

# Meets with the excellence of the Delta Acetabular System

TT 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.



## Bibliography

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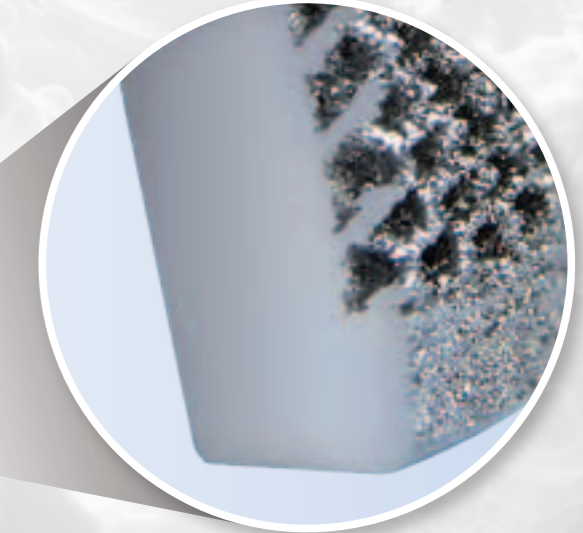
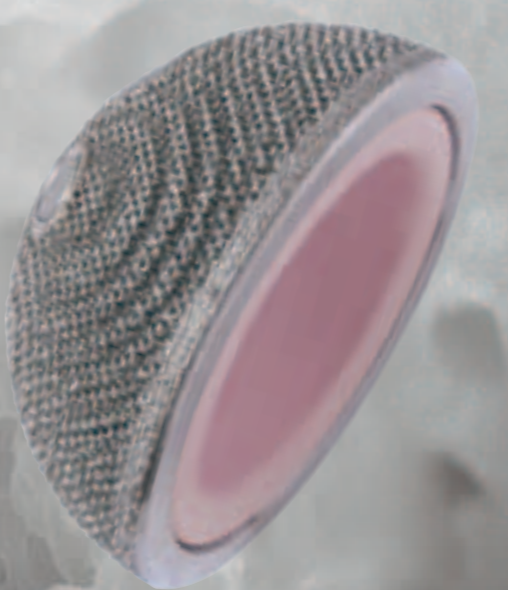
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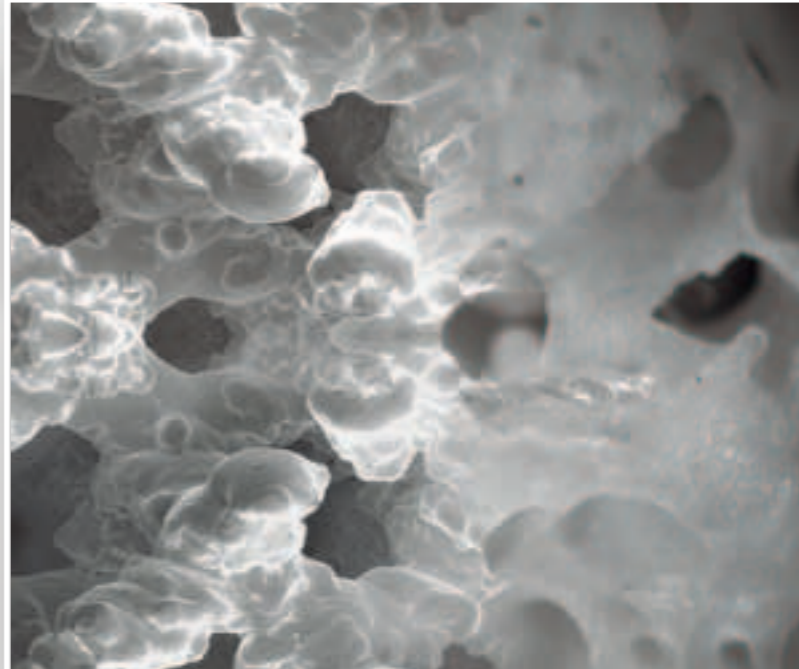
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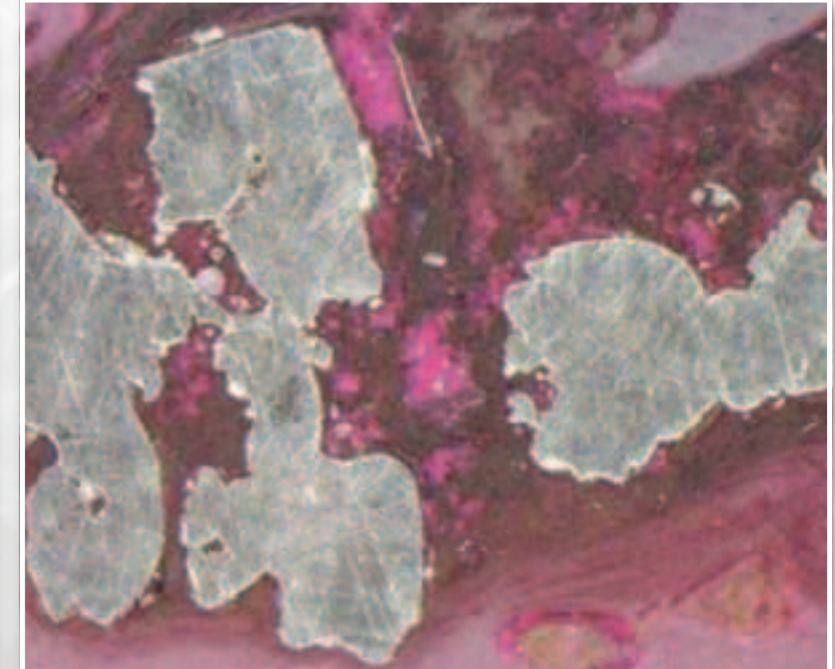
# Trabecular *Titanium*<sup>TM</sup> Naturae imitatio



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

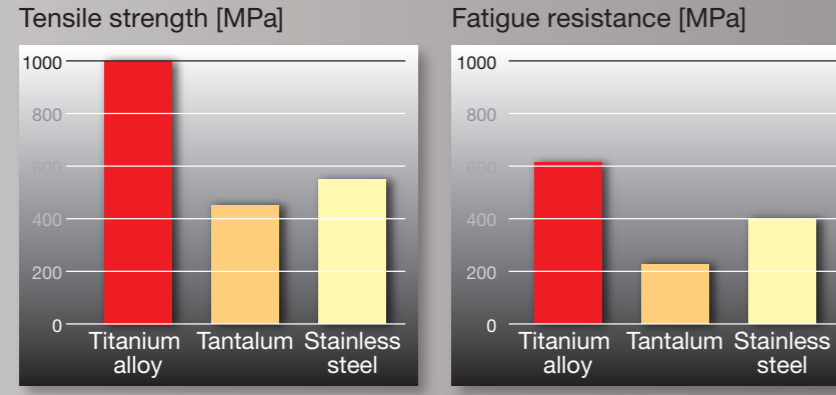


The neoformed osseous tissue completely surrounds the implant without discontinuity or fibrous tissue



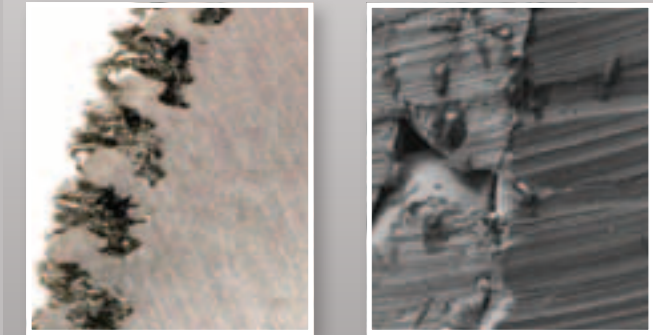
# The Material: Titanium

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



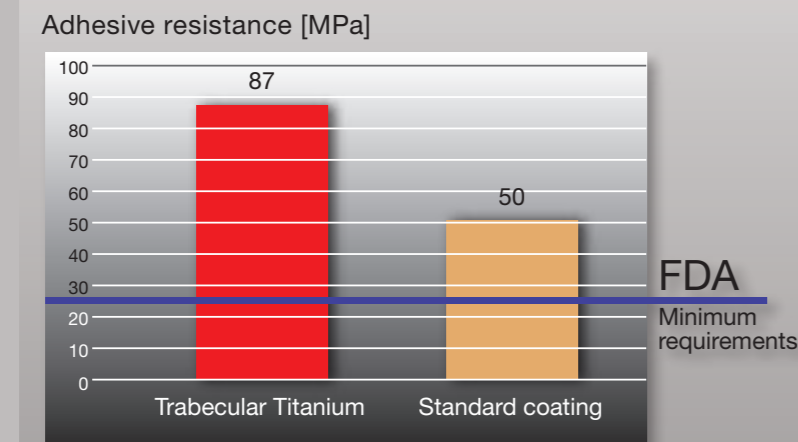
# The Trabecular Titanium structure is not a coating

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



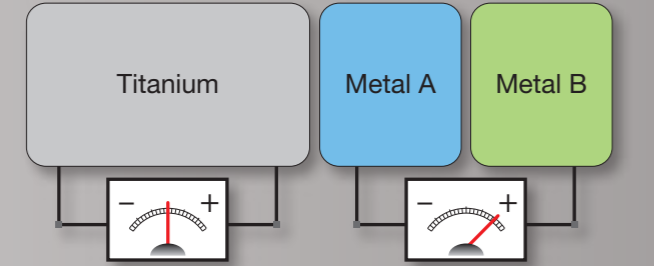
Continuous Trabecular Titanium trabecular structure  
Material discontinuity in a standard coating

**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%.

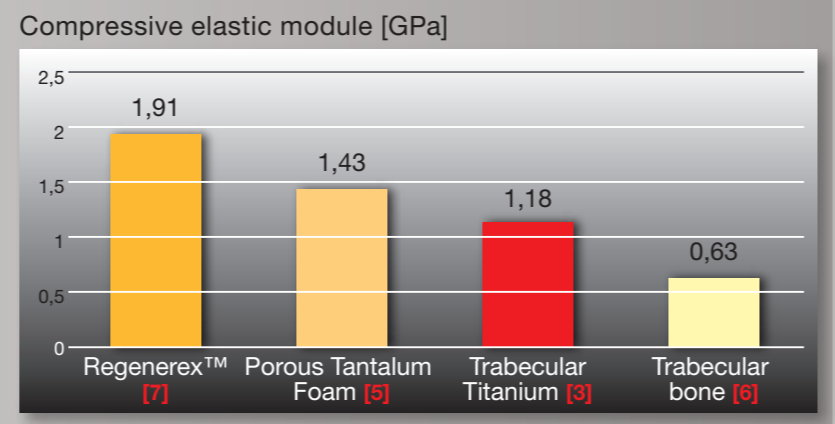
**No risk of galvanic corrosion** generated when materials with different electronegativity are in contact [4].



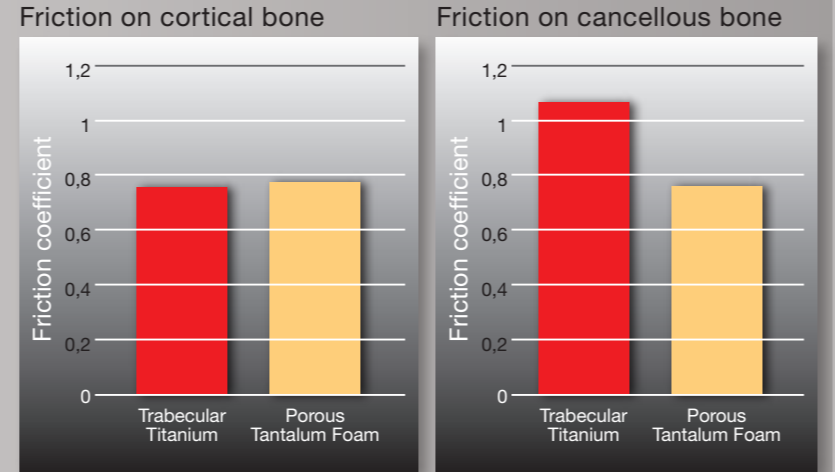
Volta effect in couplings between metals with differing electronegative potential.

# Perfectly controlled porosity

**Respect for the bone biomechanics**, thanks to an elastic module very similar to that of the trabecular bone. TT re-establishes physiological load transfer avoiding damage to the bone.



**TT has an extremely high friction coefficient at contact with the cancellous bone**, which maximizes primary stability of the acetabular components and enhances bone integration.

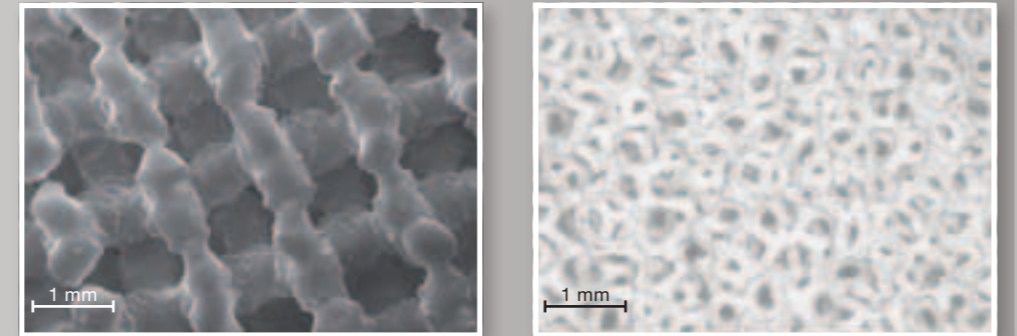


An optimal pore size plays a critical role in osteogenic processes and improves the quality of the bone formed in contact with the implant [8,9,10].

**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.



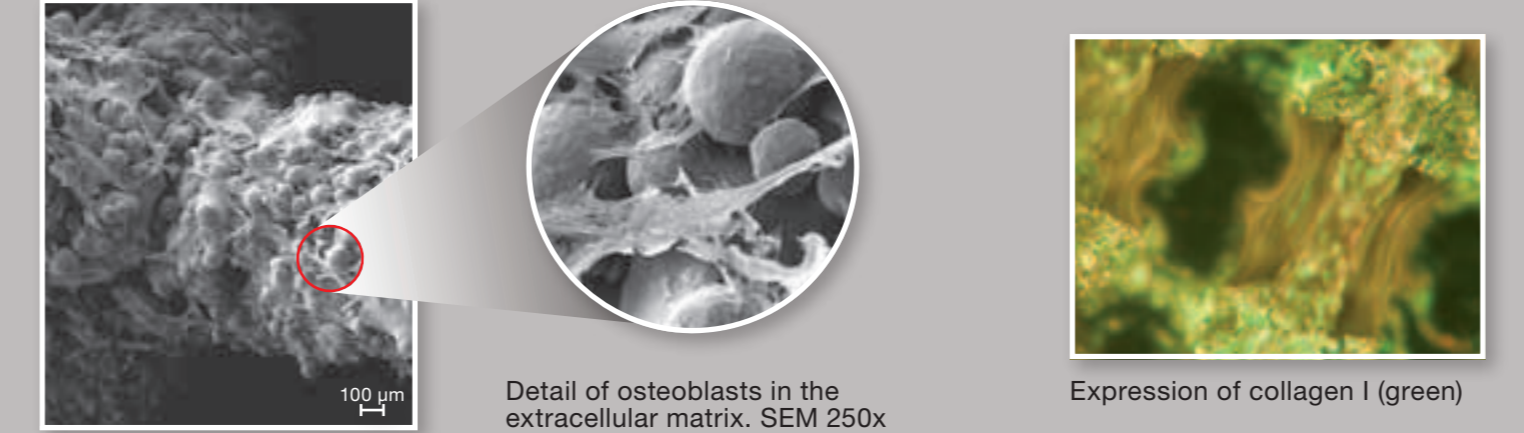
Trabecular Titanium structural uniformity  
Other trabecular structures on the market

# Osteointegration

demonstrated *in vitro* and *in vivo*

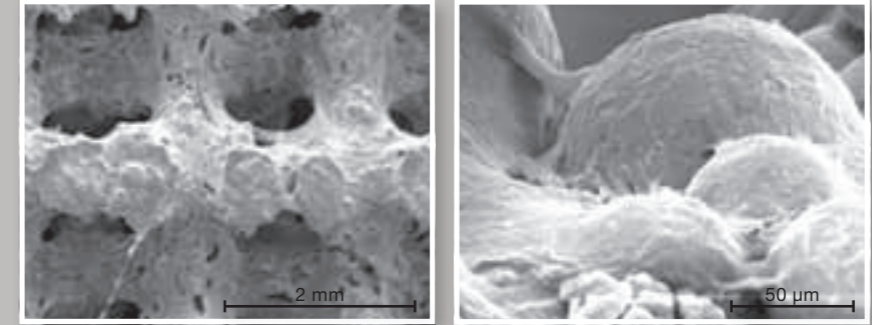
**Gene expression analysis** on steoblast-like cells demonstrate that TT favors osteogenesis processes, inhibits osteoclastogenesis and degradation of the bone matrix. \*

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



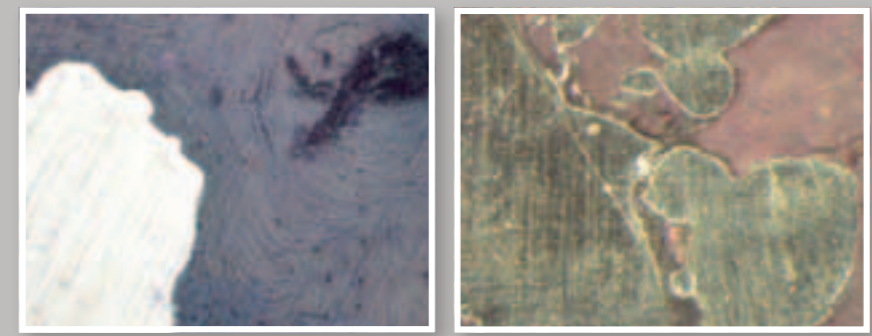
Osteoblasts on the TT. SEM 50x scaffold  
Detail of osteoblasts in the extracellular matrix. SEM 250x  
Expression of collagen I (green)

TT constitutes a proper scaffold to enhance human **adipose stem cells** adhesion, proliferation and differentiation into osteoblastic cells. \*\*



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

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



Neoformation of lamellar bone after 26 week. Stereomicr. 50x  
Continual interface between bone and TT 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