

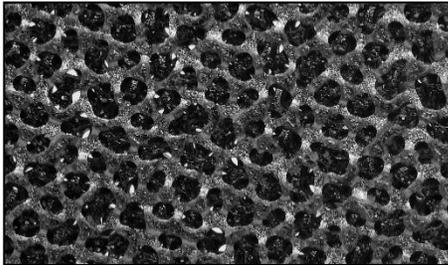
The Friction Characteristics of *OsteoSync*TM Ti

Sites Medical Research and Development

Introduction

*OsteoSync*TM Ti* is a three-dimensional, open-celled titanium scaffold for bone and tissue ingrowth (Figure 1). To aid implant stability upon implantation, *OsteoSync* Ti in its standard form incorporates a roughened outer surface that generates high friction against the surrounding bone.

Figure 1:

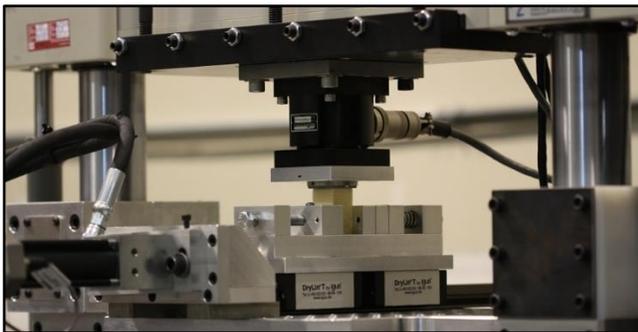


A close-up view of the *OsteoSync* Ti microstructure.

Materials and Methods

The frictional characteristics of *OsteoSync* Ti were assessed by performing friction testing of *OsteoSync* Ti against simulated bone using the methods outlined by Shirazi-Adl^{1,2}. To test, a vertical load normal to the *OsteoSync* Ti/10 pcf SAWBONE® bone interface was applied to the material couple. Then, a horizontal displacement was applied at a constant rate to the simulated bone (Figure 2). The resulting friction force was recorded. Friction coefficient then was defined as the peak friction force divided by the nominal normal force. To provide a direct comparison to other clinically available scaffolds, the nominal normal load, horizontal displacement rate, SAWBONE type, and sample size ($n=3$) employed by Brownhill were repeated in this study³.

Figure 2:

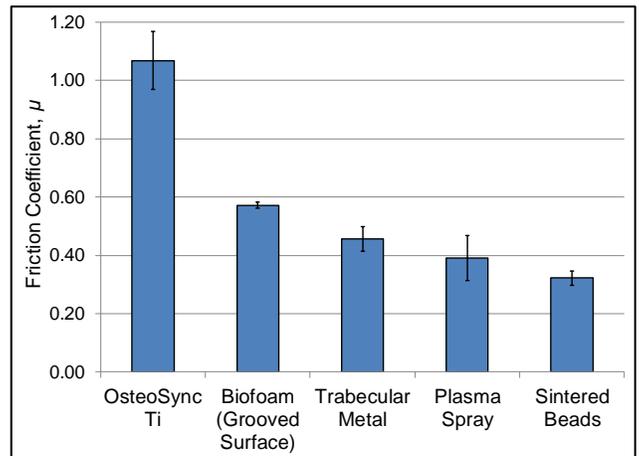


The friction test setup.

Results

A friction coefficient of 1.07 (St. Dev = 0.10) was determined. This was significantly greater than the reported friction coefficient values for Biofoam®, Trabecular Metal®, plasma-sprayed Ti, and sintered beads tested against simulated bone (Figure 3)³.

Figure 3:



Friction coefficient of bone ingrowth materials tested against 10 pcf SAWBONE. Results for materials other than *OsteoSync* Ti were taken from Brownhill³.

Conclusion

OsteoSync Ti in its standard form has a high friction coefficient, which exceeds that of other clinically available porous scaffolds, when tested against simulated bone. This supports initial implant stability prior to bone and tissue ingrowth into the scaffold. For applications requiring increased or reduced friction, the *OsteoSync* Ti outer surface can be modified during manufacturing to adjust the friction coefficient.

References

1. Shirazi-Adl, A., Dammak, M., Paiement, G. "Experimental Determination of Friction Characteristics at the Trabecular Bone/Porous-coated Metal Interface in Cementless Implants." *Journal of Biomedical Materials Research*. 27 (1993): 167-175.
2. Sites Medical Report 2007-001-23. "The Friction Properties of BioSync Ti." REV A. 2011.
3. Brownhill, J., Wong, K., Obert, R., Scholvin, D., Mosely, J., Carroll, M., Urban, R.M., Turner, T.M., Hall, D.J., Waddell, D.D., Rasmussen, G.L. "Biofoam Cancellous Titanium Fixation for Orthopedic Implant Applications: Lateral Column Lengthening." Wright Medical Document FA499-909. 2010.

* Also marketed as *BioSync* Ti® and *FortiCore*®