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Ceramic implants— current state of discussion

Dear Readers,

When the idea for this magazine was first presented at the IDS 2017, it was not yet foreseeable that in the months leading up to the first publication in fall 2017 the developments of the ceramic implant market would yet be speeding up. Numerous dental businesses were introducing new or newly acquired ceramic implant systems. The first publication of *ceramic implants—international magazine of ceramic implant technology* thus occurred in a highly sensitive environment and consequently received much attention.

If one is closely following the discussions regarding ceramic implants of the past months and years—may it be by reading, among others, this magazine or by participating in the specialist congresses e.g. in San Diego, USA (IAOCI), Constance, Germany (ISMI) or at the diverse ITI sessions—certain topics have become especially prominent:

On one hand material and processing characteristics are concerned—taking into account the monoclinic and tetragonal phases of zirconium dioxide (ZrO_2)—defining the mechanical and prosthetic capacities of the implant body. As implant material ZrO_2 can resist extreme loading forces in the tetragonal phase (compared to the monoclinic phase) and its high biocompatibility makes it an ideal dental material. However, owing to its tremendous stiffness in comparison to titanium it is also prone to fractures at the load limit—as has been noticed in the past. This consequently has an influence on the design (production), application and the characteristics of

one-piece and two-piece (screw-retained or cemented) implant systems. Thus we are reaching the second discussion topic: One-pieced or two-pieced?

The advantage of one-piece ZrO_2 implants is the absence of a micro-gap. The experts however recommend—and here the opinions and methods still widely differ—to forego a possible prosthetic follow-up processing by grinding the implant head as it can impair the surface characteristics (tetragonal > monoclinic). Thus, naturally also the indication area is restricted, as the surgically best position does not necessarily lead to the most reasonable prosthetic solution.

According to the experts, also with two-pieced, screw-retained systems, owing to the material solidity of ZrO_2 and in case of faulty design, there is a risk of fractures or loosening at the implant–abutment connection. Manufacturers of the newest two-piece systems are, however, stating that these risks have been overcome as the design was adjusted accordingly and no significant disadvantages in comparison to two-piece titanium implants have to be feared. Further the prosthetic diversity of two-piece ZrO_2 systems, especially when combined with thorough digital planning, makes it possible to join the necessary prosthetic solution with the surgically reasonable position of the implant. Overloading and faulty functionality including the presumed fracture risk can be avoided in advance. The newest generation of bone-level ZrO_2 systems is closing important indication gaps in comparison to titanium systems.

Yours, Georg Isbaner