



Title

**STRUCTURE, METALLURGY, AND MECHANICAL PROPERTIES
OF A POROUS TANTALUM FOAM**

Authors

Zardiackas LD, Parsell DE, Dillon LD, Mitchell DW, Nunnery LA, Poggie RA

Publication

Journal of Biomedical Materials Research. 2001;58(2):180-187

Purpose/Premise

This study was conducted to determine the structure, microhardness, compressive cantilever bending, tensile properties, and compressive and cantilever bending fatigue of a porous tantalum biomaterial that is designed to function as a scaffold for osseous ingrowth.

Material and Methods

Testing was conducted on bulk discs of the material. SEM examination was performed on fractured samples.

Outcomes

Microhardness range: 240–393

Compressive strength: 60±18MPa

Tensile strength: 6.3±6MPa

Bending strength: 110.2±14.0MPa

Compressive fatigue endurance limit: 23MPa at 5x10⁶ cycles with significant plastic deformation.

Cantilever bending fatigue endurance limit: 35MPa at 5x10⁶ cycles.

Conclusion/Recommendation

These results show that the material provides structural support during bone ingrowth. Considering the excellent biocompatibility of tantalum, these results demonstrate that the material is a candidate for a variety of clinical applications. Continued laboratory evaluation and clinical investigation is recommended.

More information about this article may be requested from your local Zimmer representative or by logging onto science.zimmer.com.