

IMPLANT SURFACE



- *Optimal Differential Profilometry*
- *Calcium Phosphate - "Beyond Nano Size"*
- *Thick Oxide Layer*
- *Site-Specific Surface Modification*

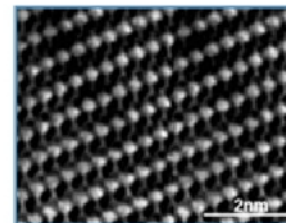
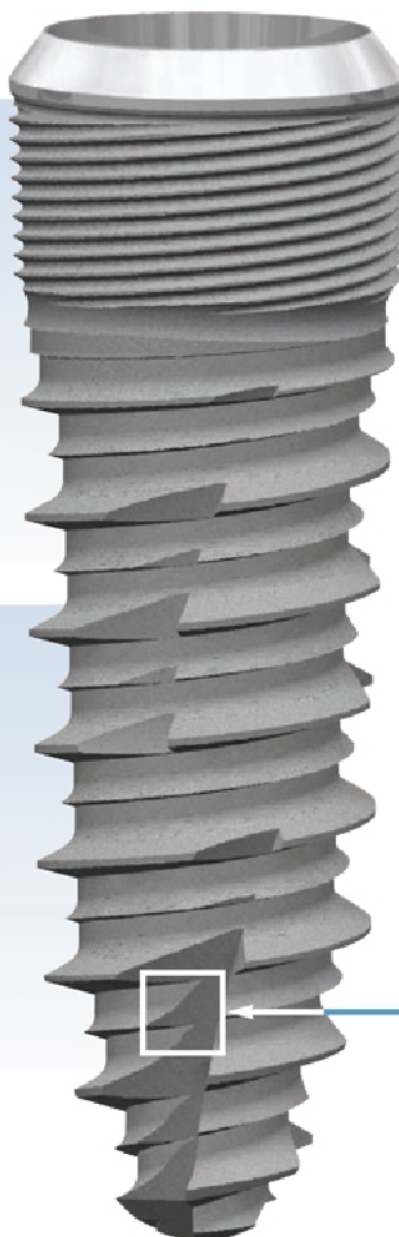
Predictable stability during the early dental implant treatment phase was a significant factor in the development of OSSEAN®¹. The surface is designed to activate the body's natural healing abilities and to induce primary stability during the critical first two weeks after placement.

Robotically Micro Blasted

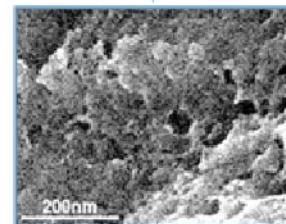
Each Intra-Lock® implant is Robotically Micro-Blasted in a clean room environment for precise control. Robotic sequencing and differential treatment is utilized to preserve the cutting groove geometry (sharpness) and permit each region of the implant to obtain optimal topography and surface roughness².

Multi-Phase Cleaning and Surface Treatment

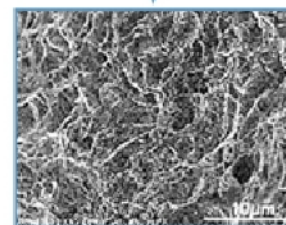
Additional procedures derived from the semi-conductor industry and refined for bio-medical applications ensure a **ultra-clean** surface. OSSEAN® Surface is exceptionally free from contaminants as confirmed by XPS-ESCA (Electron Spectroscopy for Chemical Analysis).



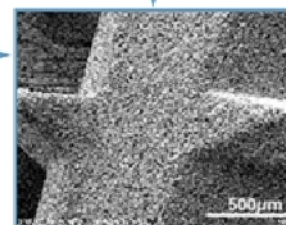
20,000,000X
Molecular Structure
Calcium Phosphate



200,000X
Nano Structure



5,000X
Micro Structure



100X
Macro Structure

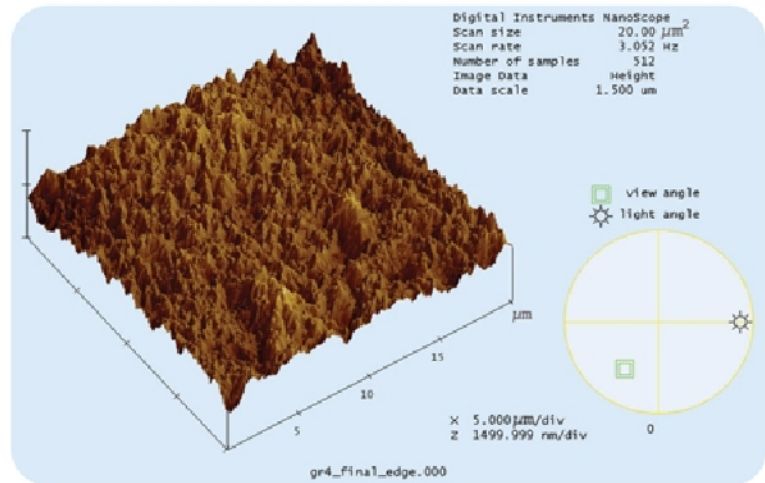


Micro-Nano Fractal Topography

OSSEAN® Surface structure is engineered to increase host-to-implant biocompatibility and biomechanical response². It is characterized by having a surface topography that is similar at all levels of magnification, from the surface to the nanoscale level.

The repetitive nature of this surface is defined as one that is “fractal” in nature. As with a set of Russian dolls, the structure when viewed at different levels of magnification has the same basic characteristics.

The surface beyond the nanometric level displays an ideal surface for fibrin attachment. At the micrometric level, the pattern is appropriate for platelet deposition⁴. Under lower magnification, the pattern shows receptor sites that encourage the growth of osteoblasts³.



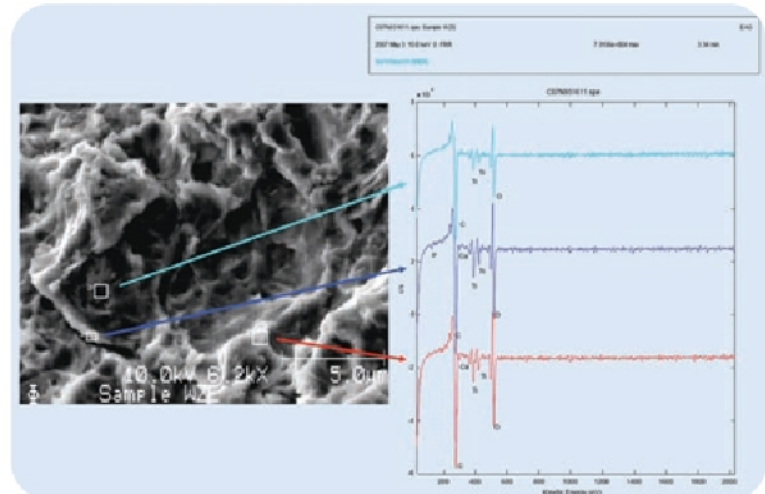
AFM: Atomic Force Microscopy

OSSEAN® Surface profilometry is well characterized with Atomic Force Microscopy, showing explicit details of its complex surface at various levels of observations⁶.

This image shows a surface of 20μm x 20μm.

Calcium Phosphate – Molecular Impregnation

When viewed at a maximum SEM resolution (200,000X), **OSSEAN®** Surface is free of any particles. However, when examined under Auger X-Ray Spectroscopy, calcium phosphate molecules (more than a thousand times smaller than nano particles) are revealed. They are present in the Titanium oxide layer as molecules (Molecular Impregnation), well beyond the nanometric level. These molecules have a greater binding energy than larger particles of calcium phosphate. In addition to extreme stability, the calcium phosphate retains its bioactive properties⁷.



AUGER Spectroscopy:

An electron beam of 15nanometers diameter is shot at various locations on the Ossean® Surface. The edge, bottom and an intermediate location of the surface all show peaks of Ca and P. They are combined in a Calcium Phosphate chemical state as confirmed by the XPS-ESCA.

References:

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- 2- Coelho & Al. Early Bone Healing Around Different Implant Bulk Designs and Surgical Techniques. A Study in Dogs. *Clinical Implant Dentistry and Related Research.* In Press.
- 3- Piateffi & Al. Histomorphometric Evaluation of Bioceramic Molecular Impregnated and Dual Acid Etched Implant Surfaces in the Human Posterior Maxilla. *Clinical Implant Dentistry and Related Research.* In Press.
- 4- Lena Kikuchi & Al. Platelet interactions with calcium-phosphate-coated surfaces. *Biomaterials, Volume 26, Issue 26, Pages 5267-5426 (September 2005).*
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- 7- Marin C. & Al. Removal Torque and Histomorphometric Evaluation of Bioceramic Grit-Blasted/Acid-Etched and Dual Acid-Etched Implant Surfaces: An Experimental Study in Dogs. *J of Perio, Volume 79 • Number 10, Oct 2008. (1942-1949). doi: 10.1902/jop.2008.080106.*

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