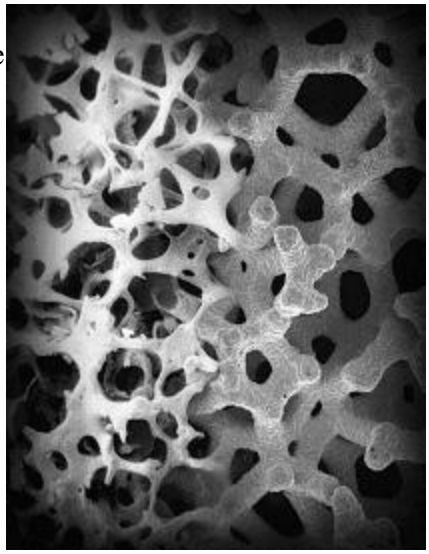
Trabecular Metal™ Technology

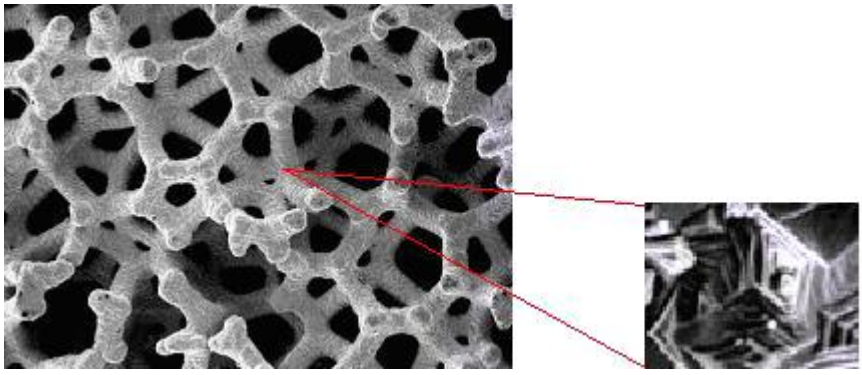
The Best Thing Next To Bone™



The cellular structure of *Trabecular Metal** resembles bone and approximates its physical and mechanical properties more closely than other prosthetic materials. The unique, highly porous, trabecular configuration is conducive to bone formation, enabling rapid and extensive tissue infiltration and strong attachment.[1,2,+]

Physical Properties

Trabecular Metal consists of interconnecting pores resulting in a structural biomaterial that is 80% porous, allowing approximately 2-3 times greater bone ingrowth compared to conventional porous coatings and double the interface shear strength.[1,+] *Trabecular Metal* implants are fabricated using elemental tantalum metal and vapor deposition techniques that create a metallic strut configuration similar to trabecular bone. The crystalline microtexture of a *Trabecular Metal* strut is conductive to direct bone apposition.[2]

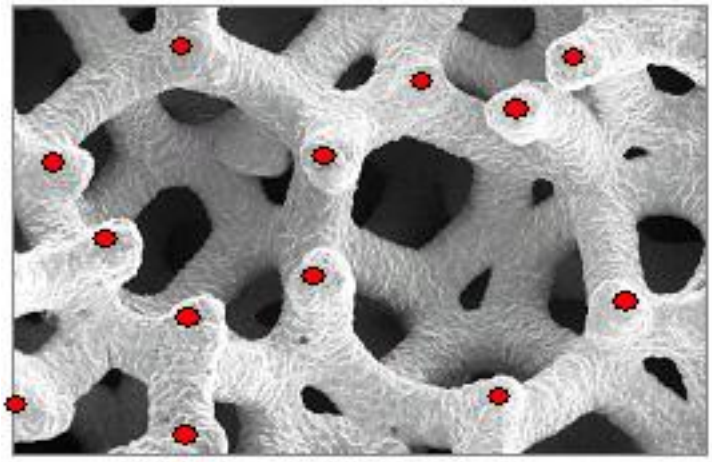


Elemental tantalum unites strength and corrosion resistance with excellent biocompatibility. These characteristics help explain tantalum's surgical use for more than 50 years in applications such as cranioplasty plates and pacemaker leads.[3]

Mechanical Properties

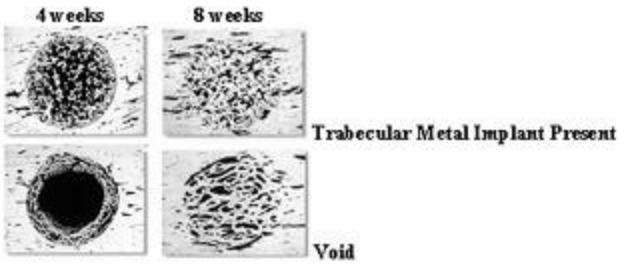
Trabecular Metal possesses a high strength-to-weight ratio, with mechanical properties capable of withstanding physiologic loading. The compressive strength and elastic modulus of Trabecular Metal are more similar to bone than are other prosthetic load-bearing materials.[2,4] The material's low stiffness facilitates physiologic load transfer and helps minimize stress shielding.

The *Trabecular Metal* struts generate a friction coefficient that is 76% greater than a sintered bead coating, providing increased initial stability.[5]



Exceptional Bone Ingrowth

The bone-like physical and mechanical properties of *Trabecular Metal* contribute to extensive bone infiltration. A transcortical implant animal study demonstrated that new bone rapidly infiltrated the *Trabecular Metal*. [1,2] Only 8 weeks after surgery, bone had grown into and filled the majority of available pore space. Consequently, fixation strength developed more rapidly. At 4 weeks, the bone interface shear strength of Trabecular Metal material was double that of sintered beads.[1,2]



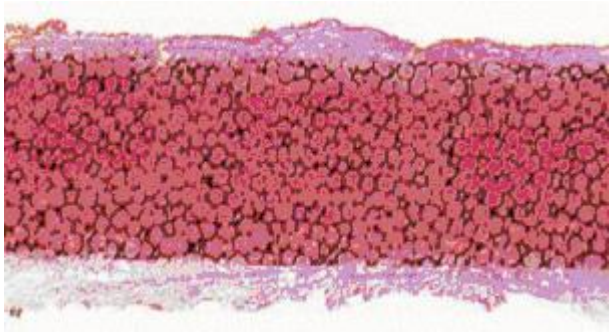
Histologic Micrographs

Filling of prepared cortical holes with new bone is comparable with *Trabecular Metal* implants (top) and without (bottom). [2] Bone filled the majority of the available pore space at 8 weeks.

Trabecular Metal has been shown to permit physiologic bone healing. In 24 week animal studies of *Trabecular Metal* acetabular cups, the density of ingrown bone was comparable to the density of peri-implant trabecular bone.[6]

Soft Tissue Attachment

The pore size and high volume porosity of *Trabecular Metal* supports vascularization and rapid, secure soft tissue ingrowth. In the canine model, soft tissue adherence and vascularization occurred quickly with extensive tissue ingrowth 4 to 8 weeks after surgery.



Soft tissue attachment strength was five times greater than with sintered bead coatings at 4 and 8 weeks.[7,8]