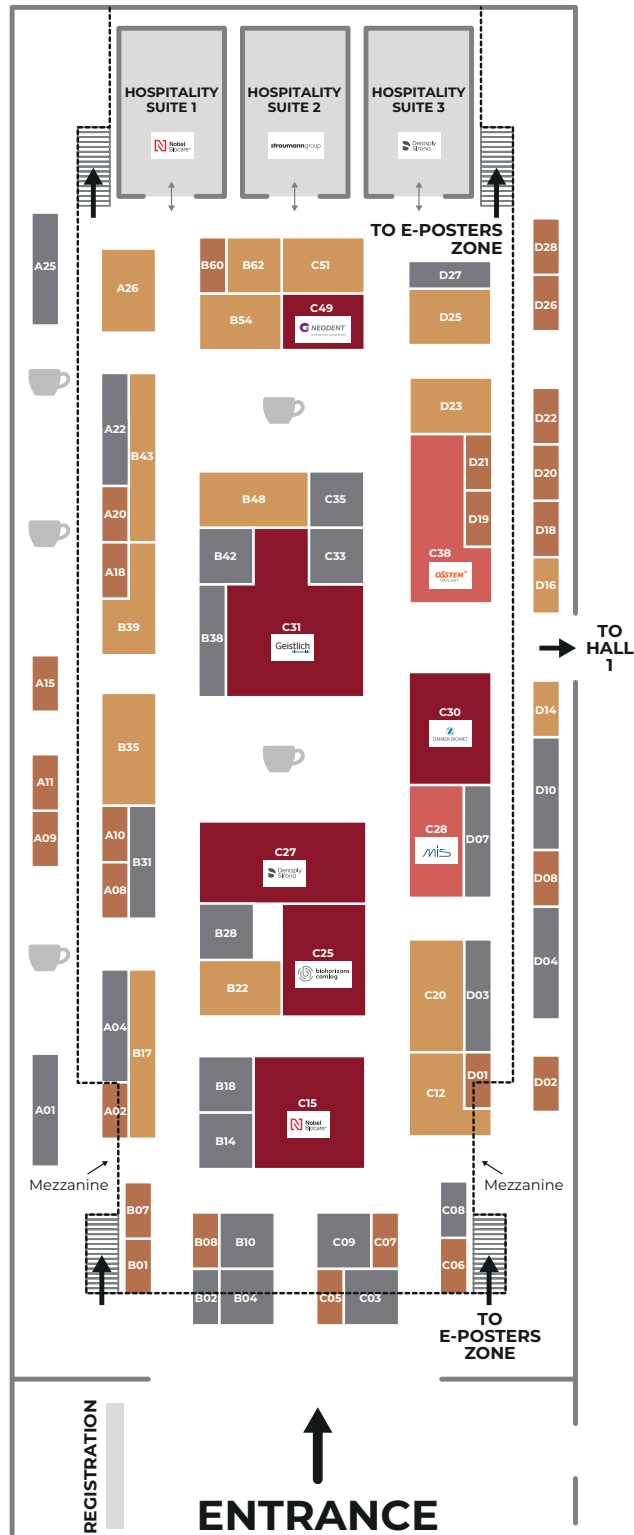
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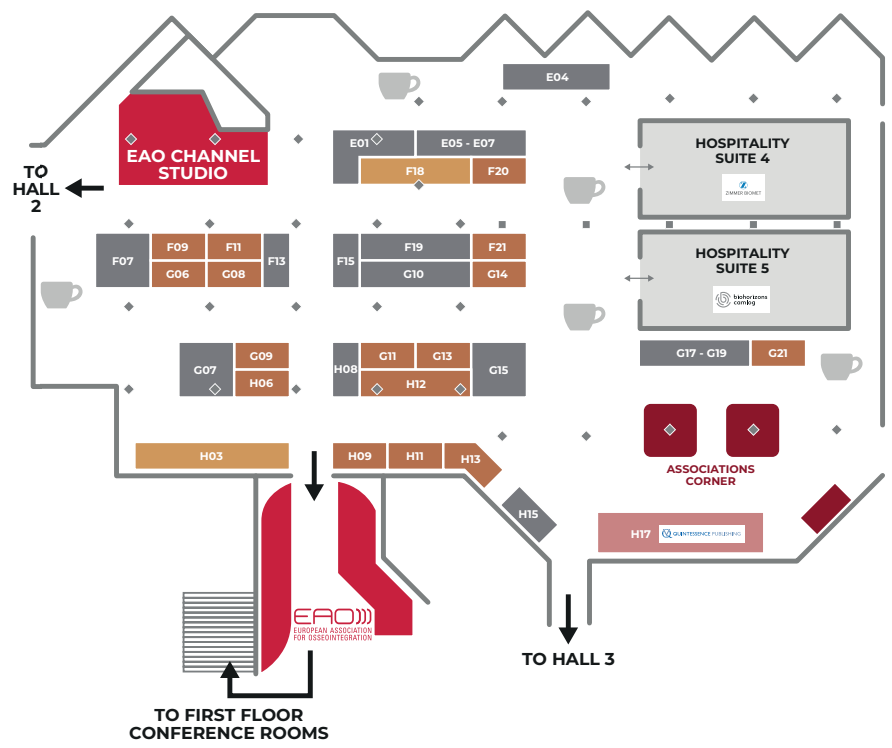
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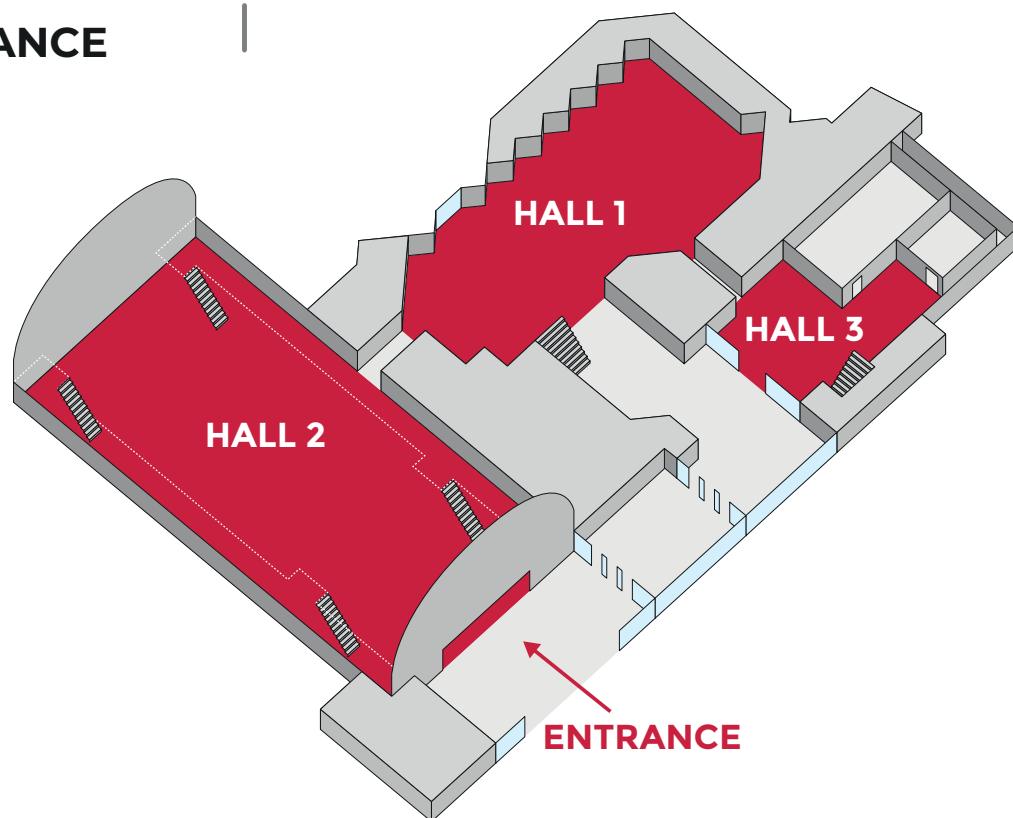
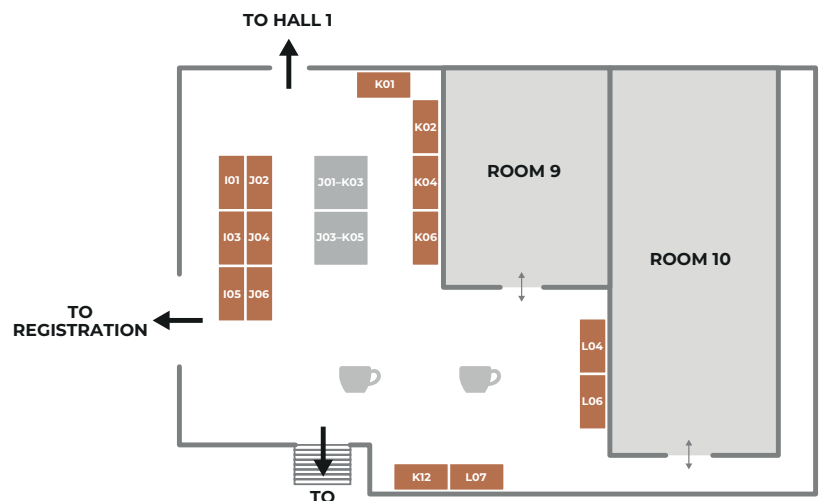
Hall 2



Hall 1



Hall 3



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ANTHOGRYR	2/D23	E		MALO CLINIC	2/A10	SAEYANG MICROTECH CO.	1/F21
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AVINENT IMPLANT SYSTEM	2/D10	EURONDA	2/A18	MECTRON	1/G15	SAUDE ORAL	3/J04
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AND TRADE CO.	3/I03	FOTONA	2/B04	MEDIDENT ITALIA	2/D26	SOUTHERN IMPLANTS	2/A26
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BIOTECH DENTAL	1/G10	I		N		STRAUMANN	2/HS2
BLUE M	1/G06	IBI SA SMARTBONE	2/D19	NEODENT	2/C49		
BOTISS BIOMATERIALS	2/A15	IBS IMPLANT	2/C51	NEOSS	1/E04		
BREDDENT GROUP	2/D14–D16	IMPLACIL DE BORTOLI	1/F15	NIBEC CO.	2/B42		
BRESMEDICAL	1/G13	IMPLANCE DENTAL		NOBEL BIOCARE SERVICES	2/C15		
BTI BIOTECHNOLOGY INSTITUTE	2/B39	IMPLANT SYSTEM	2/C08	NOVABONE PRODUCTS	1/F11		
C		IMPLANTSWISS I-SYSTEM	2/C12	NSK	2/B10		
CARESTREAM DENTAL	2/C33	INTERNATIONAL TEAM		NUCLEOSS	2/D03		
CLARONAV	2/C09	FOR IMPLANTOLOGY	1/F20	NYU DENTISTRY	1/H12		
CURAPROX	1/F19	INVIBIO BIOMATERIAL SOLUTIONS	2/B62	O			
				OMNIA	2/B31		
				ORTHOCELL	2/C05		
				OSSTELL	2/C20		
				OSSTEM IMPLANT	2/C38		
				OSTEOBIOL BY TECNOSS	2/B28		
				OSTEOGENICS BIOMEDICAL	1/F13		
				OSTEOLOGY FOUNDATION	2/A11		
				OXY IMPLANT	2/C03		
				P			
				PENGUIN RFA	1/F09		
				PLANMECA	2/B54		
				PURGO BIOLOGICS	1/H15		
						SUNSTAR	2/A22
						SURGIDENT CO.	3/L04
						SWEDEN & MARTINA	3/I05
						T	
						THOMMEN MEDICAL	2/B22
						TI-OSS OCTABONE	2/D28
						TRATE	2/B48
						TRI DENTAL IMPLANTS	2/B38
						TRUABUTMENT	1/E05–E07
						U	
						UBGEN	2/D01
						USTOMED INSTRUMENTE	1/H09
						V	
						VERSAH	3/J02
						W	
						W&H GROUP (W&H + OSSTELL)	2/C20
						Y	
						YUNYI MEDICAL DEVICE CO.	1/G21
						Z	
						ZEST DENTAL SOLUTIONS	3/J05–K05
						ZIBONE	1/G09
						ZIMMER BIOMET	2/C30

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