“Our approach to business remains uniquely different in the implant segment”

An interview with MegaGen CEO Dr Kwang-bum Park

By Claudia Duscheck, DTI

MegaGen is one of the fastest-growing dental implant companies in the world market. After the South Korean company recently announced that it was discontinuing its business relationship with a global implant manufacturer, Dental Tribune had the opportunity to speak with Dr Kwang-bum Park, CEO of MegaGen, at the International Dental Show (IDS) about the company’s participation at the trade fair and its future global market strategies.

Dental Tribune: IDS is a unique opportunity for dentists to experience implant products live and gain an overview of the latest developments in the field. What are your expectations for IDS?

Dr Kwang-bum Park: We have always viewed IDS as the key location to meet international partners and to present our new products to the market. This year, we look forward to getting to know more dentists and involving them in our MegaGen family. In 2017, we continue to highlight our AnyRidge implant system, which has seen increasing demand from patients for instant smiles. In addition, we are promoting RiGATE, a digital solution for dentists, bringing a streamlined digital approach to implant treatment ever closer.

Dental implants were first introduced in South Korea about 20 years ago. How has implantology evolved in the country since then?

The growth of implant dentistry in South Korea has been a phenomenon that can be equalised only in a few other countries, such as in Italy and Israel. High-level implant surgery is the standard in South Korea, and unless strong contra-indications are present, implants are the absolute standard for replacing missing teeth. Dental care in general is a high-priority health care consideration in all South Korean families. It is widely available and the average overall dental health of the population is good.

Today, MegaGen exports its products to 90 countries worldwide, including many European countries. How important is this market for you, and how do your products perform in this market?

As it is one of the world’s largest implant markets, the European market remains our greatest export market. We have been active in Europe for ten years now and are still experiencing a growth of over 20 per cent on average in this market, which we expect to see continue over the coming year. Our largest expected growth, however, is in the newer markets, with key product launches in India and Japan. Russia and other countries of the Commonwealth of Independent States have been stable and are still experiencing double-digit growth in the US in 2017.

With a number of major company mergers and increasing competition worldwide, the international implant market is expected to change and grow over the next few years. How do you evaluate this development, and how does MegaGen intend to compete in the future?

MegaGen is growing strongly as an independent company. We remain focused on customer satisfaction, product development and better patient outcomes. We have clinicians at the top of our company who are still practising implant dentistry, which gives us a unique insight into what dentists need to improve and their patients’ lives. We believe that the implant business is going to continue to grow as implants become the standard of care for tooth replacement worldwide. We have found that our approach to business remains uniquely different in the implant segment. We remain open, of course, to discussing possible future partnerships if we find compatible partners with whom we can establish a clear and good understanding. Meanwhile, we will continue to develop our product line and the digital approach, which we believe is the future for reliable patient outcomes.

PROSEC: New quality initiative for metal-free implantology

By DTI

COLOGNE, Germany: At the International Dental Show (IDS) in Cologne, VITA Zahnfabrik has introduced a new specialist network for metal-free implantology PROSEC (Progress in Science and Education with Ceramics), which was established with the aid of the vita-practice. Its goals are to foster close collaboration between specialist organisations, practitioners and science in order to establish high-quality standards in metal-free implantology and thereby improve the well-being of patients.

On its website, www.prosec-network.com, the organisation will present the latest findings, promote joint clinical studies and provide a platform for expert discussion, he said. In addition, an annual conference will serve to document the progress in the field and share knowledge on a global scale.

“It is great fun for me to accompany the ‘ceramics project scientifically,’” panel speaker and founding member Prof. Wilfried Wagner, Director of the Department of Oral, Maxillofacial and Plastic Surgery at the Mainz University Medical Center in Germany, said.

Concerning the organisation’s scientific approach, he said that, ideally, knowledge will be gathered in a three-stage process. First, all data in the field will need to be collected and edited, before new data can systematically be accumulated in field research and randomised studies, which will form the second and third stages of the process.
Nano-coating effective in reducing peri-implantitis risk

By DTI

PLYMOUTH, UK: Investigating the effect of a new approach using a combination of silver, titanium dioxide and hydroxyapatite (HA) nano-coatings on the surface of titanium alloy implants, researchers from Plymouth have found that the method was successful in inhibiting bacterial growth and reducing the formation of bacterial biofilm. In addition, the coating created a surface with anti-biofilm properties, thus supporting successful integration of the implants into surrounding bone and accelerating bone healing.

One of the main reasons for dental implant failure is peri-implantitis, an inflammatory process affecting the soft- and hard-tissue surrounding dental implants caused by pathogenic microbes that develop into biofilms. Current approaches to managing the development of biofilms include application of antimicrobial coatings loaded with antibiotics or chlorhexidine. However, these are usually only short-term measures. In addition, chlorhexidine has been reported to be potentially toxic to human cells.

Investigating a new approach, researchers from the University of Plymouth tested the effectiveness of a dual-layered silver–HA nano-coating on titanium alloy medical implants. The antibacterial performance of the coating was quantitatively assessed by measuring the growth of Streptococcus sanguinis, the proportion of live and dead cells, and lactate production by the microbes over 24 hours.

The results showed that the combination successfully inhibited bacterial growth and reduced the formation of bacterial biofilm on the surface of the implants by 97.5 per cent. Uncoated controls and titanium dioxide nano-coatings showed no antibacterial effect.

According to the researchers, no dissolution was detected for the HA nano-coatings. Thus, application of a dual-layered silver–HA nano-coating on titanium alloy implants further created a surface with anti-biofilm properties without compromising the HA bio-compatibility required for successful osseointegration and accelerated bone healing.

"In this cross-faculty study we have identified the means to protect dental implants against the most common cause of their failure. The potential of our work for increased patient comfort and satisfaction, and reduced costs, is great and we look forward to translating our findings into clinical practice," commented Prof. Christopher Tredwin, Head of the Peninsula School of Dentistry.

In the next step, the effectiveness of the approach needs to be tested in vivo, according to the researchers.

The study, titled “Antibacterial activity and biofilm inhibition by surface modified titanium alloy medical implants following application of silver, titanium dioxide and hydroxyapatite nano-coatings”, was published online on 17 March in the Nanotoxicology Journal.
Dr Iyad Estoiny

By Marc Chalupsky, DTI

Originally from Syria, Dr Iyad Estoiny obtained his master’s degree in fixed and removable prosthetics in France before moving to Dubai in 1997. An implantologist and prosthodontist at GMAClinics in the heart of Dubai, Estoiny also focuses on prosthodontics and aesthetics. In an interview with Dental Tribune, the implant specialist spoke in favour of proper oral hygiene and individual prophylaxis training, two areas of dental care that are essential for long-term implant success.

Dental Tribune: You are originally from Syria. How was the dental training at your school?

Dr Iyad Estoiny: I received my DDS in 1991 from Tishreen University in Syria. There are four dental schools in Syria, along with many practitioners. A number of Syrian dentists have moved to the UAE because of their good dental knowledge. The dental education is still excellent in Syria.

Can you summarise the state of oral health in Dubai?

As Dubai is a multicultural city, one sees problems from all over the world. Some patients are highly motivated in terms of their oral hygiene, while one has to put in a great deal of effort with some others. In terms of oral hygiene, I have seen that people have started to become aware of dental problems and products. In the last five years, people have become more focused on beauty and aesthetics, which in turn has led to a higher interest in healthy teeth.

We also have an overwhelmingly young population in this country, consequently, there are only a few older dentists here. Eighty per cent of expats are young. This means that one does not see any advanced periodontal problems, but one does increasingly see stress-related bruxism, which in turn leads to periodontal problems.

How would you evaluate the market for oral hygiene in this region?

The market here is competitive and small. We do not sell the products, but give it to patients. If they like it, they can buy it at the pharmacy. This has worked well.

You completed a programme on individually trained oral prophylaxis (ITOP). What was your impression?

I did the ITOP programme a year ago. Although I liked the programme a great deal, we have still seen that not all patients take the time and really apply what they have learnt. Some patients are really motivated and sit down with us to learn more about the system. The dentist and dental hygienist then work together. In today’s fast-paced world, we need to convince patients that they have to take care of individual prophylaxis. For dental hygienists and dental students, ITOP gives dental professionals a gradual awareness of how to provide oral hygiene for their patients. I think that ITOP for students will work well for future dentists. Thank you very much for the interview.

Implant failure is a failure for both the dentist and the patient

“A holistic view on medical conditions that includes oral health has not been established in clinical medical practice.”

Dr Iyad Estoiny

For us, it is important to ensure that patients have the correct interdental brush size. This means that we tell them what size they need. A dental hygienist or periodontist usually gives instructions and explains everything. One always needs to determine the correct sizes and give proper instructions.

As an implant specialist, what do you think about prevention?

There does not seem to be a strong connection between implantology and prevention at first, but just look at the problem of peri-implantitis. One needs to treat peri-implantitis as a bacterial problem and thus one must give clear instructions for cleaning, which involves interdental brushes and mouthwashes. Prevention is always the golden rule for any implant. If I do not see good oral hygiene in my patient’s mouth, I do not place the implant. I wait for a couple of months for the oral hygiene to improve. If I consider it acceptable, then I place the implant.

How do you deal with implant failure?

Implant failure is a failure for both the dentist and the patient. It is a headache for dentists, and in the worst case, patients will not be able to enjoy a beautiful smile. Periodontal treatment and oral hygiene are important before and after every implant placement. Before and after surgery, I usually explain oral hygiene and motivate my patients. Just recently, I placed an implant in an 84-year-old patient. Six months after placement, I have seen improvement owing to interdental brushes.

Oral hygiene treatment is mostly taken care of by dental hygienists. Most larger clinics employ at least one dental hygienist and it seems that Dubai citizens make extensive use of them. There is a good partnership between hygienists and dentists.

There is very good cooperation. I am not interested in cleaning and my dental hygienist is not interested in placing implants. We are both happy to do our work. The profession of dental hygienist does not exist in some countries, such as in France, where I lived for a long time. There, the dentist cleans and polishes for 5 minutes. Here, our appointments last for 45 minutes. We explain to the patient how to perform the necessary post-operative care.

How do you explain it usually?

We simply show them how to brush their teeth and interdental spaces properly. If one just prescribes a certain toothbrush to patients on a piece of paper without instructing them, they will likely go to the pharmacy and buy a different one. If you give it to them, let them try it and help them use it correctly, the possibility of the patients buying the correct brush is higher.

IMPACT NEWS

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Robotic guidance system could be game-changer for implant dentistry

By DTI

MIAMI, US: Implant dentistry is about to make a leap in development, at least if things go the way US company Neocis predicts. After introducing Yomi, the first robotic system developed for dental implant placement, and receiving Food and Drug Administration (FDA) 510(k) clearance to market its pioneering surgical assistance system, the company has now announced the completion of the first sale of its device.

The dental implant and prosthetic market is one of the fastest-growing markets in the US. Equally thriving is the surgical robotics market, which is estimated to reach $20 billion across several medical markets by 2021. Combining both medical fields is Yomi, which is intended to provide assistance in both the planning (pre-operative) and the surgical (intra-operative) phases of dental implant surgery.

Commenting on receiving FDA clearance in March, Neocis CEO and co-founder Dr Alon Mozes said, “We are excited to achieve this important milestone for Yomi. We look forward to further demonstrating the benefits of Yomi to the surgeon’s practice and their patients and to bringing the system to select key opinion leaders in the United States.”

According to Neocis, Yomi is engineered to eliminate dentists’ dependence on plastic drill guides, which can impede the site of surgery and block proper irrigation and visibility. The computerised navigational system delivers physical guidance through the use of haptic robotic technology, which provides sensory feedback and constrains the drill in position, orientation and depth. Notwithstanding its digital guidance, the surgeon remains in control and can dynamically change the plan during the procedure, the company emphasised.

Neocis further noted that it is committed to ensuring that dentists who choose to use Yomi in their practice undergo sufficient training on the use of the software and the workflow of the system.

The first clinic to use Yomi in daily practice will be the South Florida Center for Periodontics and Implant Dentistry in Boca Raton, Florida, Neocis stated in a press release. The system has been installed, and Drs. Jeffrey Ganeles, Frederic Norkin and Liliana Aranguren have completed training.

OSA and implant complications

By DTI

VITORIA, Spain: There has been increasing awareness of the reciprocal relationship between obstructive sleep apnoea (OSA) and dental problems, for example sleep bruxism and a higher clench index. However, few studies have investigated the role of OSA in the occurrence of technical failure in fixed prostheses, especially those that are implant borne. A Spanish study has now found that over 80 per cent of the patients with OSA experienced implant problems—suggesting a potentially strong correlation between the sleep disorder and implant complications.

Aiming to analyse the frequency of prosthetic complications in implant-borne prostheses, a group of researchers from Vitoria investigated implant failure in 67 patients. They identified 30 complications affecting 22 prostheses among 16 patients. Of these, 13 also had OSA (81 per cent).

Complications included porcelain fracture (14 events), screw/implant fracture (eight events), screw loosening (three events) and de-cementation (five events). According to the researchers, most of the complications occurred in the posterior segments. Moreover, the highest apnoea-hypopnea index score, and thus the severity of OSA, was identified in patients with a fracture complication related to an implant, a screw or a porcelain crown. The study showed The average time for problem occurrence was 73 months after insertion of the implant.

The study, titled “Frequency of prosthetic complications related to implant-borne prosthesis in a sleep disorder unit”, was published in the February issue of the Journal of Oral Implantology.
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The use of narrow implants

By Dr Huub van’t Veld, Netherlands

The development of very narrow implants can provide a solution for interdental spaces in the aesthetic zone that are smaller than 5–6 mm and in which implant placement is indicated to fill the diastema with an implant-supported crown. Increasingly, in the choice of implant, not only the quantity (> 1 mm) and quality of the surrounding bone are important, but the supporting function of the bone to obtain a good mucosal seal is too. The major implant brands have developed small-diameter implants for these narrow spaces. Nobel Biocare has the 3 mm NobelActive implant, concerning which many publications have already appeared. Dentistry Inc has the OsseoSpeed 3 mm implant (part of the Astra Tech Implant System) and the Xive 3.0 implant.

In 1976, already, the US Food and Drug Administration defined implants with a diameter of 3 mm and greater as conventional dental implants. In 1997, this agency defined implants with a diameter smaller than 3 mm as small-diameter implants. This mainly concerns one-piece implants used in very narrow jaws for a removable device or as an anchor for orthodontic appliances. These implants often consist of one piece owing to the fragility of the connection between the implant and abutment in such a narrow diameter. Unfortunately, they offer too few options for a crown because it is not possible to choose abutments with different angles for a perfect prosthetic solution. Therefore, the practitioner has to choose an implant with a separate abutment. Most narrow implants have a conical connection between the implant and abutment. This connection is attached via a screw. Stress tests have shown that the screw is the most limiting factor with stress. A solid abutment and a conical connection with a Morse taper of sufficient length and a cone of between 15 and 4° result in a nearly leakproof and rigid connection between abutment and implant. This is referred to as a "cold weld." This makes such an implant almost as strong as a one-piece implant.

In this article, I discuss the treatment procedure of two patients I treated with 2.8 mm Axiom implants (Anthogyr) and present the final results.

Case 1

The first patient was referred to me by her dentist owing to a persistently strong mobility of her tooth #53. Tooth #53, which had previously caused pain and had begun to exhibit mobility, was referred to me immediately after implantation. Tooth #53 was congenitally absent, as was tooth #23, which I had already removed atraumatically. Tooth #13 was congenitally absent, as was the mesial and distal papilla. I removed tooth #13 atraumatically; the mesial and distal papilla remained intact. By using a very sharp osteotome (Nentwig) as a guide, I determined the location (more palatal) and direction of the preparation (Fig. 3). I gently tapped the osteotome to approximately 2 mm (according to calibration) into the jaw bone, and by rotating it slightly, I achieved a good guide preparation. After this, I used the K-system (Dentaky) for further preparation (Fig. 4). This set consists of a hollow drill shaft containing a grinder in which, during further preparation, the bone is collected and then used to fill the space around the preparation and the residual alveolar bone. I drilled to no more than two-thirds of the desired preparation length. The narrowest K-drill has a 3.2 mm diameter so that the preparation at the top is slightly wider than the 2.8 mm implant to be used. This allows one to adjust the implant somewhat in the axial direction if necessary. I used a 2.6 mm of the Anthogyr implant system (Fig. 5) to prepare to the correct length. The total length of the preparation was 13 mm, allowing placement of the implant 1 mm below the bone crest (Fig. 6). In this manner, very good primary stability is achieved (> 35 Ncm) (Fig. 7).

After fitting a temporary abutment, the implant was placed in the bone with a transfer key (Fig. 8). I fabricated a temporary composite crown. A PEEK temporary abutment is easy to construct using composite or temporary resin. This

Fig. 1. Initial situation with the strongly resorbed tooth #53 in situ. — Fig. 2. Dental panoramic tomogram showing the initial situation. — Fig. 3. The preparation was performed precisely using a Nentwig osteotome. — Fig. 4. The autologous bone was ground and harvested using the K-system. — Fig. 5. The temporary crown in situ. — Figs. 11a & b: (a) Transfer of the abutment with a transfer key. (b) Structure impaction using the SafeLock instrument. — Figs. 12a – c: (a) Result six months after starting treatment. (b) Result 20 months after starting treatment. (c) Radiograph 20 months after starting treatment. — Fig. 13: Clinical image of the initial situation with bonded bridge in situ.
temporary abutment also has a 1.5° Morse taper, which provides good friction retention and does not damage the crown in the implant. Before placing the temporary crown, I applied the bone obtained in the hollow drill shaft on the labial side and condensed it so that the alveolus was filled properly (Fig. 9). The temporary crown was shaped in such a way in the cervical area that the alveolus was completely covered. I checked that there was no functional stress (Fig. 10). At the follow-up a week later, good adaptation of the mucosa was already visible and the patient reported no problems.

After ten weeks, I removed the temporary crown and abutment. This is easy using crown removal pliers vertically. Using a pop-in impression coping, I took an impression in a closed tray. The laboratory then made the permanent crown. The temporary crown with PEEK abutment was easily repositioned. In this case, I arranged for the crown to be returned from the laboratory separately from the abutment. The construction then had to be fitted from the model of the mouth with a transfer key (Fig. 11a) because the structure is not identical. Therefore, it can be cemented in several ways because there is no internal indexing, such as a trilobe or internal hex. After fitting the crown, which was ideal in both colour and shape, the structure was secured using the Safe Lock instrument (Anthogyr; Fig. 11b). This device is connected to the micromotor and produces short micro-strokes after activation using the foot pedal. Five strokes is sufficient to lock the abutment in place in the implant. The cold weld is then complete. I then cemented the crown accurately in the mouth with luting cement. At the six-month (Fig. 12a) and 20-month (Figs. 12b & c) follow-ups, good adaptation of the mucosa was seen, and the results were considered to be good too.

**Case 2**

The second patient approached me at the suggestion of a dental student who had read an interview about my first experiences with narrow implants. The patient was no longer satisfied with the bonded bridge that replaced her tooth 822 owing to agenesis. She also found that the tissue increasingly appeared indented at that location (Fig. 13). The radiograph taken at the initial consultation showed significant convergence of the radicles of teeth 821 and 823. The interdental space was 7.4 mm, but only 5.2 mm apically (Fig. 14).

I approached this challenge with a 2.8 mm implant. I immediately took an impression to make a temporary crown later. After I had removed the bonded bridge, I made a crestal sulcular incision around the implant, after which I tried to remove as little mucosa as possible. Again, I started by creating a guide with the osteotome (Neentwig), which allowed me to determine the position and direction. By using a slightly larger condenser, I carefully pressed the labial wall down. As there was no large alveolus (no extraction had been done), applying autologous bone using the K-system was not necessary, and I only needed to use the condensation technique. Again, the preparation was done to the correct length using the 2.6 drill. I made a direct temporary crown on a PEEK abutment and paid much attention to the cervical area to create the shape and a proper emergence profile. In this case, an additional complication was that I had to consider the robustness and reliability of the temporary crown because of her six-month stay in Africa immediately after seating of the temporary crown on the implant. Based on my experience using this method for seven implants, I was able to reassure her.

After six months, the patient returned to the practice and reported that she had not experienced any problems. I observed good adaptation of the mucosa (Fig. 15). After removing the temporary crown, which revealed an excellent emergence profile with healthy mucosa, I made a pop-in impression coping (Fig. 16). The laboratory again provided the structure with the separate crown. However, in this case, I decided to seat the crown as a whole after having fitted it satisfactorily and bonded it outside the mouth. This allowed me to avoid any embedding of cement residue (Fig. 17). However, I had to exercise greater care because I now had to tap the Safe Lock instrument directly on the zirconium dioxide porcelain crown to secure the abutment. A special attachment is available for this, which allowed fixture without any difficulties (Fig. 18). For this patient, I paid much attention to the cervical gingival line. Tooth 822 was a cone tooth constructed with composite. This achieved a good result (Figs. 19–20b).

**Discussion and conclusion**

I inserted my first 2.8 implant in 2013. Initially, I had some doubts about implants of such small diameter and bad questions such as: Is the construction strong enough? Will it not break? Will the abutment-implant connection remain intact? However, although the use of such narrow implants remains a challenge, it has so far only yielded positive results. Nevertheless, I would like to make some remarks based on my experiences:

1. All of the major brand implant systems marketing narrow implants have paid much attention to the root shape of the implant with threads that have a condensing effect. This significantly increases the primary stability, which enhances osseointegration.
2. This primary stability also results in greater usability in immediate placement and provides the option of seating a temporary crown immediately.
3. The PEEK abutment used in this system has been proven to allow trouble-free retention over a longer time. Because in these cases, the implant was placed subcortically and despite the small space, there was still enough surrounding bone, I observed good support of the mucosa and the presence of a good mucosal seal. In these cases, a 2.8 mm platform form was used as a superstructure with a platform switch. As a result, a proper emergence profile was achieved with the temporary crown.
4. Particularly with regard to reduced mesiodistal spaces, the use of an implant with a small diameter is a solution, but only in the aesthetic zone, where no extreme transverse stress will be placed on the implant. I believe that with excessive stress and great forces, because the implant is so narrow, the abutment-implant connection could be a limiting factor.
5. The faco-lingual bone thickness is less restrictive in the application of a small-diameter implant because with several techniques, such as bone splitting and harvested autologous bone with the K-system or possibly with a bone graft, more volume can be created in a less invasive way. In order to achieve a good result, it is necessary for the practitioner to have the choice of various abutments. Therefore, one of the two-piece implant systems should be chosen. A narrow one-piece implant is less suitable for the aesthetic zone.
6. The solid connection between abutment and implant with the Morse taper connection is indeed strong and poses no risk of screw fracture, but there is no return. The implant becomes a one-piece implant with the solid abutment. By using Grade 5 titanium, strength is assured: extensive test results have been carried out up to 202 N. The positioning and permanent fixing of the restoration do require more attention than with a screwed abutment. For instance, a break in the crown may only be repaired by using the abutment for a new impression of the crown stamp. It is unfortunate that only titanium abutments are available (owing to the strength). However, these are so narrow that there is enough body for the crown to make the restorations aesthetically pleasing.

The use of a narrow implant in a very limited space requires a well thought out diagnosis, great precision of work, and good use of and experience with different implant techniques. These cases were not treated using any guided surgery, but this could be recommended for precise implant positioning.