issn 1868-3207 • Vol. 25 • Issue 3/2024

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international magazine of oral implantology

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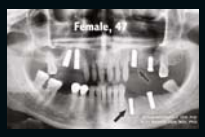

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Dr Georg Bach

President of the DGZI

Pioneering insights and innovations in implantology

Dear colleagues!

In today's rapidly evolving dental landscape, implantology is a dynamic field where innovation and precision converge. This issue not only highlights the latest technological advancements but also celebrates the passion driving these breakthroughs.

A key focus is the revolutionary application of Pulsed Electromagnetic Fields (PEMF) technology. This innovation opens new possibilities for accelerating healing after implant procedures and enhancing long-term stability. By improving bone quality and increasing implant stability in the early stages, PEMF represents a significant advancement that enhances patient outcomes while offering economic benefits for practices and laboratories.

In addition to these technological strides, we are excited to spotlight the upcoming DGZI congress, a key event for professionals in our field. This congress is a unique opportunity to engage with the latest research, connect with industry leaders, and explore innovative approaches that are shaping the future of implantology. The event promises a rich programme of lectures, workshops, and discussions that will provide invaluable insights and practical knowledge, helping us all to elevate our practice standards.

As we prepare for this important event, we also pause to recognise the individuals driving these innovations. An exclusive interview with a leading expert offers insights into the passion for customer care, innovation, and growth that propels our industry. These stories remind us that every technical achievement is the result of dedication, hard work, and a commitment to excellence.

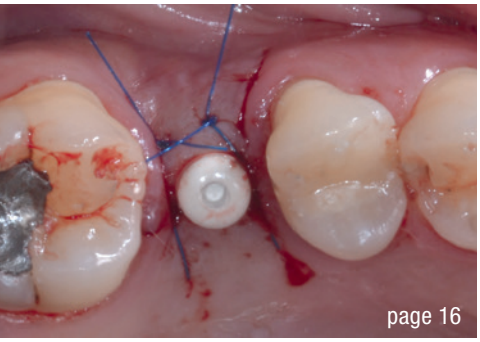
In closing, we extend our deepest gratitude to you, our devoted readers. Your unwavering support and dedication to advancing implantology are the forces that propel us forward. Together, let's embrace this exciting era, elevate the standards of dentistry, and provide our patients with the highest quality care.

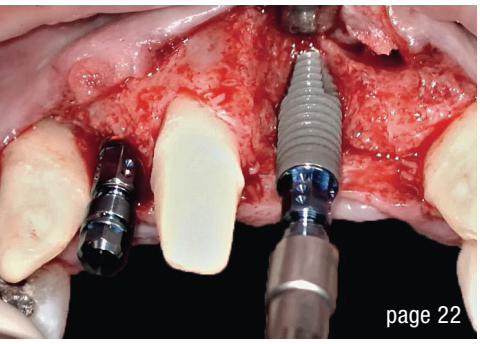
Sincerely,

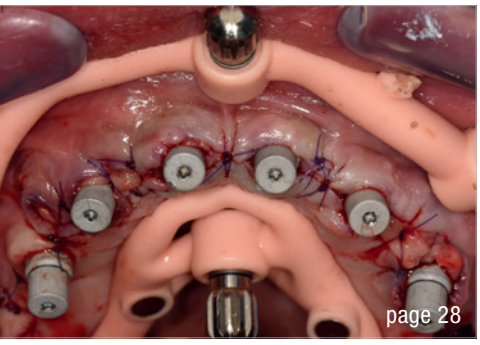
Dr Georg Bach

President of the German Association of Dental Implantology

Dr Georg Bach







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[1] Semper-Hogg, W, Kraft, S, Stiller, S et al. Analytical and experimental position stability of the abutment in different dental implant systems with a conical implant–abutment connection Clin Oral Invest (2013) 17: 1017.
[2] Semper Hogg W, Zulauf K, Mehrhof J, Nelson K. The influence of torque tightening on the position stability of the abutment in conical implant-abutment connections. Int J Prosthodont 2015;28:538-41.

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Redefining dental care standards with advanced proven PEMF technology

Prof. Shlomo Barak DMD, Israel

Pulsed Electromagnetic Fields (PEMFs) technology, known for its therapeutic benefits, has gained recognition for its non-invasive nature and ability to fully penetrate tissues. It has been extensively studied for its impact on biological processes, including DNA synthesis, gene expression, and cell migration.

PEMFs therapy has found applications in various medical and dental treatments, offering relief from postoperative pain, managing inflammation, and aiding in bone and wound healing. This review explores the historical development of PEMFs technology, detailing its *in vitro* and *in vivo* studies, and highlighting its diverse therapeutic applications in medical and dental fields. From its origins in the 19th century to modern-day applications, PEMFs have evolved into a promising therapy with significant potential in clinical settings.

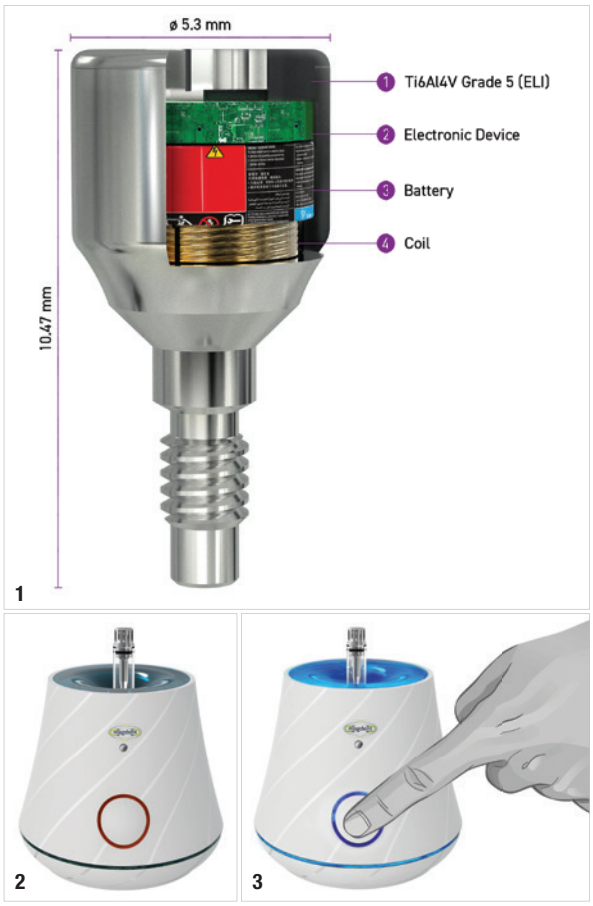
This innovation is not just a breakthrough in patient care; it represents a substantial growth opportunity in the dental tech market. Implementing Magdent's device in clinics has shown to increase income by offering efficient, premium treatments and helps implant companies to save millions on their R&D pipeline, offering its technology with their products.

In vitro studies demonstrate PEMFs' ability to influence cellular activities, such as apoptosis, proliferation, and differentiation, through modulation of ion channels and signal transduction pathways. *In vivo* studies further support these findings, showing effects on tissue hypoxia, capillary blood flow, and wound healing.

PEMFs in implantology

Pulsed Electromagnetic Fields (PEMFs) have made significant strides in dental applications, particularly in dental implantology. Dental implants, which rely on primary stability for successful osseointegration, often face challenges with poor bone quality. Studies have shown that PEMFs stimulate bone formation, induce osteoid formation, and promote neo-vascularisation, ultimately improving bone quality around dental implants.

Magdent with its exclusive proprietary patents has developed a Miniaturised Electromagnetic Device (MED) for PEMFs therapy in dental implants. This device, resembling traditional healing abutments, significantly improved implant stability, bone quality, and reduced pro-inflammatory cytokine levels compared to conventional healing abutments. It was found to enhance implant stability, particularly in the early healing phases, and contribute to improved bone development surrounding the implant.



Figs. 1–3: A cross-sectional view of the Miniaturised Electromagnetic Device (MED) healing abutment **(1)**; an activator device which triggers the battery in the MED **(2 & 3)**.

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1 Norton MR, Astrom M. The influence of implant surface on maintenance of marginal bone levels for three premium implant brands: A systematic review and meta-analysis. Int J Oral Maxillofac Implants 2020;35(6):1099-111

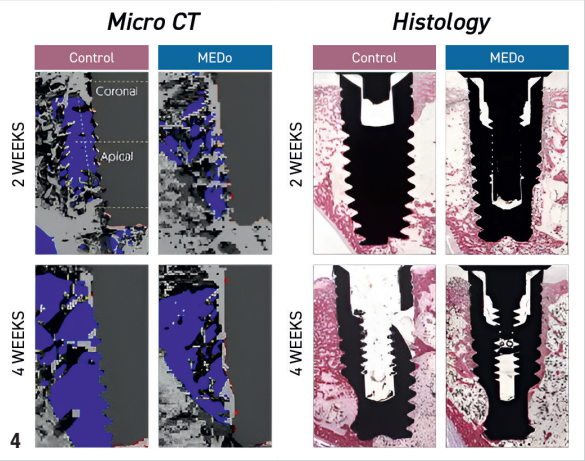

Fig. 4: Bone-to-implant contact higher in test implants after two weeks and stable after four weeks.

Furthermore, PEMFs therapy has shown promise in treating peri-implantitis, a common complication that can lead to implant loss if untreated. Studies have investigated the use of MED in implants affected by peri-implantitis, demonstrating significantly less crestal bone loss, lower levels of pro-inflammatory cytokines, and overall improvement in clinical parameters compared to conventional treatments.

The introduction of the Miniaturised Electromagnetic Device (MED) marks a significant advancement, particularly in dental implantology, by promoting implant stability, osseointegration, and antimicrobial effects, improve bone quality and address complications as peri-implantitis (Figs. 1–3).

Magdent has been working for the past few years with world-recognised researchers such as Prof. Jamil Shibli, Dr Yaniv Mayer and Dr Alberto Monje, supported by its founders, Prof. Shlomo Barak and Dr Moshe Neuman.

Based on Magdent's disrupting results, the company has been working with leading dental implant companies to distribute its products through their distribution channels, currently available in Europe, and targeting its launch in the US towards the end of 2025.

Increasing bone-to-implant contact & trabecular bone volume density: "A new device for improving dental implants anchorage: a histological and micro-computed tomography study in the rabbit". Barak et al. Clinical Oral Implants Research. 2016 Aug;27(8):935–42.

Dental implants typically require a two- to six-month healing period before loading, but shortening this time increases failure rates, particularly for unsplinted implants. Immediate loading necessitates primary stability and adequate bone tissue quantity and quality at the interface, affecting prognosis. Additional stimulants for enhanced osteogenesis are needed to overcome failures, especially in poor bone quality, and shorten loading times.

The study conducted on rabbits involved the insertion of implants in the proximal tibial metaphysis, with half receiving a healing cap containing an active PEMF and the other half receiving a traditional cap. At two and four weeks, samples underwent micro-computed tomography and histology. Results showed significant increases in trabecular bone fraction, trabecular number, and connectivity density in the coronal region of test implants compared to controls at both time points. Additionally, bone-to-implant contact was higher in test implants after two weeks and remained stable at four weeks (Fig. 4). The study concludes that the PEMF device accelerated early bone formation around dental implants resulting in higher peri-implant BIC and bone mass already after two weeks which suggests an acceleration of the osseointegration process by more than three times.

This marks a significant milestone for millions of chronic patients with poor bone quality, including those suffering from conditions like diabetes, osteoporosis, and heavy smokers, all of whom are at a high risk of failure.

Effect of PEMF on Dental Implants Stability—Accelerating Osseointegration: "Effect of the Pulsed Electromagnetic Field (PEMF) on Dental Implants Stability: A Randomized Controlled Clinical Trial". Bhukya P. Nayak et al. Materials. 2020 Apr 3;13(7):1667.

The waiting period for functional loading after osseointegration can be lengthy in dental implants procedures. Recent advancements allow for earlier loading, addressing patient discomfort and improving quality of life. Primary

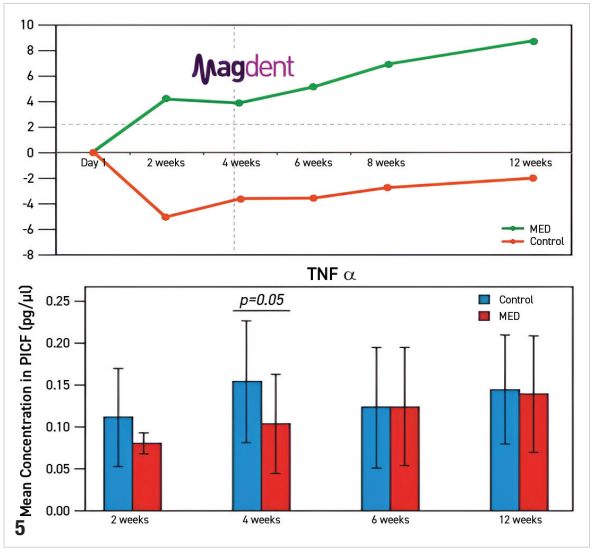

Fig. 5: Implant stability change from baseline in ISQ (Implant Stability Quotient).

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