

# A New Era in Implant Dentistry

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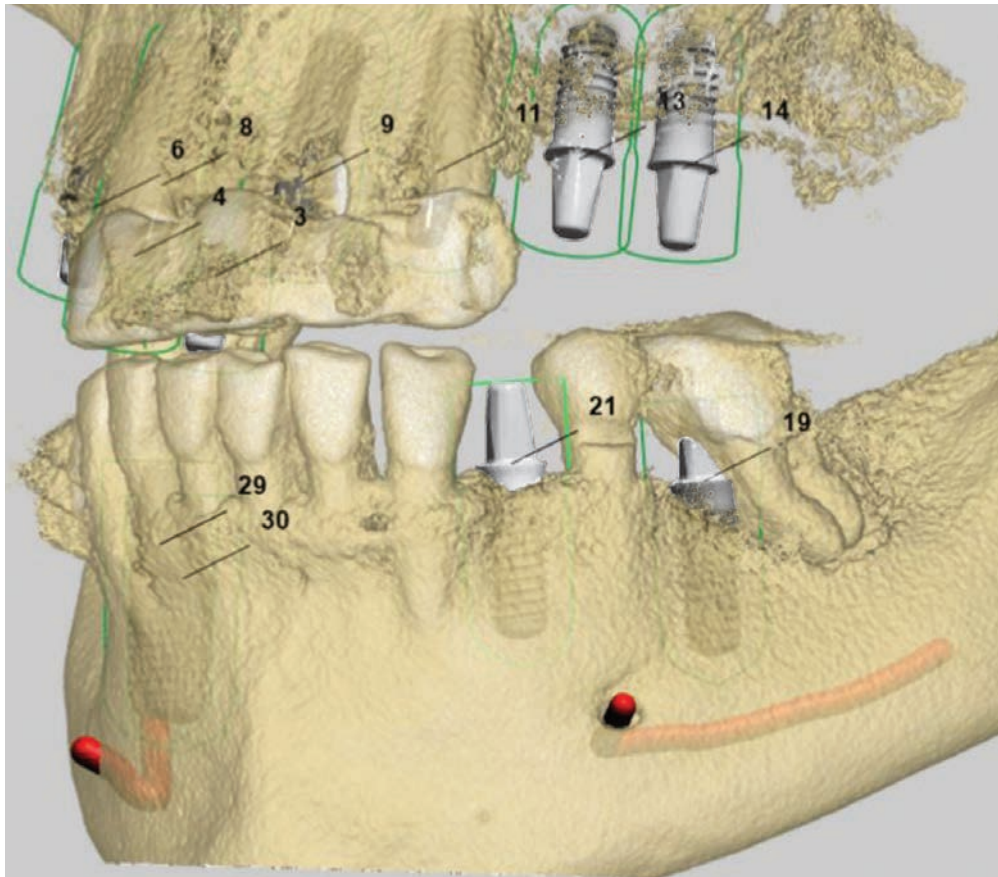


**R**estoring form, function and aesthetics have been the pillars of dentistry. An aesthetic smile along with the ability to eat significantly impacts a person's social, physical and emotional life. The search for viable means of teeth replacement and preservation has been an ongoing quest in human history. Archeological findings dating back from ancient China, Egypt and Mayan civilizations show that efforts to replace teeth is by no means a modern phenomenon. The materials utilized over millennia to replace teeth have also evolved from basic materials such as bamboo pegs, wooden wedges, sea shells, ivory to various metal alloys and composite materials.

The earliest evidence of osseointegrated dental implants was identified in the Mayan population dating back to around 600 AD where sea shells were used as implants and were proven to have successfully osseointegrated in the mandible. Modern implantology as we know it and practice today has its roots in the early twentieth century with various macroscopic designs and mostly made of metal alloys of different compositions. Research conducted during the 1950's by Prof. Branemark, Dr. Linkow and others confirmed the viability of titanium as an implant and implantable dental material. In 1965 Brånemark

who coined the term “osseointegration” placed his first pure titanium dental implant into a human jaw and for the next fifty years titanium implants revolutionized dentistry, evolved significantly and have enjoyed great success.

These original implants have undergone significant changes both at the macroscopic and microscopic level since Brånemark. Developments such as thread designs and surface modification treatments, alloying with other metals have all taken place with the



objective of improving the physical, chemical, biological properties and their behavior in human jawbone and oral environment. As a matter of fact, coating of dental implants with bioactive ceramic coatings such as hydroxyapatite began in the early 1990's.

The quest for alternative implant materials has never stopped and has intensified with the pursuit of higher aesthetics, increasing reports of metal sensitivity and mounting evidence that titanium and titanium alloys are not as biologically stable and inert as initially thought.

In the mid-60's, Prof. Sami Sandhaus developed the Crystalline Bone Screw (CBS) implant which was monocrystalline and made from aluminum oxide (alumina) and is widely looked upon as the first commercially available modern ceramic implant. In 1975 Dr. Thomas Driskell introduced the Synthodont alumina ceramic implant. Other commercially available ceramic implants subsequently came about such as the Sapphire implants from Kyocera and the Tübingen ceramic implant. However, given their monocrystalline composition they responded poorly to the harsh conditions and demands of the oral environment.

By the early 2000's ceramic materials technology matured to the point where it was now possible to have ceramic composites. Ceramic implants were now manufactured with other ceramics in order to achieve better aesthetics, but also similar or better physical and biological properties compared to metal alloy implants. At the same time patients have increasingly taken ownership of their wellbeing and the type of healthcare they choose to receive; they have been asking for less invasive procedures, materials and treatment modalities both in medicine and dentistry.

In the last ten years we have seen ceramic implants claiming their place in dental implantology. Manufacturers and dentists have responded well to patients requests and concerns so much that in less than a decade we have evolved from one-piece ceramic implants to two -piece implants and in some cases with metal free abutment connection screws. The major implant manufacturers now have ceramic implants in their portfolio, and some have simply resorted to OEM manufacturing in order to fast track their presence in the ceramic implant market. Ceramic implants still do not have the broad range of prosthetic options their titanium counterparts have. However they have become versatile and reliable enough to be used in most clinical situations. This special edition of Spectrum Implant Magazine on ceramic implantology was put together to share with the reader clinical case presentations of different ceramic implants systems in a wide range of clinical applications. ■

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