

From concept to patented innovation

Implantology is shaped by constant development and innovation. Dr Dr Gerd Axel Walther, an oral surgeon and practice owner from Germany, has had a remarkable journey, during which he developed a new implant system that stands out for its patented design principles. In this interview with Timo Krause and Henrik Eichler from OEMUS MEDIA AG, Dr Walther offers insights into the inspiration behind this innovation, the development process, and the unique attributes of his implant system.

Dr Walther, the ZIRKONUS implant system is a metal-free, modular system that comes in single- and multi-part versions. One of its standout features is the patented coupling mechanism between the implant, abutment, and crown in the multi-part system. The design harmonises perfectly with the material properties of ceramic. What motivated you to develop a new type of connection?

The pivotal moment came when the manufacturer of the implant system I was using in my practice transitioned from a transgingival concept to a bone-level approach. Although I had been highly satisfied with the previous system, the often-visible dark titanium beneath the gum tissue was aesthetically unpleasing. I was also concerned about the long-term health effects of metal oxide release. It became clear to me that simply changing the material was not enough—the design itself needed to be rethought. Instead of opting for a hybrid solution with a steel screw or a shoulder support, I wanted to develop a truly ceramic-appropriate design that maximised the material's unique properties.

Could you walk us through the development process?

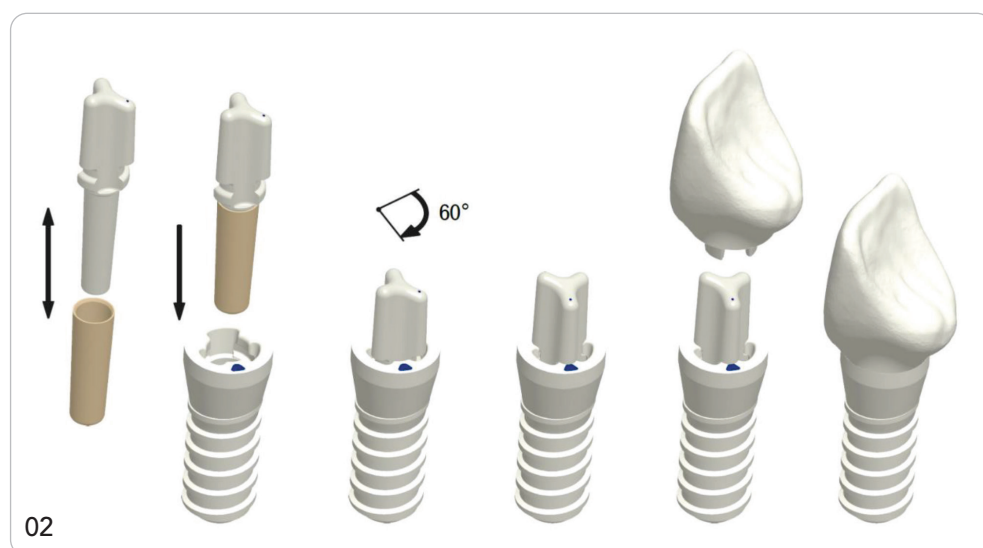
In the beginning, I found myself sitting on my sofa, reflecting on the best way to bring this concept to life. I started by sketching my ideas on paper and discussing them with experts in the field. The actual development took off after I secured the patent for my system in 2007.



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Dr Dr Walther, oral surgeon and practice owner, discussing the development of the ZIRKONUS implant system.



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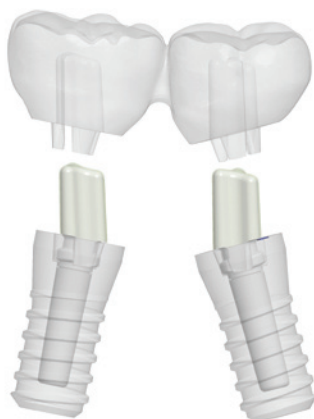
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Connection between the implant body and abutment via a Renk connection. The abutment rotates 60 degrees to the right, lowering by 5 degrees into the final position when screwed in. Rotational stability is achieved by securing the dental crown.

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Implant, custom
abutments, and
bridge on
non-axially
aligned implants.



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One of the defining characteristics of the design is how the components fit together like a three-dimensional puzzle, significantly reducing the hollow spaces typically found in screw-based connections. Later, patents were also secured in the EU and the USA.

What were the main challenges you faced during the system's introduction?

Finding the right industrial partner proved to be much more difficult than I anticipated, especially when it came to meeting ISO standards and ensuring the material's durability. After investing a considerable amount of time and resources, I decided to take matters into my own hands and develop the implant system independently. Today, we can produce implants with undercuts in various sizes, and I believe this capability is one of the company's most valuable assets.

Please explain the core principles behind the system.

The ZIRKONUS system stands out for its screwless design, made entirely from ceramic material. Surgeons using this system must adjust to a new approach, as its geometric structure is fundamentally different from metal-based systems.

The system features a patented "Renk connection" between the implant and abutment. When the abutment is screwed in, it lowers by 5 degrees into place. The anti-rotation mechanism is secured with the placement of the dental crown. The abutment, made of zirconium dioxide, utilises a PEEK sleeve for optimal force transmission to the implant walls. This eliminates the need for screw channels in both the abutment and superstructure, enabling more delicate abutments and frameworks. Additionally, the design minimises hollow spaces, reducing bacterial reservoirs common in metal-based systems. The system allows for easy replacement of secondary components, and the crown is cemented onto the implant-abutment complex. To reverse the abutment, the crown must first be removed. A colour-coded marking on the implant shoulder ensures precise placement and replacement of components.

The ZIRKONUS implant system is ideal for fixed prosthetics, whether for single-tooth restorations or bridges of any size, and is also suitable for immediate implantation procedures.

We thank you for this enlightening conversation, Dr Walther, and wish you continued success in your endeavours!



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