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 diplomat 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.

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.

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.

IT’S TIME FOR EFFICIENT 3D DIAGNOSIS

3D diagnosis is more accessible than ever with a smart and compact solution
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.

New hydrogel shows promise in dental and craniofacial tissue engineering

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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.

Crushed or powdered 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 eggshell–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 repair 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 our invention. 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.

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, which causes the fatal “early aging” disease called progeria syndrome. By 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 profiles.”

“We believe that our findings are an important stepping stone to better dental treatments in situations where antibiotics have been prescribed unnecessarily in dentistry,” said co-author Dr Balazs Denes, 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.