

## **Dental Implants: from Gold to Zirconia, and beyond**

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Although Maggiolo reported the use of a gold dental implant already in 1809, the eve of dental implantology can be set in the early 1900s, when Dr. Greenfield placed a noble metals cage as an artificial root in the jawbone of a patient to replace single teeth. Others followed, using implants conceived on different clinical approaches, made out different metals like gold, stainless steel, CoCr-alloy (Vitallium™). But today implantology has its roots in the 1960s': in 1965 Prof. Per-Ingvar Branemark, who in 1965 introduced his titanium screw system that soon became - and still today is - the golden standard in dental implantology, while in 1966 Prof. Sami Sandhaus introduced the first ceramic implant, made out high purity alumina.

So far there are about 700 different implant systems in clinical use worldwide, the large majority of them made out the so-called "Commercially Pure" titanium (ISO 5832-2) either out titanium alloys, but the market share of ceramic implants made out zirconia (Y-TZP, ISO13356) is steadily growing in the last ten years.

The scientific literature shows that the osseointegration of zirconia and titanium implants is similar. In addition, ceramic implants are offering advantages over titanium in terms of esthetics and hygienic properties. The concerns of a growing share of the public about sensitization to metals is also contributing to the increase the demand of metal-free devices in dentistry.

Today, new ceramic materials with mechanical behavior enhanced in comparison with Y-TZP are under development for application in ceramic dental implants.

This presentation briefly reviews the evolution of dental implantology and outlines the development now in progress in ceramic implantology based on new dispersion ceramics, the improvements introduced in the manufacturing processes, new design of implants and on the surface treatments aimed to improve the osseointegration of ceramic devices in dentistry and in orthopedics.