

2<sup>nd</sup> International Conference and Expo on

# Ceramics & Composite Materials

July 25-26, 2016 Berlin, Germany

## An overview of ceramics in dentistry: Basic properties and clinical applications

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Research on the possibility of using zirconia ceramics as biomaterials started about twenty years ago, and now zirconia (Y-YZP) is in clinical use in dentistry, but developments are still continuing for application in other medical fields. Mechanical properties of zirconia relate to its fine grained, metastable microstructure. The expected performances are due to the stability of this structure during the lifetime of TZP component. TZP materials, containing approximately 2-3% mol Y<sub>2</sub>O<sub>3</sub>, are completely constituted by tetragonal grains with sizes of the order of hundreds of nanometers. Basic properties and clinical applications as implants for surgery are now described by the standard ISO 13356. Different zirconia products and their applications were tested (flexural strength, K<sub>ic</sub>, XRD, SEM). The K<sub>ic</sub> (MPa m<sup>1/2</sup>) Kerox HD (12.97±1.2), Upcera (9.71±1.05), Crystal (10.68±1.28), Sagemax S (9.26±0.8), KeroxET (9.79±0.95), and the flexural strength (MPa) KeroxET 1415±160., Kerox HD 1365±145, Crysta 1267±105, Upcera 1255±145, Sagemax S 1172±135 was respectively. The clinical application of these new ceramics and technologies produced better esthetical effect, however there are not enough long term studies about these new technics. Newly proposed zirconia seems to have good biological and mechanical properties; further studies would be necessary to compare the new systems (zirconia toughened Al<sub>2</sub>O<sub>3</sub>, alumina toughened zirconia) and the different products.

### Biography

Csaba Hegedus received his General Medicine degree from the Medical University of Debrecen (Hungary) in 1982 and his PhD degree in Medical Sciences from the University of Debrecen (UD) in 2000. He is currently a Full Professor and Head of the Biomaterials and Prosthetic Dentistry Department at the Faculty of Dentistry UD, and also the Dean of the Faculty of Dentistry UD since 2009. His research interest comprises dental materials, the analysis of interfacial systems in dentistry, the metal ceramic-bioceramic and implant surface modification.

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