

## **Metal-free Dental Implantology: Zirconia, what's Next?**

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### Abstract

The development in biomaterials and the development of the concept of osseointegration by the end of the 1970s allowed making a true, functionally effective substitution of missing teeth. Since then, titanium is the golden standard biomaterial in dental implantology with very good clinical outcomes. However, the esthetic outcome of restorations supported by titanium implants could be not satisfactory in the frontal teeth for the gray shadow appearing through a thin peri-implant mucosa, or if grey “collars” appearing due to soft tissue recession. Furthermore, concerns about a potential health hazard in titanium particles or possible hypersensitivity to corrosive products is leading an increasing number of patients to ask for metal-free treatment options. Zirconia is the answer to this demand. Introduced in dental implantology in the mid-1960 by Prof. Sami Sandhaus (the SIGMA® implant system) it is now in use in a number of dental implant systems, as well as in conservative dentistry devices (e.g. crowns, bridges, frameworks) obtained by CAD/CAM. In the last 15 years, the design of zirconia implants evolved from simple monoblock construction to contemporary two-pieces implants, and as metal-free implantology is spreading, new materials and devices are under development like e.g. implants in functionalized PEEK, or made of new composite ceramics based on alumina and zirconia that are promising candidates for the future of dental implantology. This presentation is aimed to review the characteristics of the materials now available, the strategies adopted to enhance their bone bonding behavior, and an overview of the research in progress in the field of metal-free dental implantology.