

 **Trabecular** *Titanium*TM

NATURAEIMITATIO
NATURAEIMITATIO



MEETS WITH THE EXCELLENCE

of the Delta Acetabular System

Trabecular Titanium™ technology is used to produce acetabular components, where the geometry is studied to adapt to the differing clinical indications ensuring maximum stability and ideal recovery of the anatomy



TT

Primary implants and revisions



ONE-TT

Dysplasia and revisions



REVISION-TT

Severe revisions



REVISION-TT

Severe revisions with bone defects



Hemispheric TT module

REVISION-TT

Liner Biolox® Delta angled spacer



Hemispheric TT module

REVISION-TT

Polyethylene



Hemispheric TT module

REVISION-TT

MET-MET 42 mm



Hemispheric TT module

REVISION-TT

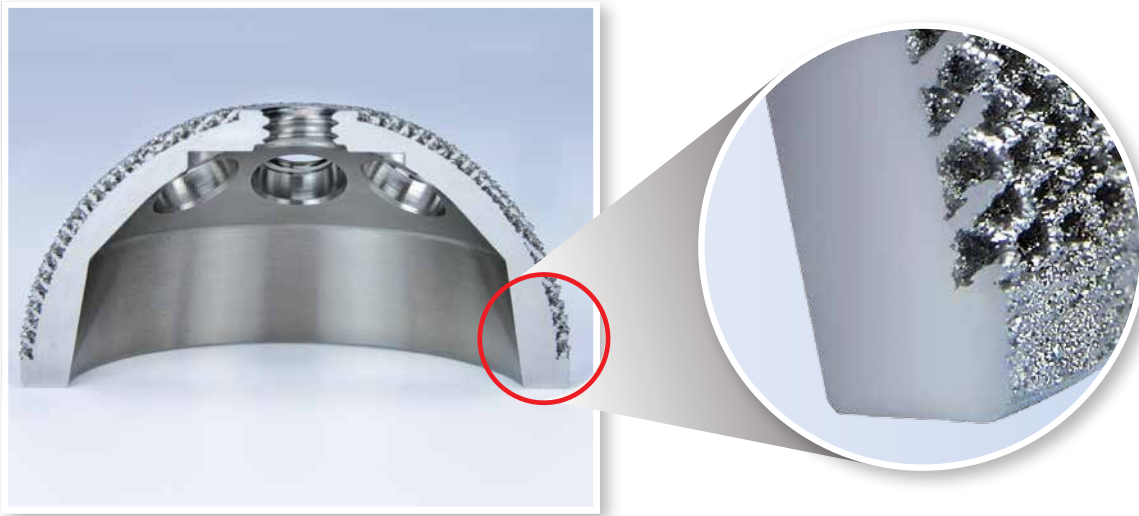
Dual mobility 42 mm

The hemispheric modules are assembled onto the DELTA-ONE-TT and DELTA-REVISION-TT cups

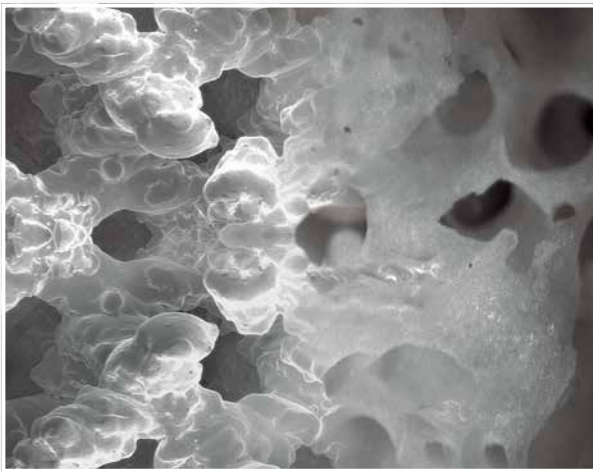
THE STRUCTURE THAT IMITATES BONE

Trabecular Titanium™

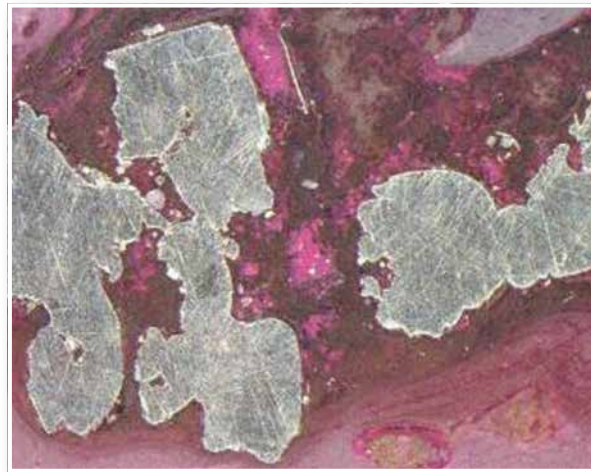
Trabecular Titanium™ ensures the best interface between bone and implant. With the Trabecular Titanium™ technology it is possible to obtain titanium components without coatings thanks to a perfectly controlled porosity



The 3D structure with its hexagonal cells imitates bone morphology creating an ideal space for the cellular colonization and revascularization of neoformed bone tissue



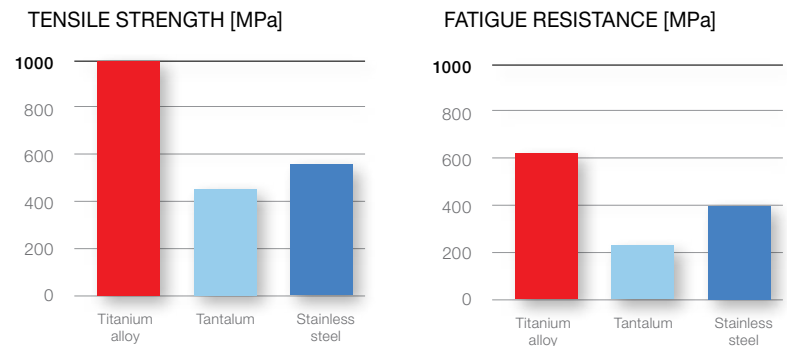
Trabecular Titanium™ reproduces the morphology of the trabecular bone



The neoformed osseous tissue completely surrounds the implant without discontinuity or fibrous tissue

THE MATERIAL: Titanium

We have chosen an extremely **biocompatible** material without compromise ^[1-2] with extraordinary mechanical characteristics.

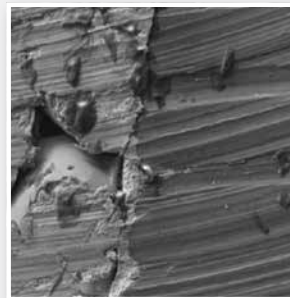


THE TT STRUCTURE is not a coating

Overcoming the coating concept, there is no interface between the bulk structure and the porous trabecular surface.

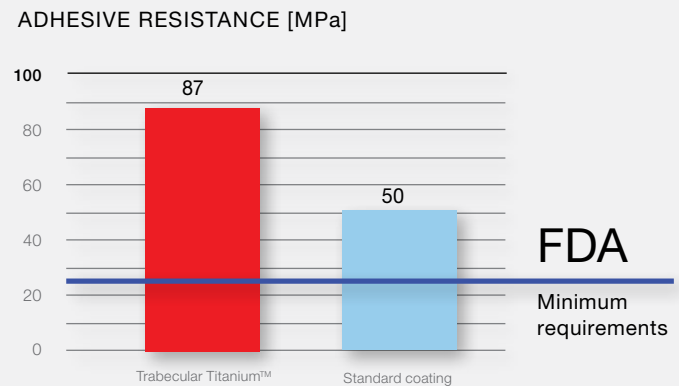


Continuous Trabecular Titanium™ trabecular structure



Material discontinuity in a standard coating

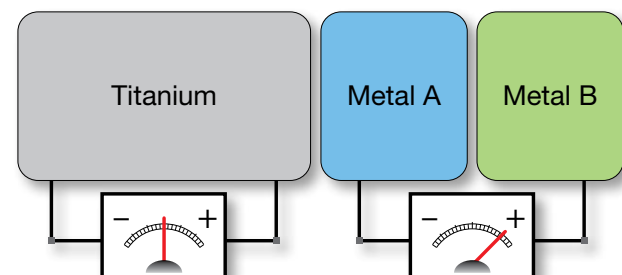
There is no risk of detachment Trabecula breakage occurs above the ultimate tensile strength of titanium as demonstrated by the adhesion tests ^[3].



Adhesive resistance exceeds standard coating by 75% and safety values imposed by FDA by 400%.

No risk of galvanic corrosion generated when materials with different electronegativity are in contact ^[4].

Volta effect in couplings between metals with differing electronegative potential.



PERFECTLY CONTROLLED POROSITY

Respect for the bone biomechanics,

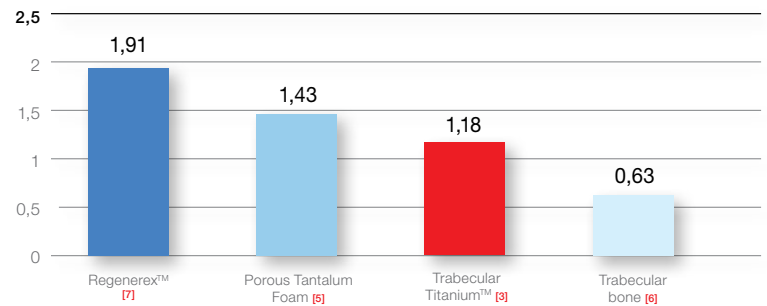
thanks to an elastic module very similar to that of the trabecular bone.

Trabecular Titanium™ re-establishes physiological load transfer avoiding damage to the bone.

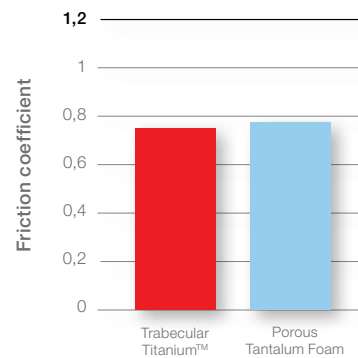
Trabecular Titanium™ has an extremely high friction coefficient at contact with the cancellous bone,

which maximizes primary stability of the acetabular components and enhances bone integration.

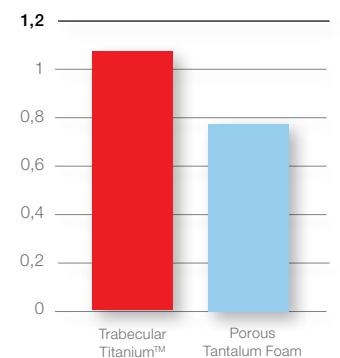
COMPRESSIVE ELASTIC MODULE [GPa]



FRICITION ON CORTICAL BONE



FRICITION ON CANCELLOUS BONE



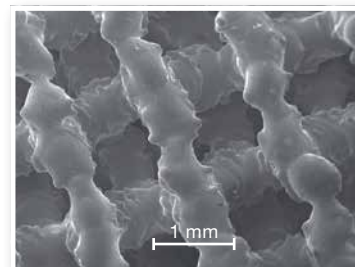
An optimal pore size plays a critical role in osteogenic processes and improves the quality of the bone formed in contact with the implant [8,9,10].

TT pore diameter = 640 µm

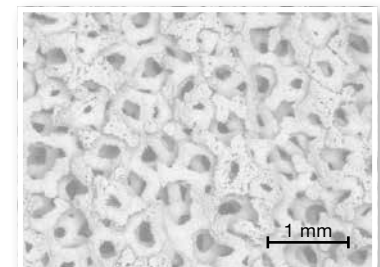
Comparative studies on trabecular structures with pores of different diameters (300, 400, 500, 600 and 1,000 µm) show how, after 20 days, the most rapid and effective osteointegration takes place inside the 600 µm canals [9].

The uniformity of the structure

ensures that the chosen characteristics will be replicated over the entire surface, cell by cell.



Trabecular Titanium™ structural uniformity



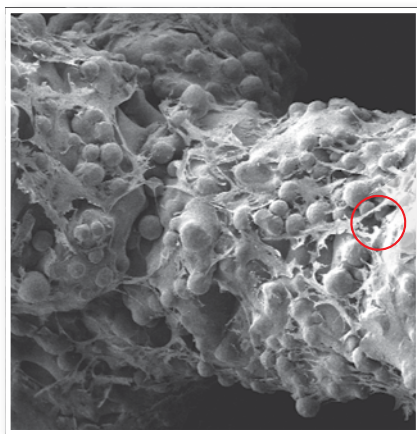
Other trabecular structures on the market

OSTEOINTEGRATION

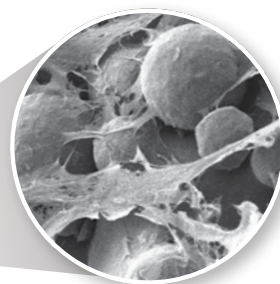
demonstrated in *vitro* and in *vivo*

Gene expression analysis on osteoblast-like cells demonstrate that Trabecular Titanium™ favors osteogenesis processes, inhibits osteoclastogenesis and degradation of the bone matrix.*

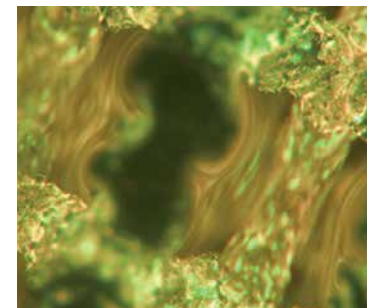
In vitro studies show that trabecular structure is completely colonized by osteoblasts after 22 days in dynamic culture conditions.**



Osteoblasts on the Trabecular Titanium™. SEM 50x scaffold



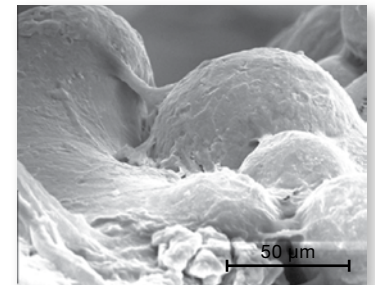
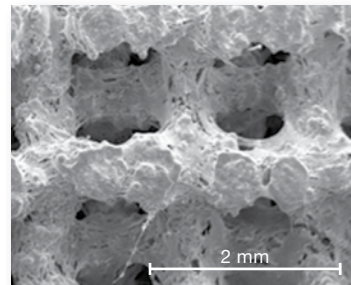
Detail of osteoblasts in the extracellular matrix. SEM 250x



Expression of collagen I (green)

Trabecular Titanium™ constitutes a proper scaffold to enhance human **adipose stem cells** adhesion, proliferation and differentiation into osteoblastic cells.**

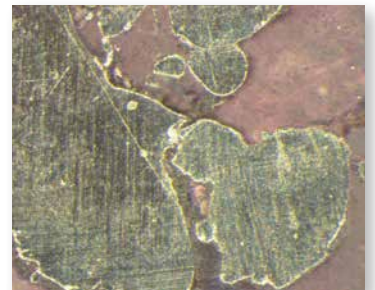
Colonization of Trabecular Titanium™ pores with human stem cells differentiated into osteoblasts and deposition of bone matrix. SEM 16x, 550x



In vivo studies demonstrate excellent osteointegration with neof ormation of lamellar bone and a 95% Bone Implant Contact (BIC) after only 26 week in a rabbit model.***

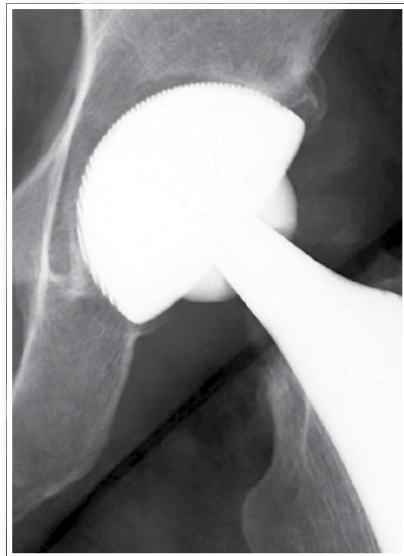


Neof ormation of lamellar bone after 26 week. Stereomicr. 50x



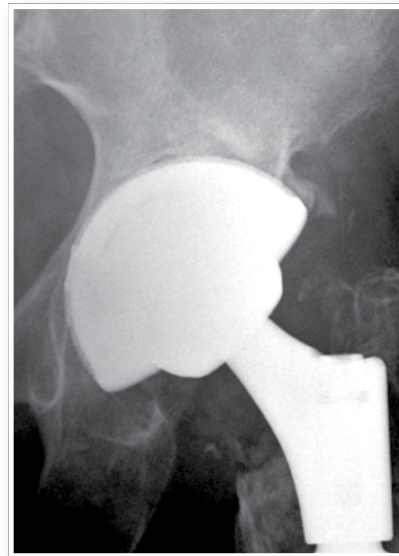
Continual interface between bone and Trabecular Titanium™ with no fibrous tissue. Stereomicr. 60x

CASE HISTORIES



PRIMARY IMPLANT

DELTA-TT implant in a case of coxarthrosis



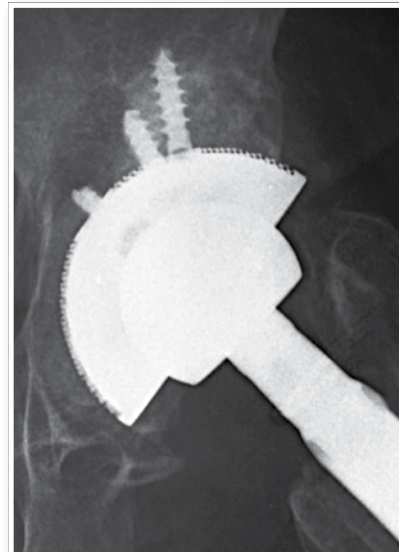
REVISION

DELTA-TT implant with ceramic liner



REVISION

DELTA-REVISION.
Acetabular cavity defect corrected
with TT HEMISPHERIC MODULE.
Coverage corrected with +20° angled spacer



REVISION

DELTA-TT implant with ceramic liner

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