

# ActiviOSS<sup>TM</sup>

Bioactive bone substitute  
Osteostimulative bone regeneration granules

Gene Activation  
for Excellent  
Bone Remodeling





Noraker has been involved in biomaterial development since 2005. It's today an innovative manufacturer of medical implants for bone regeneration, with its core technology: the bioactive glass, a synthetic bioresorbable ceramic.

## Composition

The bone substitutes Activioss™ Granules and Activioss™ Putty are made of bioactive glass. This ceramic is composed of Silicium, Calcium, Sodium and Phosphorous, minerals naturally present in the human body. The natural composition allows an excellent biocompatibility.

## Avantages

The bioactive glass is more reactive than inert materials, such as hydroxyapatite or calcium phosphate. Its composition stimulates the natural process of bone regeneration at the genetic level.<sup>1 2 3</sup>

## Performances

The bioactive glass has clinically proven its performance to fill bone defects over 1 million patients. Over time, it is fully absorbed and replaced by functional bone tissue.<sup>4</sup>

## MECHANISM OF ACTION

### 1. Easy to use

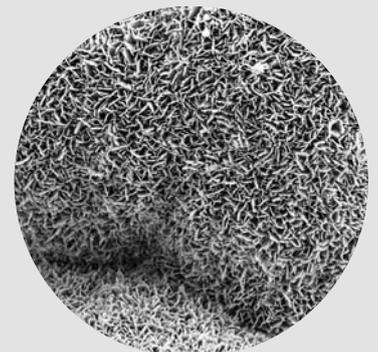
*Granules:* cohesive mass when mixed with serum or blood.

*Injectable Putty:* can be injected through the syringe, or molded with the gloves or surgical instruments.



### 2. Ionic exchanges

At 14 days: formation of an active biological mineral layer of calcium phosphate, with similar composition and structure as human bone.<sup>1 3 5</sup>



The products range of ActiviOSS™ consists of Injectable Putty and Granules.

## ActiviOSS™ Injectable Putty

The ergonomics of the syringe has been especially studied to have a good grip. Two tips are available.



## ActiviOSS™ Granules

When mixed with patient's blood or physiological saline solution, it forms a cohesive mass enabling easy implantation.



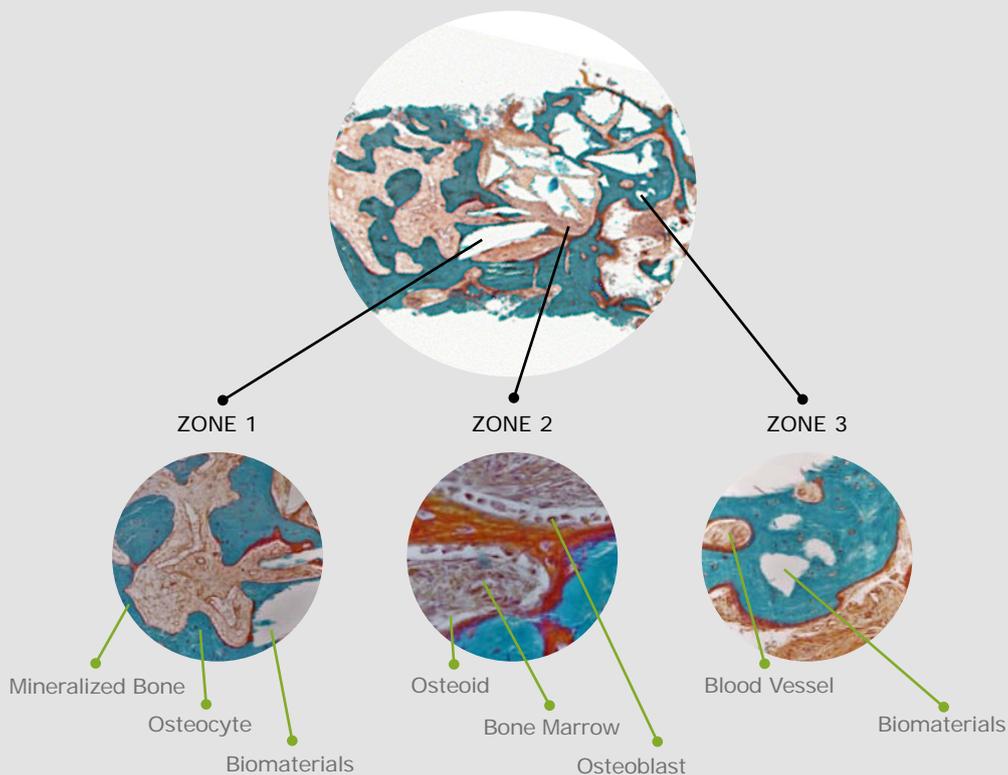
### 3. Genetic activation

At 21 days:  
The increased concentration of minerals stimulates the differentiation and proliferation of osteoblasts in the defect; and starts the formation of the extra-cellular matrix of collagen. <sup>2 4 6</sup>



### 4. Bone Regeneration

At 6.5 months, mineralized bone tissue is present in all the augmented bone volume. Bone architecture appears to be normal.<sup>7</sup>  
*Clinical case*

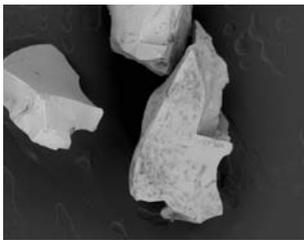


# Did you know?

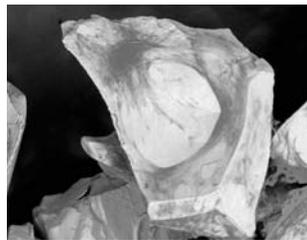
Bone substitutes are classified into an Index of Bioactivity.<sup>8</sup>

Class A	Class B
Matrix for the bone colonization + Stimulation of stem cells	Matrix for the bone colonization
Bioactive Glass 45S5	HA, $\beta$ TCP

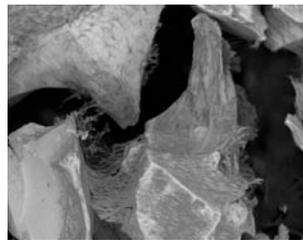
## Illustration of the osteostimulation property of Activioss™: Adhesion and Proliferation of mesenchymal stem cells hMSC on Activioss™<sup>9</sup> (in vitro study)



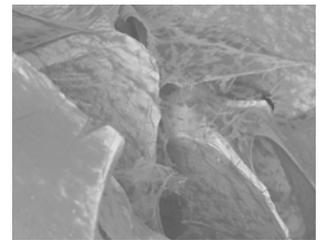
SEM - Day 2  
Stem cells adhesion on the surface of Activioss™ (dark dots)



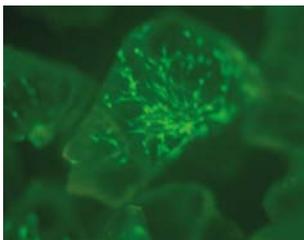
SEM - Day 7  
Multiplication and differentiation of the stem cells (dark spider web)



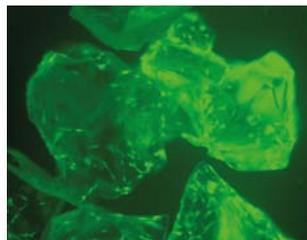
SEM - Day 14  
Extracellular matrix and natural hydroxyapatite in formation



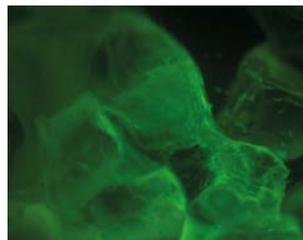
SEM - Day 21  
Dense extracellular matrix; cells differentiated in osteoblasts



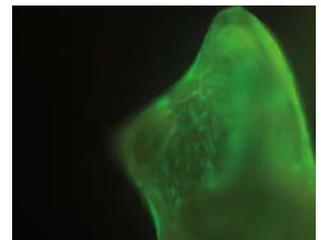
Live&Dead – Day 2  
Alive stem cells (green dots); no dead stem cells (no red dots)



Live&Dead – Day 7  
Alive cells spread on the Activioss™ surface (in green)



Live&Dead – Day 14  
Alive cells and network spread on the Activioss™ surface (in green)



Live&Dead – Day 21  
Alive cells and network spread on the Activioss™ surface (in green)

### Additional property in granule shapes.

In vitro tests have demonstrated the bactericidal effect of the bioactive glass 45S5 on common bacteria present in dental and orthopaedic surgeries.<sup>10 11 12</sup>

\* [45S5] ≥ 50mg·ml<sup>-1</sup>

Bactericidal percentage (%) *		
Orthopaedic	S. Epidermidis	≥98%
	S. Aureus	≥98%
	E. Coli	≥98%
Dental	S. Mutans	≥83%
	S. Sanguis	≥98%
	P. Gingivalis	≥91%

## Clinical Cases

### 1: Implant dehiscence, Dr D. Carrotte, private practice in Villeurbanne Lyon (69)



1. Gingival healing after tooth extraction.



2. Bone crest after flap opening and cortical stimulation.



3. Fenestration to neck implant, on 5 mm



4. Recovery of the apparent grooves with drilling bone.



5. Placement of the Activioss™ bone substitute, in relation with autologous bone.



6. Defect's recovery with Activioss™ Membrane, 20x30 mm, reshaped for this site.



7. Final view with stitchings.



8. 3 months scanner. Highlight of the bone graft, on the vestibular face of the implant.



9. Gingiva scalloping at 3 months, due to the connection of the temporary crown «direct implant».



10. Clinical results at 6 months, with natural adjacent tooth mimetism and papilla's maturation.

### 2: Ginvivoperiostoplasty Dr M-E Gatibelza, CHU Sud Rennes

This case is a 9-years-old female, with an alveolar left cleft of 4,6mm, confirmed on cone-beam. Ginvivoperiostoplasty was realized in ambulatory, with 1cc of Activioss™ Granules mixed with 0,5cc of patient's blood. School could start again 1 week after surgery, and sports 1 month after. Clinical follow up at 1 month and 1 year showed good gingival continuity, stable bone volume, no persistent palate or alveolar fistula. Radio follow up at 6 months with cone beam showed progressive integration of the bone substitute. At 1 year follow up, cone beam confirmed a mature bone bridge with same density as adjacent maxillaire and complete resorption of Activioss™.



ConeBeam before surgery



ConeBeam at 6 months follow up



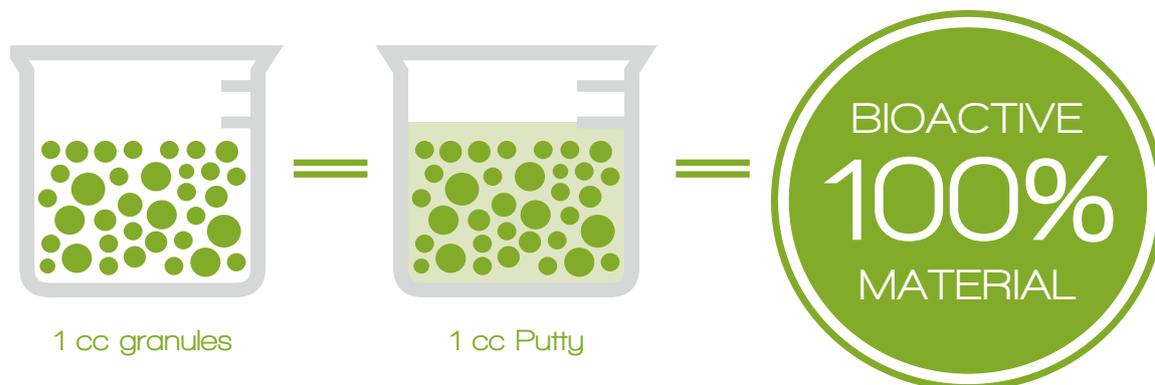
ConeBeam at 1 year follow up

Reference	Granulometry	Volume ≈ weight
<b>Activioss™ Granules</b> Osteostimulative granules for the bone regeneration.		
ACT-GS0.5	S	0.04 – 0.5 mm / 0.5 cc
ACT-GS1.0	S	0.04 – 0.5 mm / 1.0 cc
ACT-GM0.5	M	0.5 – 1.0 mm / 0.5 cc
ACT-GM1.0	M	0.5 – 1.0 mm / 1.0 cc
ACT-GL1.0	L	1.0 – 3.0 mm / 1.0 cc
<b>Activioss Injectable Putty</b> Osteostimulative Injectable paste for bone remodeling.		
ACT-IP1.0		1,0 cc
ACT-IP2.5	0.1 mm to 0.7 mm	2,5 cc



1. Tsigkou, O. et al. *Biomaterials*. 2009;**30**:3542-50
2. Oonishi, H. et al. *J. Biomed. Mater Res*. 2000;**51**:37-48.
3. Jones, J.R. *Acta Biomaterialia*. 2013;**9**:4457-4486.
4. Xynos, I.D. et al. *Calcif Tissue Int*. 2000;**67**:321-9.
5. Hench, L.L. *J. Mater Sci: Mater Med*. 2006;**17**:967-978.
6. Jell, G. et al. *J Mater Sci : Mater Med*. 2006;**17**:997-1002.
7. Data on file at Noraker, clinical case.
8. Hench, L.L. *Biomaterials* 1998;**19**:1419-1423.
9. Data on file at Noraker, in vitro study.
10. Allan, L. et al. *Biomaterials*. 2001;**22**:1683-1687.
11. Hu, S. et al. *J Mater Sci: Mater Med*. 2009;**20**:281-286.
12. Datas on file at Noraker 22/06/2018 : State of the Art analysis of bioactive glass antibacterial effect.

*Activioss™ Granules et Activioss™ Injectable Putty, bone graft substitutes are a medical devices class III, manufactured by NORAKER and whose conformity assessment was conducted by LNE / G-MED (0459). Activioss™ is indicated for filling bone defects. Read the instructions supplied with the product for complete information on indications, contraindications, warnings and precautions, and adverse effects. Last update : 2018/06*



NORAKER is a French manufacturer specialized in the research and development of innovative products based on the 45S5 bioactive glass technology for medical applications.

Distributed by:



**NORAKER**

INNOVATIVE BIOMATERIALS

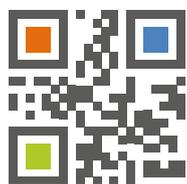
13 Av. Albert Einstein  
69100 Villeurbanne  
France

Tél : +33 (0)4 78 93 30 92

Fax : +33 (0)4 72 35 94 37

contact@noraker.com

www.noraker.com



www.noraker.com

2.2-GLB-Brochure-EN-2.1