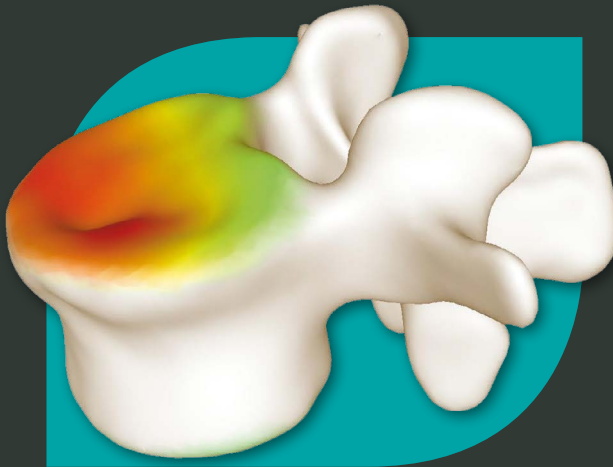


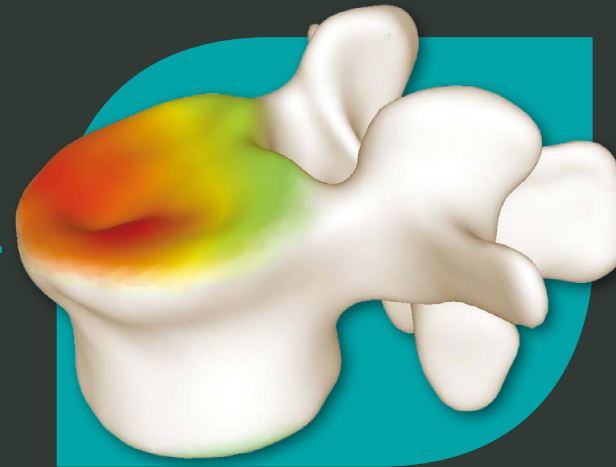
Cohesion®
B o n e C e m e n t



Interface®
B o n e F i x a t i o n C o m p o s i t e



Post-op



12 month follow-up

vexim
REBALANCING SPINE

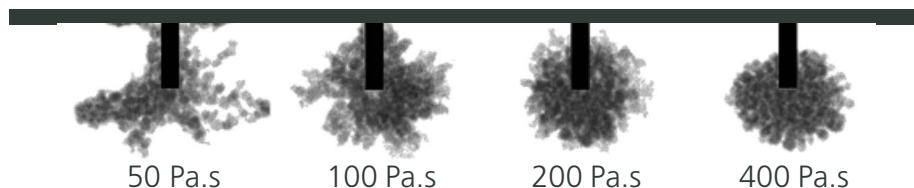
CONTINUUM OF CONTROL

+ Based on your experience

Appropriate High Viscosity

Multiple studies have identified viscosity as the most important factor influencing bone spreading cement within the vertebral body and leakage frequency^{1,2}.

Vexim Injectable Biomaterials have been formulated to reach a minimum viscosity of 350 Pa.s at injection time. This viscosity range has been proven to clinically reduce the risk of extravasation³. Above these levels, an increase of viscosity does not result in better spreading patterns or cement interdigitation.⁴



REFERENCES:

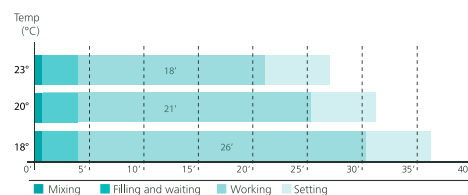
1. Loeffel M et al. Vertebroplasty: Experimental Characterization of Polymethylmethacrylate Bone Cement Spreading as a Function of Viscosity, Bone Porosity and Flow Rate. 2008 SPINE Vol. 33(12), pp 1352–1359. 2. Baroud G, 2005 A Brief Update on the Biomechanisms Underlying Cement Injection and Leakage in Vertebroplasty. Supportive Cancer Therapy Vol. 2(2) January 2005. 3. Giannitsios D et al. High Cement Viscosity Reduces Leakage Risk in Vertebroplasty. European Cells and Materials Vol. 10(3), 2005 (Page 54). 4. Baroud G et al. How to determine the permeability for cement infiltration of osteoporotic cancellous bone. Med Eng Phys. 2003 May Vol. 25(4):283-8. 5. Wilmhurst JA et al. The effects of particulate bone cements at the bone-implant interface. J Bone Joint Surg [Br] 2001;83-B:588-92. 6. Dalby MJ et al. Initial interaction of osteoblasts with the surface of a hydroxyapatite-poly(methylmethacrylate) cement. Biomaterials Vol. 22 (2001) 1739-1747. 7. Moursi AM et al. Enhanced osteoblast response to a polymethylmethacrylate-hydroxyapatite composite. Biomaterials Vol. 23 (2002) 133–144. 8. Arabmotlagh M et al. Nanocrystalline Hydroxyapatite Facilitates Bone Apposition to Polymethylmethacrylate: Histological Investigation Using a Sheep Model. J Orthop Res Vol. 30:1290–1295, 2012. 9. Appleford MR et al. In vivo study on hydroxyapatite scaffolds with trabecular architecture for bone repair. J Biomed Mater Res A. 2009 Jun 15 Vol. 89(4):1019-27. 10. Le moniteur HOSPITALIER n°235 Avril 2011/ IFU

Sustained High Viscosity

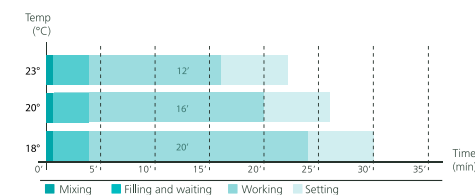
Along with the required high viscosity, enough time to control and adapt the injection to the type of pathology and fracture is required.

Vexim Injectable Biomaterials have been designed to allow an appropriate preparation (mixing and filling) while avoiding any waiting time.

The injection or dough phase has been designed to be exceptionally long for a comfortable management of the fixation phase even in the most complex fractures.

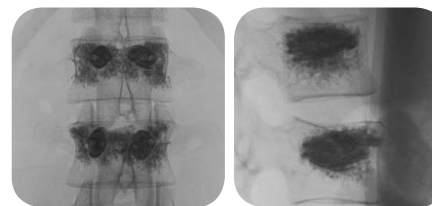


Cohesion® Bone Cement



Interface® Bone Fixation Composite

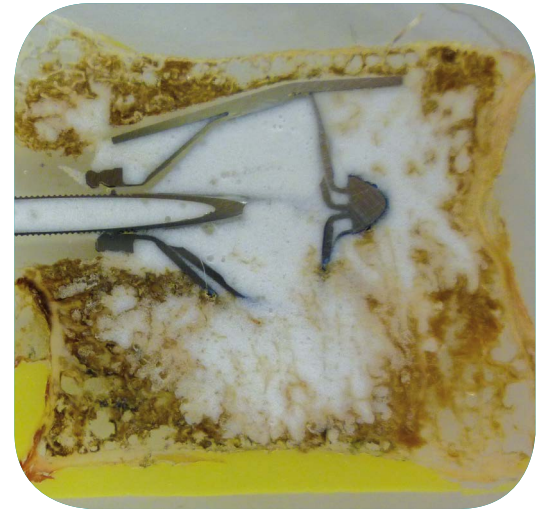
High Radio-opacity



Vexim Injectable Biomaterials contain Zirconium Oxide as radio-opacifiant to provide state-of-the-art visibility while injected. This leads to an increased safety during injection.

ANATOMICAL RESTORATION

Unlike **SpineJack®** which allows the practitioners to reduce the fracture independently of the bone quality, the fracture fixation depends on the existing bone quality.



Back in shape



Fixation of the fractured Vertebral Body (VB) in Vertebral Compression Fractures (VCF) deserves a different approach in trauma cases than fixation on VCF in a patient with underlying pathologies such as osteoporosis or tumors.

Vexim's main concern is to preserve the existing structures and rely on it for the bone healing process. Thereby depending on the quality of the preserved trabecular structure acting as a scaffold, Vexim offers a range of injectable Biomaterials for fixation:

- ✕ **Cohesion® Bone Cement**
- ✕ **Interface® Bone Fixation Composite.**

PATHOLOGICAL FRACTURE

+ Osteoporosis

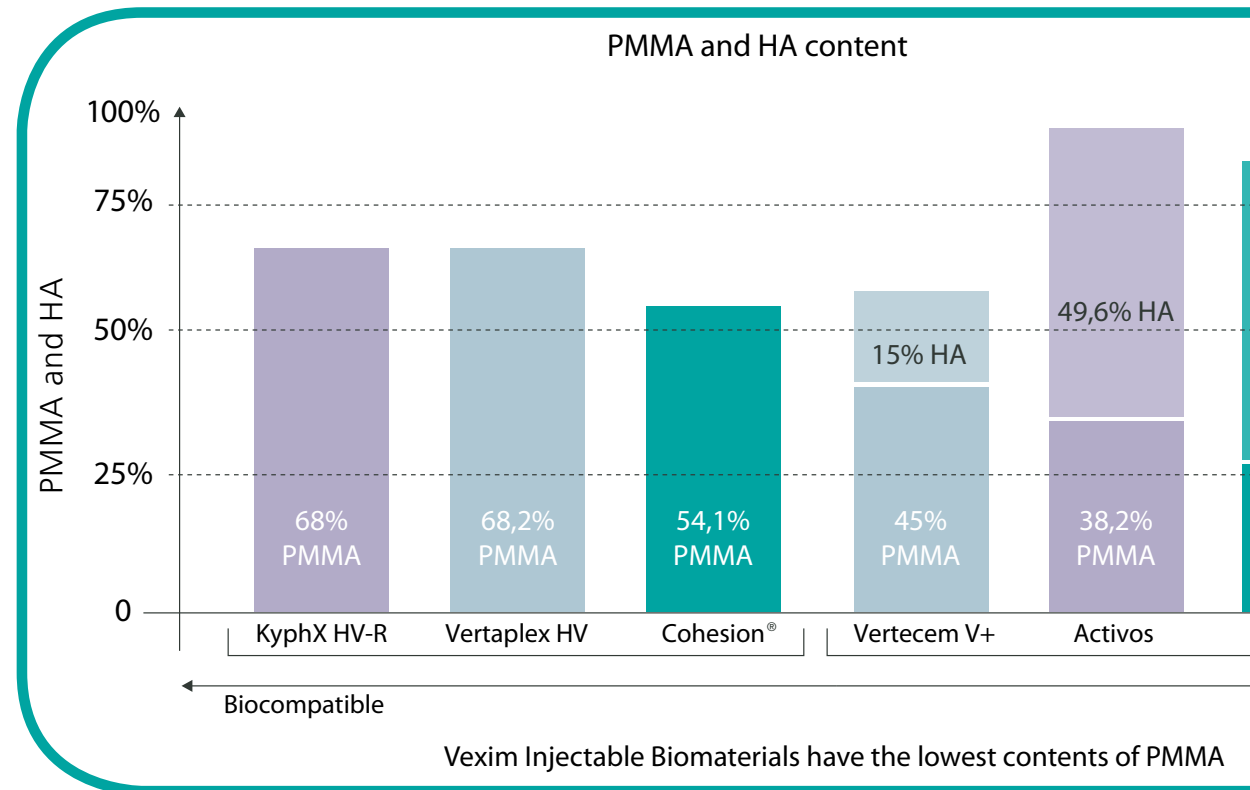
+ Osteolytic tumors

Underlying pathologies in VCF affect the VB mechanical stability and its intrinsic bone osteogenesis equilibrium thus compromising the bone remodeling. In such cases, the goal is to achieve **safe and long term mechanical stabilization** of the SpineJack® with the Cohesion® Bone Cement.

+ Cohesion® Bone Cement

Based on more than 50 years of excellent PMMA clinical history, **Cohesion®**, is a fully biocompatible high viscosity bone cement made with the latest generation of compounds.

The use of Zirconium Oxide instead of Barium Sulfate has been shown to limit the potential of bone osteolysis, thus potentially leading to better long term results⁵. PMMA cement is not a glue, therefore getting the best and widest possible interdigitation will optimize the fracture stabilization.



TRAUMATIC FRACTURE

In traumatic VCF with good bone quality, the ideal fixation solution should incorporate a:

- ✕ Safe and reproducible **strong primary fixation**.
- ✕ Strong long term **osteointegration** of the injected Biomaterial with the surrounding bone tissues.

✕ Interface® Bone Fixation Composite

With **only 30% of PMMA**, Interface® Bone Fixation Composite is a proprietary formulation combining the lowest percentage of PMMA available in the market* while keeping the mechanical properties of the high viscosity Cohesion® Bone Cement.

The Interface® Bone Fixation Composite with 50% **osteoconductive Hydroxyapatite** (HA) crystal-shape particles provides a surface with a composition very similar to bone making making osteointegration possible^{6,7}.

Interface® Bone Fixation Composite provides:

- ✕ **Primary mechanical stability**
- ✕ **Long term biological apposition**

State-of-the-art handling properties

- ✕ Sustained high viscosity.
- ✕ Long working time.
- ✕ Excellent radio-opacity.

Strong primary mechanical stabilization

- ✕ Interdigitation with trabecular structures.
- ✕ Based on Cohesion® Bone Cement experience.

Enhance biocompatibility

- ✕ Osteoconductivity: strong and direct bone apposition⁸.
- ✕ Tissue-friendly: reduced PMMA volume and low exothermic temperature.

Rational for the choice of 0-200 µm and Crystalline shape of HA particles:

- ✕ Right size to ensure reproducible and homogeneous mixing.
- ✕ Right shape for adequate sustained high-viscosity.
- ✕ Ideal size and shape for bone tissue apposition⁹.



References: 10

* In this category of products

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