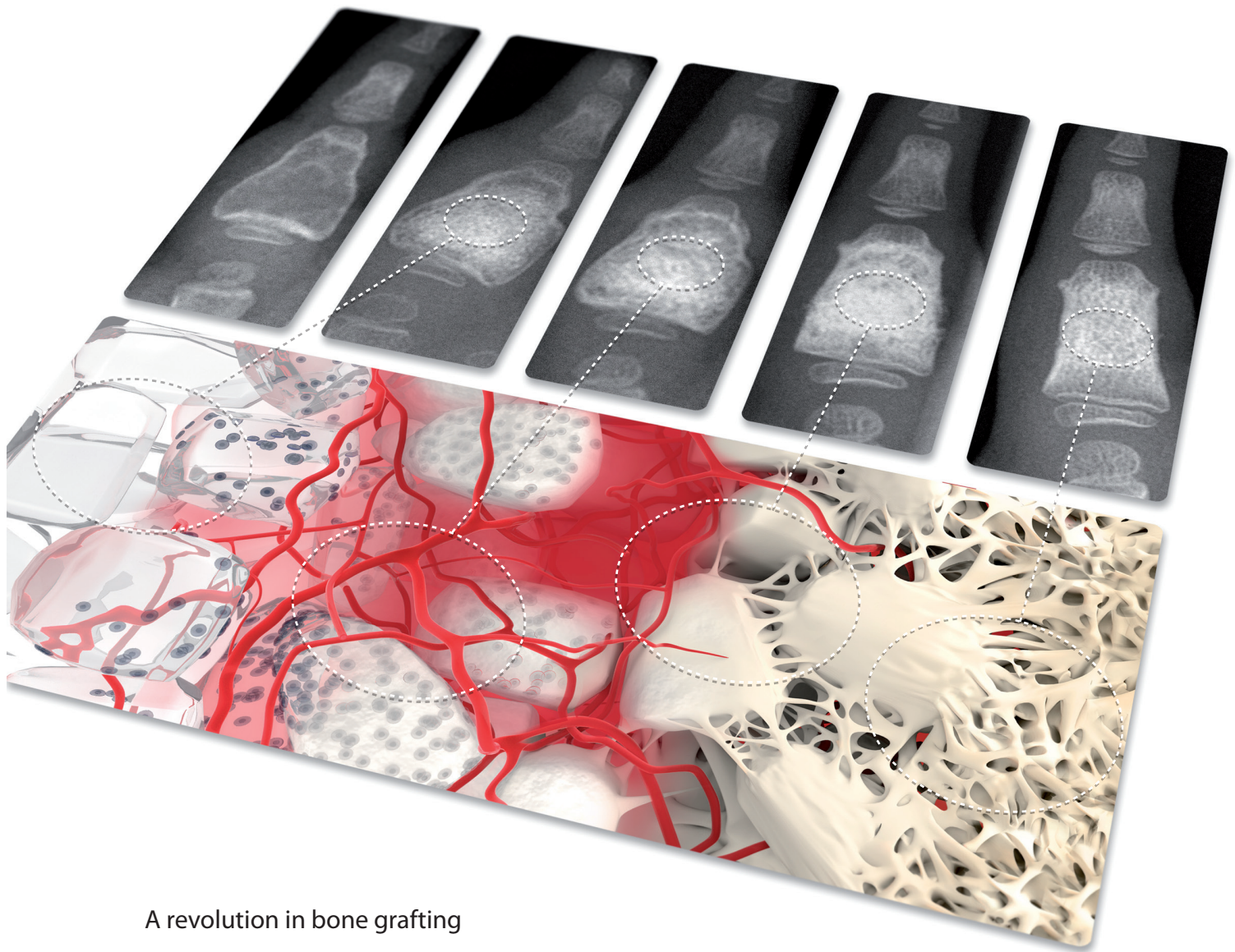


BonAlive[®]

granules



A revolution in bone grafting

“BonAlive[®] is bioactive and osteoconductive with proven bone growth promoting properties”

Nina C. Lindfors, MD, PhD, MSc
Hand surgery, Orthopedic and Trauma surgery
Helsinki Central University Hospital, Finland

Bioactive BonAlive® granules

BonAlive® is a 100% synthetic *bioactive* bone graft substitute that *promotes new bone formation*^{1,2}. Surgeons trust BonAlive® with its over 15 years of proven safety and clinical performance in orthopedic and trauma surgery³. The composition of BonAlive® by weight is: SiO₂ 53%, Na₂O 23%, CaO 20% and P₂O₅ 4%.



Proven Clinical Performance

Bioactive

Bonds effectively to surrounding bone^{1,2}

Osteoconductive

Promotes the growth of new bone^{1,2}

Safe

Fully synthetic with long term verified safety^{3,4}

Resorbs slowly

Encourages long-term bone growth^{3,5}

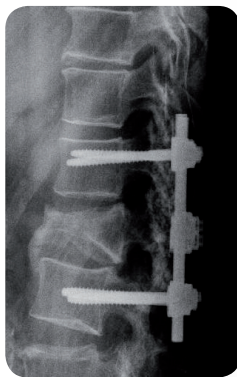
Composite grafting

BonAlive® can easily be combined with autograft or allograft to contribute to accelerated healing⁷

BonAlive® in Spine Surgery

Bone grafting in spinal surgery is often required in cases of vertebral body fractures or spinal fusions. BonAlive®'s capacity to promote bone growth offers an excellent option as a bone graft extender for spine surgery.

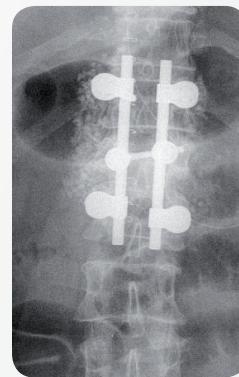
Patient case I: BonAlive® in posterolateral fusion



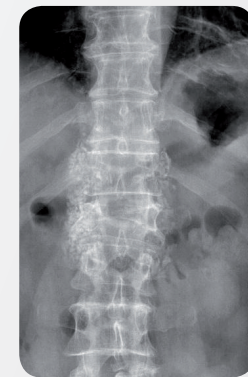
Post-op



Post-op 1 year



Post-op



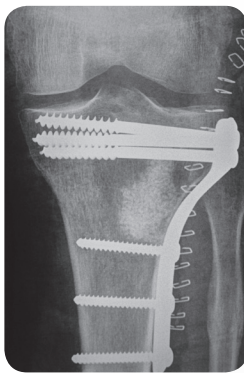
Post-op 1 year

A 56 year old male patient with a L1 fracture of the vertebra was instrumented posteriorly to restore the original anatomical position. BonAlive® was used as a bone graft extender together with autologous bone in a 50/50 ratio. The instrumentation was removed at the patient's own request at 12 months post-op and no complications or symptoms could be observed.

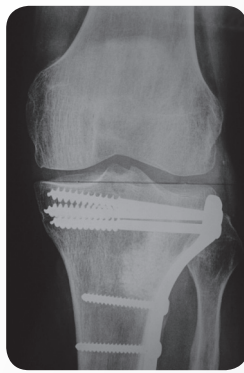
BonAlive® in Traumatology

BonAlive® is well suited for use in both osteotomies and fracture repair and has an excellent record when used in combination with metal implants. BonAlive® provides both a bone void filler and a biomaterial that promotes new bone formation^{1,2,3}.

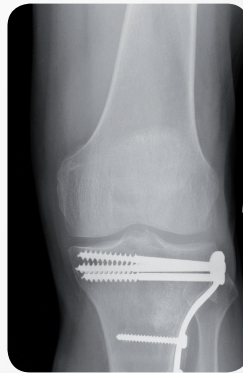
Patient case II: BonAlive® in the treatment of a depressed tibial plateau fracture



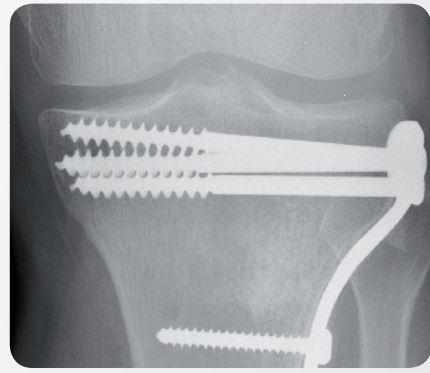
Post-op



Post-op 1 year



Post-op 11 years



Post-op 11 years

BonAlive® (15cc; 1.0-2.0mm granule size) was used to treat a depressed tibial plateau fracture in a 57 years old male in 1998. Joint alignment was performed and the fracture was fixated with a plate. During the follow-up the joint line had sustained its originally elevated level and no complications were observed.

Images © Turku University Hospital, Finland

Patient case III: BonAlive® in the treatment of a depressed tibial plateau fracture



Pre-op



Post-op 1 year



Post-op 11 years



Post-op 11 years

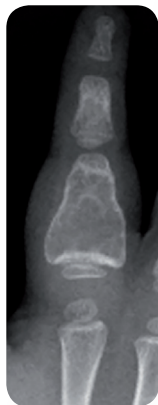
BonAlive® (10cc; 1.0-2.0mm granule size) was used to treat a depressed tibial plateau fracture in a 57 years old female in 1998. The joint was aligned and the fracture was fixated with a plate. The plate was removed in 2003 at the patient's own request. During the follow-up the joint line had sustained its originally elevated level and no complications were observed.

Images © Turku University Hospital, Finland

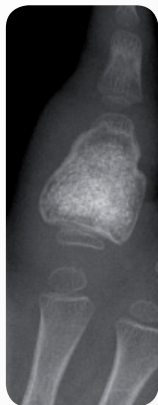
BonAlive® in Benign Bone Tumor Surgery

BonAlive® has been used successfully for almost two decades to fill bone cavities, and it has been clinically proven that the long-term performance is *comparable to autogenic bone*^{3,5,6}. BonAlive® induces a high but balanced local bone turnover by promoting new bone formation^{1,6,7}. The high level of bone remodeling can be seen remarkably well in pediatric patients⁶. BonAlive® does not disturb the growth of bone in children⁶.

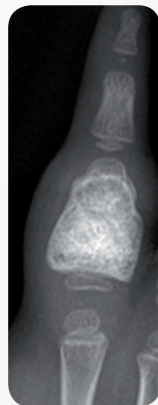
Patient case IV: BonAlive® granules in the treatment of benign bone tumors⁶



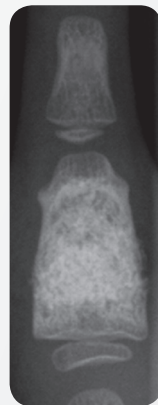
Pre-op



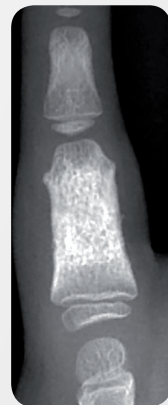
Post-op 1 month



Post-op 3 months



Post-op 1 year



Post-op 2 years

BonAlive® was used to treat a recurrent aneurysmatic bone cyst (ABC) in the proximal phalanx of the finger, in a three-year-old child, with good results. During the two-year follow-up, the filled cavity appeared dense on X-ray and no sign of a recurrent cyst was observed. The phalanx had grown in length and remodeled to an almost normal shape.

Images © Helsinki University Hospital

Product	Ref. no	Granule size	Package size
BonAlive®granules ORTHO	14130	0.5-0.8 mm - small	5 cc
	14140	0.5-0.8 mm - small	10 cc
	14330	1.0-2.0 mm - medium	5 cc
	14340	1.0-2.0 mm - medium	10 cc
	14430	2.0-3.15 mm - large	5 cc
	14440	2.0-3.15 mm - large	10 cc

References:

- 1 *Molecular basis for action of bioactive glasses as bone graft substitute.* Välimäki V-V, Aro H, Scand. J Surg. 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 Mat Res Part A, 1997, 35(1):9-17.
- 3 *A prospective randomized 14-year follow-up study of bioactive glass and autogenous bone as bone graft substitutes in benign bone tumors.* Lindfors N.C, Koski I, Heikkilä J, Mattila K, Aho A, J Biomed Mat Res Part B, 2010, 94B(1):157-164.
- 4 *Long-term evaluation of blood silicon and osteocalcin in operatively treated patients with benign bone tumors using bioactive glass and autogenous bone.* Lindfors N.C, Heikkilä J, Aho A, J Biomed Mat Res Part B, 2008, 87B(1):73-76.
- 5 *Bioactive glass and autogenous bone as bone graft substitutes in benign bone tumors.* Lindfors N.C, Koski I, Heikkilä J, Mattila K, Aho A, J Biomed Mat Res Part B, 2009, 90(1):131-136.
- 6 *Treatment of a recurrent aneurysmal bone cyst with bioactive glass in a child allows for good bone remodelling and growth.* Lindfors, N.C, Bone, 2009, 45(2):398-400.
- 7 *Bioactive glass as bone-graft substitute for posterior spinal fusion in rabbit.* Lindfors N.C, Tallroth K, Aho A, J Biomed Mat Res, 2002, 63 (2):237-244.



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contact@bonalive.com, www.bonalive.com

Distributor:

Federal law restricts BonAlive® granules to sale by or on the order of a licensed practitioner