



# Neocement®

## Calcium Phosphate Cement

Calcium phosphate cements (CPCs) represent a real breakthrough in the field of bioceramics. The possibility of having a mouldable calcium phosphate paste able to self-set *in vivo* has significant benefits for several clinical situations such as the treatment of osteoporosis related fractures, unstable fractures, maxillofacial defects and deformities, and more recently for other specific applications such as vertebroplasty.<sup>[1]</sup>

CPCs are produced by the interaction of two phases, a solid and a liquid one which, when mixed, form a paste that progressively sets and hardens into a solid mass.<sup>[2]</sup> The cement setting reaction is a dissolution and precipitation process, and the entanglement of the precipitated crystals is the mechanism responsible for cement hardening.<sup>[1]</sup>

The versatility of this family of materials and their ability to harden at low temperature make them very attractive materials to be used in combination with different techniques. These advantages are related mainly to the fact that the consolidation of the material is achieved through a low temperature dissolution-precipitation reaction that, somehow, mimics the processes taking place in the biomineralization phenomena. This allows obtaining hydrated compounds with morphologies and compositions very similar to the CaP found in the mineralized tissues, with high specific surface area and a particular microtexture that can play a significant role in osteoinduction related phenomena.<sup>[1]</sup>

### References

[1] M.P. Ginebra, M. Espanol, E.B. Montufar, R.A. Perez, G. Mestres, "New processing approaches in calcium phosphate cements and their applications in regenerative medicine", *Acta Biomaterialia* 6 (2010) 2863–2873

[2] J.T. Zhang, F. Tancret, J.M. Bouler, "Fabrication and mechanical properties of calcium phosphate cements (CPC) for bone substitution", *Materials Science & Engineering C* (2010)

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**Neocement®** is a hydroxyapatite bone cement based on calcium phosphate synthetic ceramics, for manual application. It consists in a solid phase of tricalcium phosphate and tetracalcium phosphate, and in a liquid phase of citric acid, glucose and chitosan.

### Effects

**Neocement®** reacts to form calcium phosphates that are rapidly osseointegrated, due to its chemical composition, which is similar to the human bone mineral phase.

**Neocement®** has a chitosan matrix in order to increase the stability of the mixture, facilitating the cement application and its maintenance at the injury site.

### Advantages

- Biocompatible
- Radiopaque
- Avoid the use of autologous graft
- Shorter operating time
- Chitosan is mucoadhesive giving excellent handling properties and moldability to the cement
- Optimal defect filling due to pasty consistency

### Applications

**Neocement®** is easily adjustable and is intended to fill small bone defects in craniofacial and trauma surgery. Must be applied directly in the treat site.

### Composition

- Tricalcium phosphate ( $\text{Ca}_3(\text{PO}_4)_2$ )
- Tetracalcium phosphate ( $\text{Ca}_4(\text{PO}_4)_2\text{O}$ )
- Chitosan ( $\text{C}_6\text{H}_{11}\text{O}_4\text{N}$ )<sub>n</sub>
- Citric acid
- Glucose

### Properties

<b>Working time<sup>1</sup> (min)</b>	2 to 5
<b>Setting time<sup>1</sup> (min)</b>	8
<b>Compressive strength (MPa)</b>	≥4

<sup>1</sup> - Times are approximate and determined by simulated clinical use

### Sterility

**Neocement®** is sterilized by gamma irradiation.

### Presentations

**Neocement®** is provided in a package with three bottles, with the exact amount of liquid and powder phases.

Final Cement Quantity (g)	References
10	CMT10
20	CMT20

Manufactured by



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