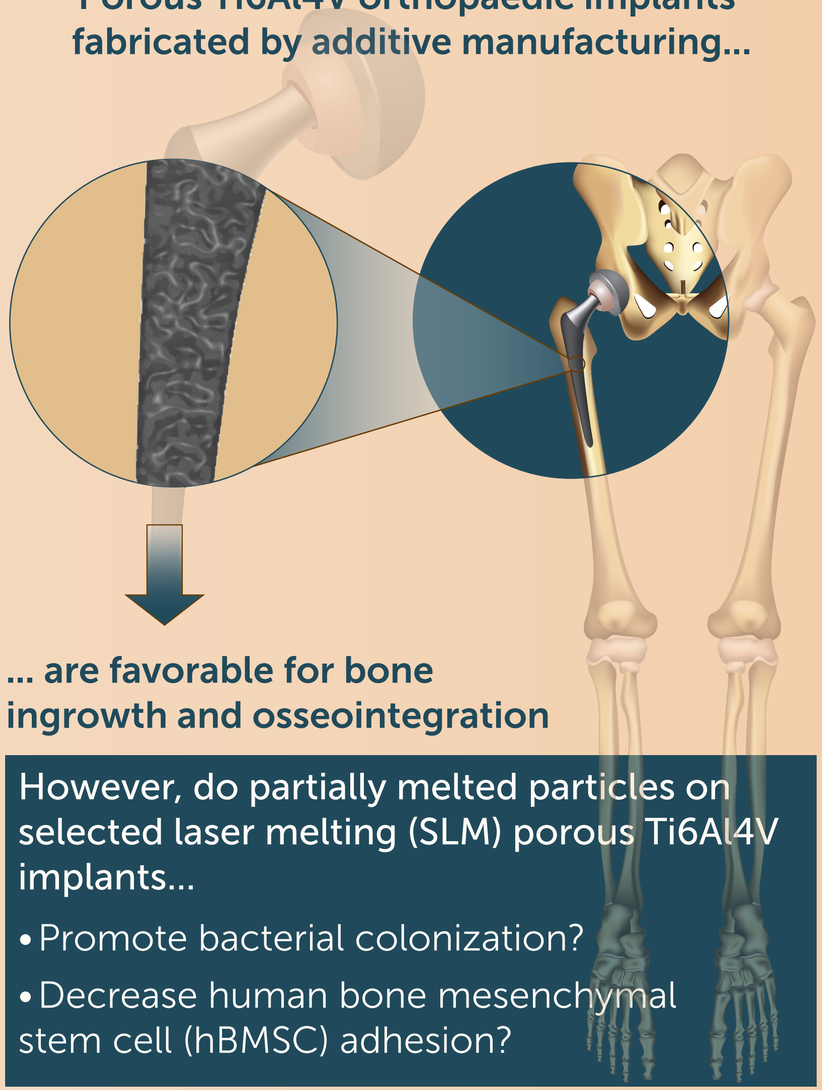
Partially Melted Particles Increase Bacterial Adhesion and Inhibit Osteogenic Activity on 3D-printed Implants

Porous Ti6Al4V orthopaedic implants fabricated by additive manufacturing...

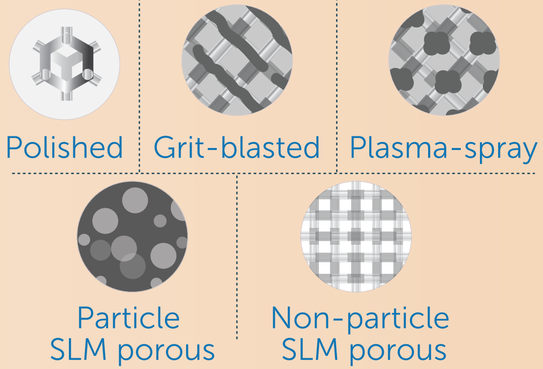


... are favorable for bone ingrowth and osseointegration

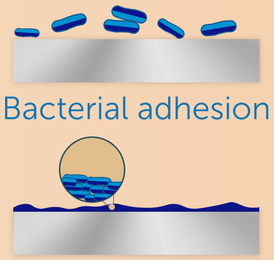
However, do partially melted particles on selected laser melting (SLM) porous Ti6Al4V implants...

- Promote bacterial colonization?
- Decrease human bone mesenchymal stem cell (hBMSC) adhesion?

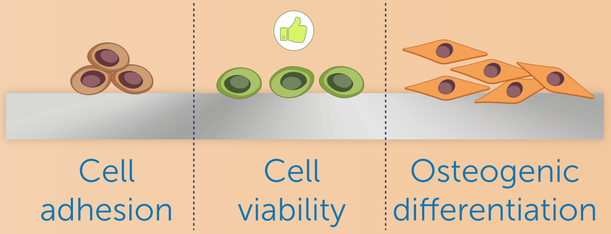
5 Ti6Al4V discs



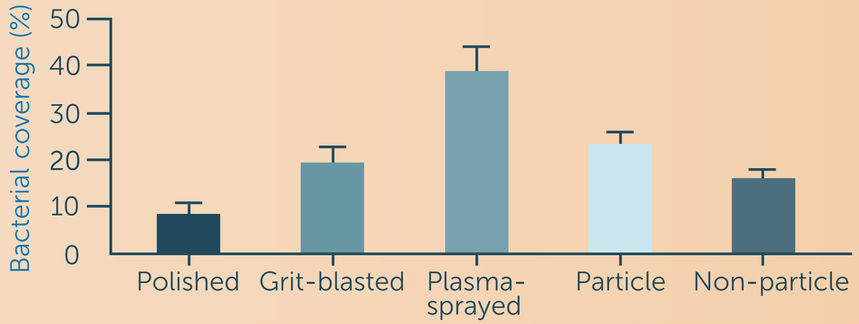
Incubation with bacterial



Morphology and adhesion of hBMSC



Particle and non-particle SLM porous discs show higher bacterial adhesion than polished discs



Compared to polished SLM discs, roughened or porous SLM discs had...

- Cell viability
- Cell adhesion
- Osteogenic differentiation

When using SLM to make porous prosthetic implants made of Ti6Al4V:

- Post-processing treatment may be needed to remove partially melted Ti6Al4V particles before use
- An implant's porous structure depth should not exceed the maximum depth of bone ingrowth because the host immune defense cannot prevent bacterial adhesion without integration

Partially Melted Ti6Al4V Particles Increase Bacterial Adhesion and Inhibit Osteogenic Activity on 3D-printed Implants: An In Vitro Study
Xie et al. (2019) | DOI: 10.1097/CORR.0000000000000954.

@CORR1953 | @Clinorthop

Clinical Orthopaedics and Related Research®