UNIVERSITÀ DEGLI STUDI DI TRENTO
Dipartimento di Ingegneria Civile, Ambientale e Meccanica

Mechanics of refractory materials at high-temperature for advanced industrial technologies
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MARIE CURIE ACTIONS
PEOPLE

AVVISO DI SEMINARIO

Si comunica che **Lunedì 07 luglio 2014 alle ore 16:00**
presso l'aula **D1** (via Mesiano 77) si terrà il seguente seminario

New biomimetic mechanically competent devices for bone regeneration

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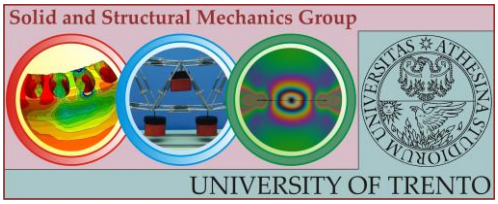
The regeneration of load-bearing bone parts is still an open challenge, and a clinical need of great relevance, also due to the progressive ageing of the world population. In this respect, it is highly desirable to develop bioactive devices enabling early sustain of critical bone defects and extensive bone formation and penetration, so to soon recover the initial biomechanical performances, thus restoring the functioning of the diseased part.
In this respect calcium phosphates, particularly hydroxyapatite, are the golden biomaterials for bone regeneration; however they are characterized by insufficient mechanical strength to manage the biomechanical loads in vivo. In this respect, new bioactive composites can be designed to associate good osteogenic and osteoconductive character, typical of calcium phosphates, to the high mechanical strength of titanium dioxide that, in the form of coalescing nanoparticles, provides a reinforcing framework in the CaP matrix, suitable to increase compression and flexural strength, as well as the fracture toughness.
In this respect, recently developed technological processes enable to manufacture highly porous scaffolds, starting from ceramic powders, showing very promising ability of osteogenesis and cell behavior.
On the other hand, a promising class of new bio-devices is represented by injectable apatitic bone cements for vertebroplasty procedures that, besides providing bone-like composition, do not induce the drawbacks related to the use of acrylic cements. Strong limitation to the use of CPCs is the insufficient porosity that limit new bone penetration as well as the compression strength not suitable to withstand early biomechanical loads after surgery. In this respect, the addition of natural, bio-erodible polymers, to the formulation of the injectable cement paste enables the formation, in vivo, of a progressively opening porosity that enable cell conduction, penetration of the new bone and suitable osteointegration that can restore the biomechanical function of the spine. Moreover, these new devices can function as injectable regenerative scaffolds that can be used in a number of clinical cases where the implantation of 3D devices is difficult or hard to perform.

Tutti gli interessati sono invitati a partecipare.

Il seminario è organizzato dal gruppo di **Scienza delle Costruzioni**
(D. Bigoni, L. Deseri, N.Pugno, M. Gei, F. Dal Corso, A. Piccolroaz, R. Springhetti)



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