BoneMaster®
Nano-Crystalline HA Coating Technology

Design Rationale
BoneMaster® – Inspired by Nature

BIOMIMETICS: \{ Derived from the Greek ‘bios’, meaning ‘life’, and ‘mimesis’, meaning ‘to imitate’. \}

BoneMaster® is an advanced biomimetic coating technology that combines the biological benefits of hydroxyapatite with an enhanced needle-like nanostructure based on apatite crystallites found in bone.

Through its optimal combination of surface chemistry and surface topography BoneMaster® offers a number of unique clinical advantages.

Enhanced Implant Stability

Due to BoneMaster’s® unique needle-like topography, it creates a favourable environment for osteoblast adhesion. BoneMaster® coating is 1/10th of the thickness of plasma sprayed HA coating and is therefore, able to maintain the topography of the substrate. Preserves the macro roughness and porosity of Porous Plasma Spray (PPS) Ti-alloy coating for enhanced primary and long-term fixation.

A recent study demonstrates that BoneMaster® significantly increases bone apposition compared with conventional coatings.
“Cell adhesions are considerably and significantly higher with BoneMaster®.”
S. Roessler, A. Sewing, R. Born, D. Scharnweber, M. Dard, H. Woroch;

Reduced Fibrous In-growth

By combining the osteoconductivity of hydroxyapatite with a unique needle-like nanostructure that closely resembles apatite crystallites found in bone, BoneMaster® is able to convince the body’s bone remodeling processes into thinking that the implant surface is bone.

“Implant-Bone Contact: 61.7% with BoneMaster® Vs. 31.5% without BoneMaster®.”
“Biological performance of biomimetic calcium phosphate coating of titanium implants an the mandible, a pilot study in dogs”

MC3T3-E1 mouse osteoblasts on a BoneMaster® coated surface after one hour of adhesion

Increased Bone Density

In a recent clinical study, BoneMaster® coated stems showed significantly greater bone density in Gruen Zone 1 up to 2 years post operatively, compared to identical plasma-sprayed HA stems. (Professor Lars Nordsletten, Ulleval University Hospital, Oslo, Norway).

“Results show significantly higher preserved bone density for BoneMaster® up to two years in Gruen zone 1... In the acetabulum, BoneMaster® had a significant higher bone mineral density than that of HA, vertical to the cup...”
Changes in Bone Density After Implantation AV Taperloc Cementless Hip Prosthetic With Two Different Hydroxyapatite Coatings. A Prospective Randomized Trial
References

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   Surface activation of implants

6. S. Roessler, A. Sewing, R. Born, D. Scharnweber, M. Dard and H. Woroch
   Biomimetic coatings functionalized with adhesion peptides for dental implants

7. S. Roessler, A. Sewing, M. Stötzle, R. Born, D. Scharnweber, M. Dard and H. Woroch
   Electrochemically assisted deposition of thin calcium phosphate coatings at near-physiological pH and temperature

8. H. Schliephake, A. Aref, D. Scharnweber, S. Roessler, M. Dard and A. Sewing
   Biomimetic calcium phosphate composite coating of dental implants

   Biological performance of biomimetic calcium phosphate coating of titanium implants in the mandible: a pilot study in dogs

    A New Electrochemically Graded Hydroxyapatite Coating for Osteosynthetic Implants Promotes Implant Osteointegration in a Rat Model

11. A. Sewing, S. Roessler, D. Scharnweber, B. Nies and H. Woroch
    Thin Biomimetic Hydroxyapatite And Mineralised Collagen Coatings Prepared By Electrochemical Assisted Deposition
    Oral Presentation, 7th World Biomaterials Congress, 17.5.-21.5.2004, Sydney, Australia

    Cell Culture Studies with Keratinocyte, Fibroblast and Osteoblast Cell Lines on Biomimetic Coatings on Titanium

    Influence of Ca/P ratio on electrochemical assisted deposition of hydroxyapatite on titanium

    Biomimetic coatings for orthopaedic implants based on hydroxyapatite and collagen functionalized with a cell selective adhesion peptide
    Oral Presentation, Euroforum France, Orthopaedic Implants and Biomaterials Congress & Exhibition, 29.6.-30.6.2005, Paris, France