

# BonAlive<sup>®</sup> putty

[www.bonalive.com](http://www.bonalive.com)



A revolution in bone grafting

***Osteoconductive bone graft substitute  
with osteostimulative\* properties***

\*non-osteoinductive

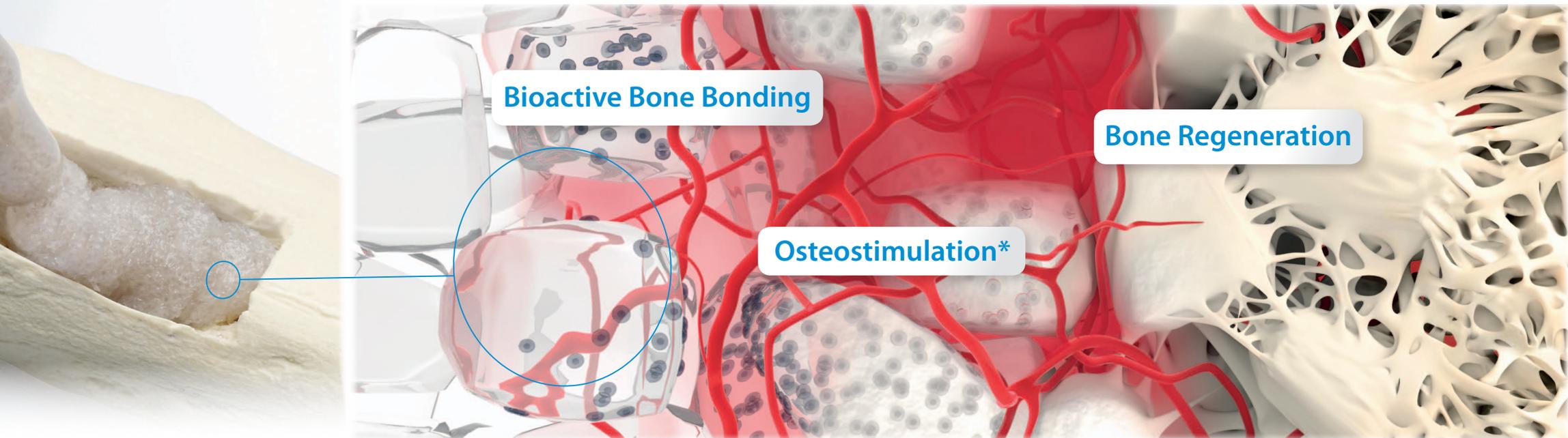


**Before use of BonAlive® putty, it is important that:**

- The surgeon is familiar with the surgical technique required, including normal patient follow-up, the specific application methods and the properties of BonAlive® putty
- All the soft/pathological tissue are thoroughly removed from the defect
- The surface of the bone is refreshed
- Antibiotics and other treatment involved in the implantation procedure shall be used according to routine clinical practice.

## Easy to handle and apply to the bone defect

BonAlive® putty is a sterile ready-to-use bone graft substitute that can be delivered directly to the bone defect.



*\*Non-osteinduction*

## What is bioactive glass?

Bioactive glass (S53P4) consists only of elements naturally existing in the body (Si, Na, Ca, P). It is characterised by its ability to attach firmly to living tissue, facilitate tissue growth, bond chemically with surrounding bone in an implantation bed and promote new bone formation in the implanted area. Bioactive glass works by leaching out ions that react with the body fluids, transforming the glass surface chemically into one that by its chemical composition and structure resembles the mineral phase found in natural bone. In contact with an aqueous solution the bioactive glass develops a silica-gel layer, which acts as a template for calcium phosphate (CaP) precipitation. The CaP surface enables bonding of the bioactive glass to the surrounding bone. This makes bioactive glass a unique material for filling defects and replacing damaged bony tissue.

## What is BonAlive<sup>®</sup> putty?

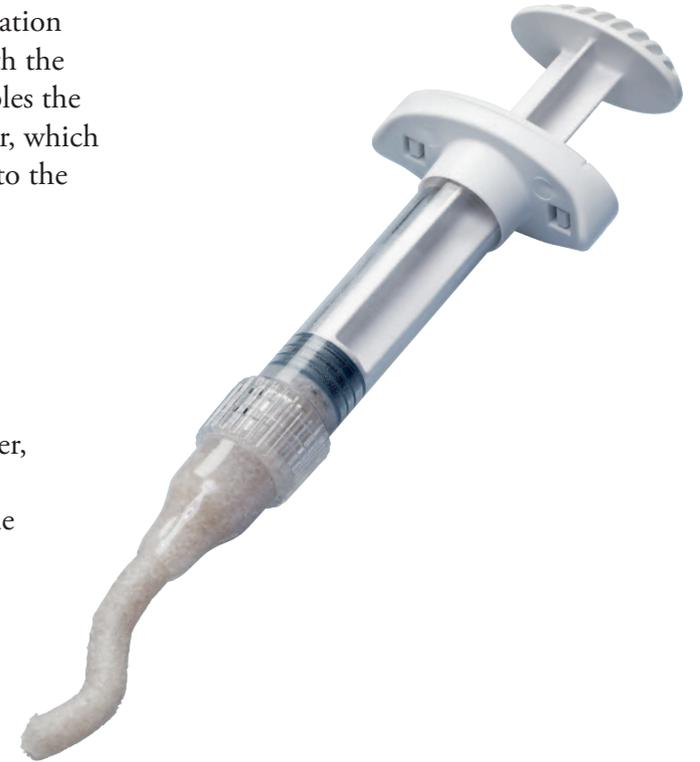
BonAlive<sup>®</sup> putty\* is a bioactive, osteoconductive and osteostimulative\*\* synthetic bone void filler, which is made of bioactive glass granules<sup>1,2</sup> mixed with a small amount of spherical glass. It also contains a water-soluble synthetic binder, which is a blend of polyethylene glycols (PEGs) and glycerol. The binder acts as a temporary binding agent for the bioactive glass. After implantation the binder is absorbed leaving behind only the bioactive glass thus permitting tissue infiltration between the granules which have a number of beneficial properties.

\*BonAlive<sup>®</sup> putty has not been verified to inhibit bacterial growth.

\*\*non-osteoinductive

## Indication for use

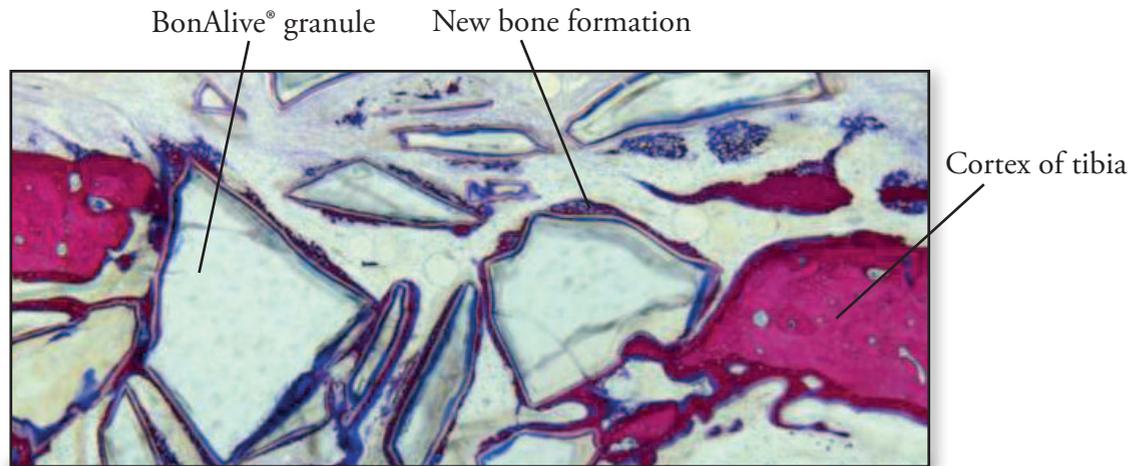
BonAlive<sup>®</sup> putty is indicated for bony voids and gaps.



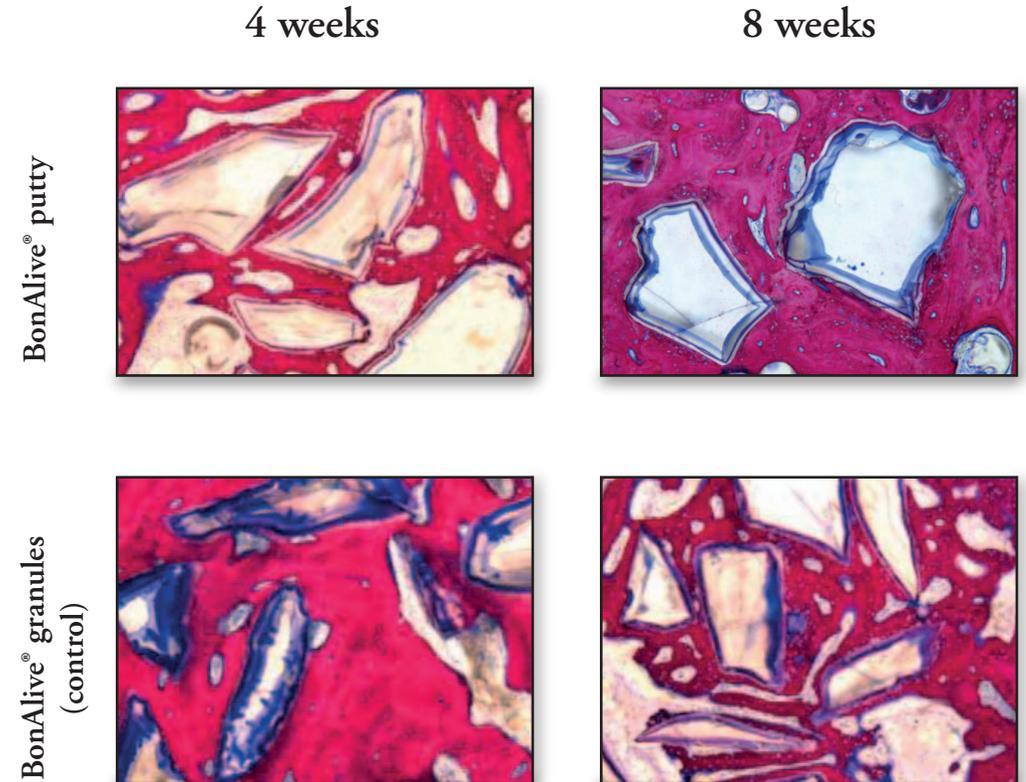
# Bone formation with BonAlive® putty

In a preclinical rabbit tibia defect model it was shown that with BonAlive® putty, new bone formation is visible already at 2 weeks after implantation (*Figure 1*).

The histological findings at 4 and 8 weeks were that new bone is formed in a similar manner with BonAlive® putty and BonAlive® granules (*Figure 2*). The grafted area was highly vascularised with dense bone formation and periosteal growth in both cases.



*Figure 1. Histological section 2 weeks after BonAlive® putty implantation*



*Figure 2. Histological 80-100 µm-thick sections from the BonAlive® putty and BonAlive® granules grafted areas at 4 and 8 weeks*

# Benefits of BonAlive® putty

## Easy to use

BonAlive® putty is provided as a sterile, ready-to-use paste.

## Effective bone formation (Osteostimulation\*)

Bioactive glass granules in BonAlive® putty stimulate the growth of new bone in the presence of bone-forming cells.<sup>1,2,3</sup>

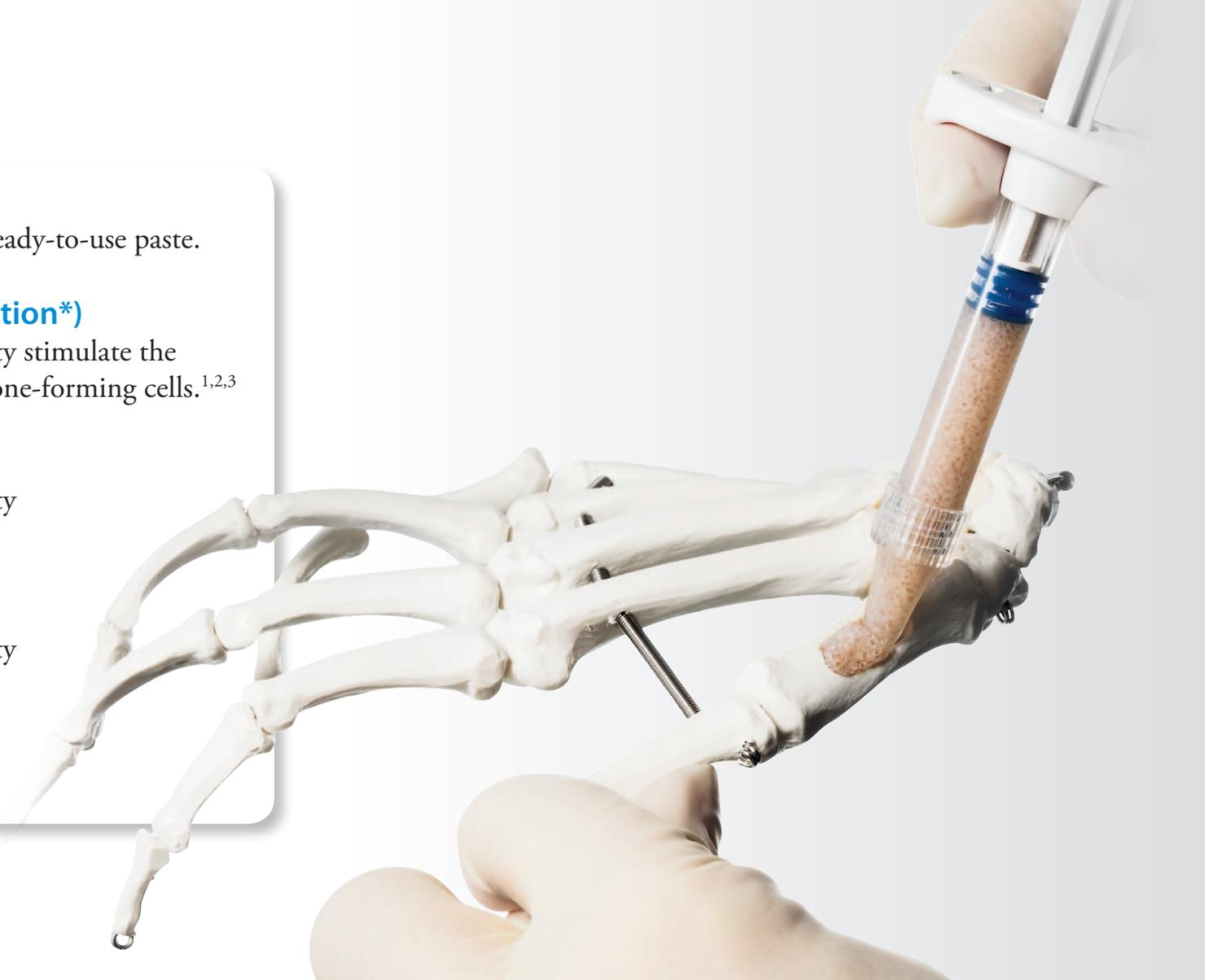
## Bioactive

Bioactive glass granules in BonAlive® putty bond to surrounding bone.<sup>1,2</sup>

## Long-term bone growth

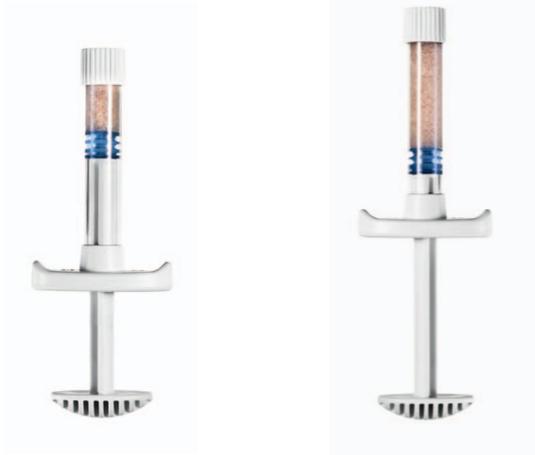
Bioactive glass granules in BonAlive® putty resorb slowly and are replaced with bone during the progressive healing process.<sup>4,5</sup>

*\*Non-osteinduction*



## Small applicator

The small applicator is primarily used for hand and cranio-maxillofacial surgery.



Product	Ref. no	Package size
Small applicator	16110	1 cc
	16120	2.5 cc

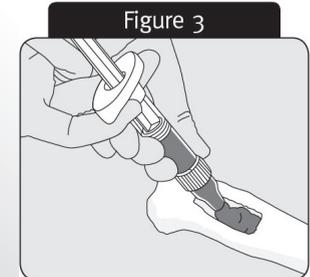
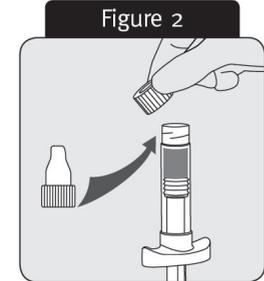
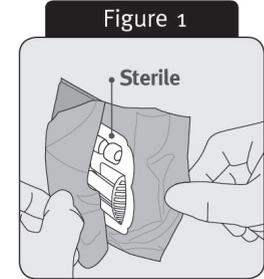
## Large applicator

The large applicator is primarily used for orthopaedic and trauma surgery.



Product	Ref. no	Package size
Large applicator	16130	5 cc
	16140	10 cc

## Instructions for use



# References

1. Molecular basis for action of bioactive glasses as bone graft substitute. Välimäki VV, Aro HT. Scandinavian Journal of Surgery. 2006;95(2):95-102.
2. Histomorphometric and molecular biologic comparison of bioactive glass granules and autogenous bone grafts in augmentation of bone defect healing. Virolainen P, Heikkilä J, Yli-Urpo A, Vuorio E, Aro HT. J Biomed Mater Res. 1997;35A(1):9-17.
3. Treatment of a recurrent aneurysmal bone cyst with bioactive glass in a child allows for good bone remodelling and growth. Lindfors NC. Bone. 2009;45:398-400.
4. A prospective randomized 14-year follow-up study of bioactive glass and autogenous bone as bone graft substitutes in benign bone tumors. Lindfors NC, Koski I, Heikkilä JT, Mattila K, Aho AJ. J Biomed Mater Res. 2010;94B(1):157-164.
5. Bioactive glass S53P4 and autograft bone in treatment of depressed tibial plateau fractures. A prospective randomized 11-year follow-up. Perna K, Koski I, Mattila K, Gullichsen E, Heikkilä J, Aho AJ, Lindfors N. J Long-term Eff Med Impl. 2011;21(2):139-148.

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