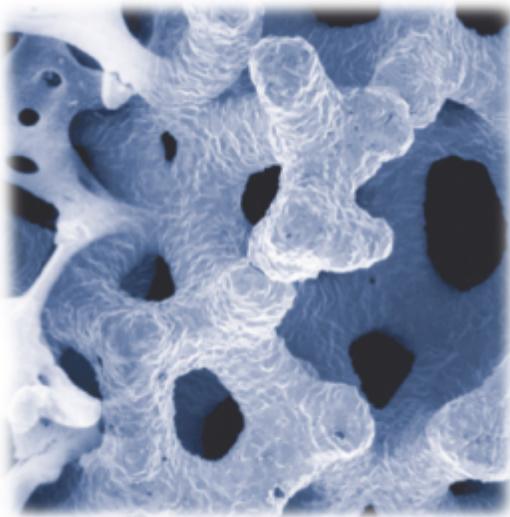


Trabecular Metal™ Technology



Zimmer Biomet's Trabecular Metal Material is a unique, highly porous biomaterial made from elemental tantalum with structural, functional, and physiological properties similar to that of bone.¹ The material features a 100% open, engineered and interconnected pore structure to support bony in-growth and vascularization.^{1,2} The material has over 20 years of demonstrated clinical use in a variety of orthopaedic applications.^{3,6,7}

Product Features

Structure

- Made from commercially pure elemental tantalum and designed to withstand physiologic loads.¹
- 100% open engineered and interconnected pore structure to support bony in-growth and vascularization.^{1,2}
- Up to 80% porosity.¹

Function

- Low modulus of elasticity similar to cancellous bone for more normal physiological loading which has the potential to reduce stress shielding when used in a monoblock or monolithic application.³
- High coefficient of friction vs. cancellous bone for stable initial fixation.³

Physiology

- Chemically stable and biocompatible material which creates very little adverse biological response.⁴

Trabecular Metal Material has demonstrated clinical use throughout Zimmer Biomet's product portfolio, including hip, knee, and shoulder implants; trauma applications; spine implants; bone void fillers and augments; Osteonecrosis Rods and dental implants.

Technology

Trabecular Metal Material is made of elemental tantalum (atomic number 73), one of the most chemically stable and biologically inert metals used in orthopedic implants.⁵ This makes it highly biocompatible and corrosion-resistant. Tantalum is the ideal material for this structure, because it has high fatigue strength and a compressive modulus that allows it to bend before breaking.³

Utilizing a proprietary chemical deposition process, elemental tantalum is deposited onto a substrate, creating a nanotextured surface topography and building Trabecular Metal Material one atom at a time.

Clinical Performance

Zimmer Biomet's Trabecular Metal™ Technology has more than 19 years of clinical history.^{3,6,7} The performance of specific components in human subjects has been well-documented in 320+ peer-reviewed journal articles, poster exhibits and abstracts. Independent studies have confirmed the structural and mechanical properties of Trabecular Metal material, which include:

- Consistent 3D tantalum structure similar to cancellous bone.¹
- Up to 80% porosity.¹
- Average pore size of 440µm.^{2,8}
- Low modulus of elasticity.¹
- 0.98 coefficient of friction for net shape parts.³

Additional Information



Bespoke Implant Report - All Trabecular Metal Cups vs. All non-TM cementless cups

References

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7. A Shirazi-Adl, M Dammak, G Paiement, "Experimental determination of friction characteristics at the Trabecular bone / porous-coated metal interface in Cementless implants", *the Journal of Biomedical Research*, Vol 27, 1993, pp 167-175.
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For questions about the data in the above report, please contact:

Zimmer Biomet Medical Affairs

Tel: (888) 210-8234

Email: medinfo@zimmerbiomet.com

Legal Manufacturer:

Zimmer, Inc.

1800 West Center Street

Warsaw, Indiana 46580 USA

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