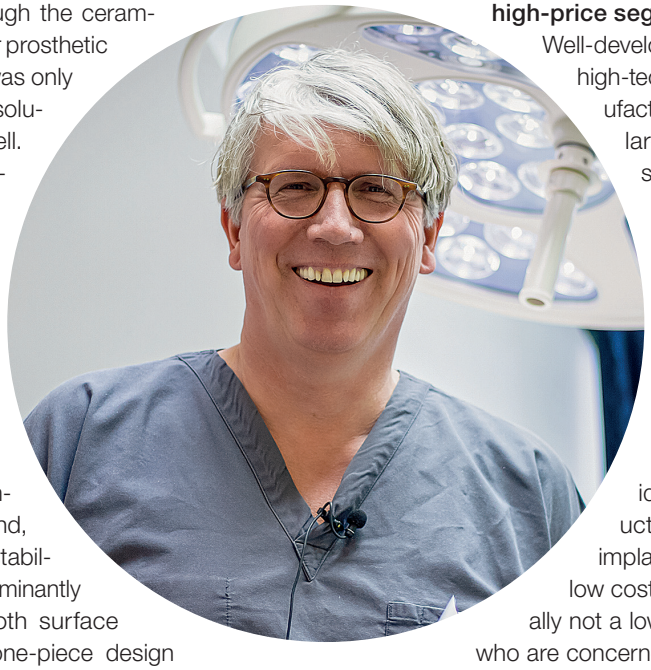
An implant suitable for all surgical indications

In this interview Dr Ralf Lüttmann, a pioneer in ceramic implantology, talks about the current state of ceramic implants and his experiences with the new SNOW implant system, the latest addition to Straumann's ceramic implant portfolio, which was developed in cooperation with Z-Systems.

Ceramic implants have been an alternative to titanium implants in your practice for two decades. Where did your early interest in this material come from?
At the beginning of the 1990s, I got to know and love the excellent tissue-friendliness and aesthetic advantages of this material through the ceramics then already available for prosthetic applications. Therefore, it was only logical to look for ceramic solutions in implantology as well. However, there were sacrifices that one had to make. On the one hand, the ceramic surfaces of the time were significantly smoother than those of titanium implants, which could make fast and reliable osseointegration more difficult due to a reduced bone-to-implant contact (BIC). On the other hand, for reasons of mechanical stability, the implants were predominantly one-piece. A rather smooth surface in combination with the one-piece design could make the early osseointegration phase challenging, and simultaneous augmentation and sinus lift procedures were not an option. In addition, the one-piece design often forced compromises in implant positioning due to prosthetic limitations.

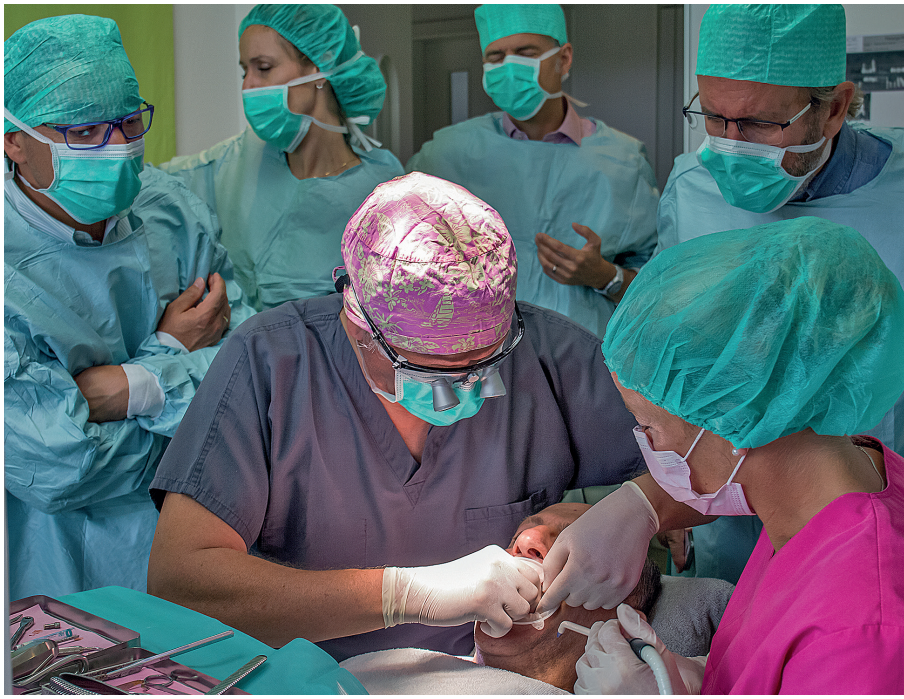


Why should every dentist today deal with the subject of ceramic implants?
Ceramic implants are high-tech products, but for a long time they had to lead a shadowy existence in the niche of holistic dentistry. But when we see the excellent mucosal behaviour around ceramics and, at the same time, given the importance of the mucosal cuff for the long-term preservation of implants, this material simply cannot be ignored. When, in medicine, we are forced to replace body parts, we should consider the use of materials that most closely match the body's own substances. Ultimately, our bone is nothing more than a calcium-based bioceramic—so what could be more natural than replacing hard substances in the body with high-performance ceramics such as zirconium dioxide? No study has investigated the risks posed by ceramics to the human body, and any dentist who wants to provide their patients with materials that are as biocompatible as possible should look into this issue.

Why are ceramic implants only available in the high-price segment?
Well-developed ceramic implants are high-tech products whose manufacturing process involves a large number of complex steps. This starts with the production of the high-purity ceramic powder and continues through the whole subsequent processing phase. More than 20 time-consuming and costly production steps are necessary from the original zirconium dioxide powder to the final product. A high-quality ceramic implant cannot be produced at low cost today. Implants are generally not a low-budget solution. Patients who are concerned with implants know that this type of tooth replacement is more expensive and are willing to invest in the best possible quality of life. Implant patients for whom quality of life means not only good function but also a highly aesthetic solution, and one that is as compatible as possible with their body, often explicitly demand ceramics. It is less a question of price than of the patient's attitude.

Are all ceramic implant systems on the market equally well-engineered?
All ceramic implant systems today are based on zirconium dioxide (ZrO_2). However, the systems differ significantly in terms of macro design, secure osseointegration and long-term stability. Many systems are one-piece designs and mostly tissue-level concepts. Among the

two-piece ceramic implants available on the market, there are also serious differences in the abutment-to-implant connection. Studies by Holger Zipprich and others show that conical connections are very stable and greatly reduce the risk of abutment loosening or pumping effects known from hex connections. This promotes the long-term success of the prosthetics and the preservation of the crestal bone. However, the production of a conical connection in ceramic requires extremely high manufacturing precision, which is why most ceramic implant brands do not currently offer this type of two-piece connection.



In addition, there are also huge differences in the manufacturing process, from the original powder form to the finished implant, which have a significant effect on the mechanical stability and ageing resistance of the implants. The base material is almost identical, and all implants are called zirconia ceramic implants. However, the manufacturing process—whether injection-moulded, milled from the sintered material, or milled from a sintered and additionally compressed material—means that the strength values differ considerably. Especially with ceramics, it is not the external design that is decisive for long-term success. The difference lies in the processing of the powder into a highly stable finished product, the surface treatment for secure osseointegration, and the precise connection between implant and abutment. As banal as it may sound: experience in the very specialised manufacturing process is what distinguishes long-standing ceramic implant manufacturers from their competitors who have only recently embraced this technology.

What are the specific advantages of the new Straumann SNOW implant?
SNOW is the first truly reversibly screw-retained all-ceramic implant system at bone level: ceramic implant, ceramic abutment and ceramic connecting screw. The special feature is the true bone level design with platform switch and excellent mucosal adaptation in the important transition area of the implant abutment. Thus, this implant is suitable for all surgical applications in implantology in all bone qualities, including immediate implant placement after extraction, simultaneous internal or external sinus lift, or extensive accompanying augmentation. The drilling instruments are available with integrated drill stops, which simplifies surgery for less experienced users and provides additional safety for experienced ones in critical situations. Speaking of prosthetics: for SNOW, a large number of ceramic standard abutments are available for prosthetic restorations, enabling simple solutions for all cases. Analog impressions are possible both indirectly and directly, and the abutments are optimised for intraoral scans to allow direct scanning at abutment level as an alternative to scan bodies. As for full-arch treatments: So far, it was possible to place six or more one-piece implants with good bone quality and to splint them by means of a fixed temporary, because other there was an increased residual risk of biomechanical overload. This risk is greatly reduced with SNOW. The prosthetic restoration is performed using fixed bridges, removable telescopic constructions or SNOW-Loc, a locator-based solution.

What advice would you give colleagues interested in starting to work with ceramic implants?
Dentistry, and implantology in particular, is an empirical discipline. If our titanium pioneers had waited for studies, we would not be where we are today. Today, ceramic implantology works just as well in clinical practice as titanium implantology. In the long term, ceramics might be even better because of the more stable perio-integration. My advice to interested colleagues is clear: start as soon as possible, deal with the material and its handling, and attend specific training courses. As a dentist, ceramic implants allow you to make a relatively strong name for yourself within the oversupplied field of implantology that exists today from the patient's point of view.

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