**Press release**

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#Idscologne

# Artificial Intelligence enhances backward planning, stackable guides complement the classic surgical drilling template

## AI-supported planning - classic and stackable surgical guides, material and surface optimisation - relevance of decisions at the International Dental Show

Digitalisation in implantology continues with new tools: Backward planning is becoming even more efficient as a result of the integration of artificial intelligence (AI) elements. This enables treatment to be designed with a higher likelihood of success and greater comfort for the patient. Furthermore, new developments are also emerging for the classic implant material titanium - the entire spectrum of these optimisation possibilities will become tangible at the 42nd International Dental Show (IDS) in Cologne from 16 to 20 March 2027.

Backward planning, from the desired prosthetic outcome through to the optimal positioning of implants, is well-established among the dental and dental technician team. Specialised dental software assists in the precise alignment of imaging data generated via various measurement methods, such as radiographs or model scans. This even enables precise initial proposals regarding the implant therapy to be carried out. Today, this form of three-dimensionally planned, template-guided implant insertion is the clinical standard.

Artificial intelligence is increasingly providing additional support. For instance, it considerably facilitates the superimposition (matching) of different file formats such as DICOM and STL. If numerous image files are available, AI can merge them in one single workflow step. During the subsequent computer-assisted planning, AI also helps minimise the risk of future bone loss and proactively prevent mechanical overloading of the overall system comprising implants and prosthetics.

Moreover, artificial intelligence renders valuable service in the segmentation of bone and individual teeth, the automatic tracing of panoramic curves and the automatic detection of nerve structures. Using modern AI algorithms, even complex further developments in stackable guides can already be taken into account in the planning phase.

Where template-guided implantation reaches anatomical limits, the procedure using multiple stereolithographic templates stacked on top of one another ("stackable guides") offers an outstanding alternative - although this approach is somewhat more complex to handle, it remains minimally invasive and demonstrates its strengths particularly in cases of uneven bone anatomy following an extraction. Above all, this

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procedure allows for the exact positioning initially of provisional restorations for immediate loading, as well as for the subsequent definitive restorations. What's more, several implants can be inserted rapidly one after another, noticeably reducing the treatment time. The imaging systems required for this, along with the software and further solutions, can all be found at IDS 2027.

Thanks to the high level of precision in each of these work steps, long-term provisional restorations can be fitted at ever-shorter intervals following the surgical intervention. This reliability is an indispensable prerequisite for prosthetic success, particularly in demanding, screw-retained suprastructures.

New development potential is even still emerging for the primary implant material, titanium. In both clinical practice and science, the significance of the passivation layer on the titanium surface, which measures around ten nanometres, is undisputed, as it lends the metal its high biocompatibility and supports the human bone during the healing process. Due to targeted fine-tuning of this oxide layer, which - as one now knows - occurs in three different crystalline forms and one amorphous form, previously untapped biological optimisation potential can be exploited.

Furthermore, it is already becoming apparent on the horizon how collaborative robot systems ("cobots") could support the implantology team in day-to-day surgical routines in the future. As intelligent assistants, they are to help make procedures even more precise, time-saving and safer by supporting guided implantation directly at the ideal position.

"The incorporation of AI into implantological backward planning can improve the precision of implantations, the time required and patient comfort," explained Sebastian Voss, Deputy Chairman of the Executive Board of the Association of the German Dental Industry (VDDI). New methods such as stackable guides would complement the classic surgical drilling template as an additional option in complex cases. The VDDI Executive Board also still sees immense potential in the established material titanium: The chemical and nanostructural complexity of titanium surfaces offers far more starting points for optimisation than previously assumed. "Although possibilities for the partial automation of individual surgical steps are becoming apparent today, the implantologist remains the decisive surgeon for the foreseeable future." Visitors will experience all this and more from the field of dental implantology at the upcoming leading global trade fair, according to Voss. Based on this solid foundation of information, the right decisions can be made for the future alignment of both practices and laboratories.

**About IDS**

The International Dental Show (IDS) takes place in Cologne every two years and is organised by the GFDI Gesellschaft zur Förderung der Dental-Industrie mbH, the commercial arm of the Association of the German Dental Industry (VDDI), and hosted by Koelnmesse GmbH, Cologne.

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