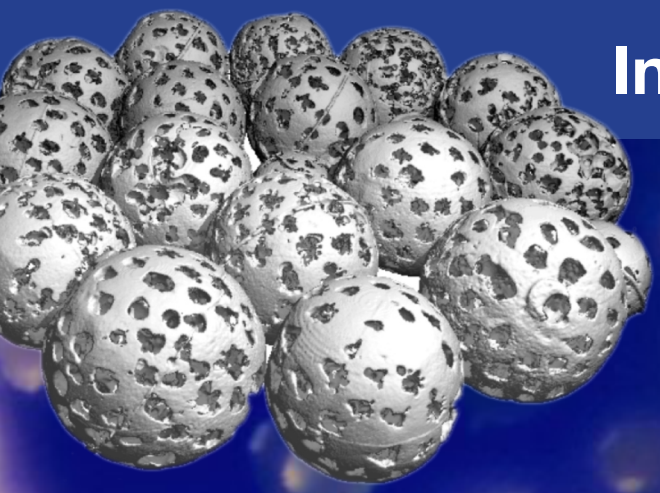
Ceraball® is *en marche*.

bayern innovativ
NOMINIERT
INNOVATION LEBEN AWARD

Local Tissue Engineering.
In Weeks instead of Months.



PRODUCT INFORMATION - ORTHO

boneArtis AG

swiss made

EN

Primarily formed mature cancellous bone? No longer a Dream.

1. Replica-based bone formation

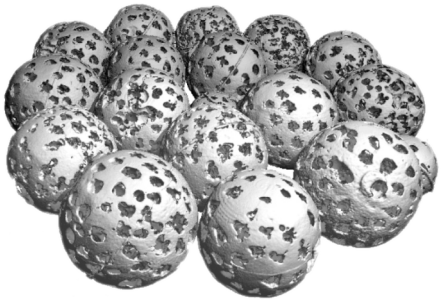


Fig. 1: Ceraballs®

The dream of reconstructing cancellous bone scaffolds has a long history[1] which now came true. The newly formed bone is based on:

- a cancellous bone scaffold carrying the load from the beginning.
- an osteoconductive ceramic suctioning-in blood and bone marrow.
- full interconnectivity of the ceramic.
- a maximum specific surface for cell colonization.

Ceraball® (fig. 1) presents a pure and fully synthetical ceramic material, providing high porosity up to **85%** and at the same time **an unachieved strength** of the material. **Ceraball®** allows to reconstruct any kind of bone defects, regardless of its etiology; i.e. of trauma, osteosynthesis, bone defects, tumor cavities, traumatic bone loss, dental bone defects, bone loss in parodontology and augmentation of jaw bone in implantology. Independent from its size by yielding a physiological architecture, the ceramics are changing the bone-healing time span tremendously. The ceramics are available as hydroxyapatite (**HA**) and ß-tricalcium-phosphate (**ß-TCP**) or a mélange of both; due to its strength and its primary cancellous bone formation no biphasic material is necessary.

2. Interconnectivity

Fig. 2: Absorption rate

Fig. 3: Capillary Forces

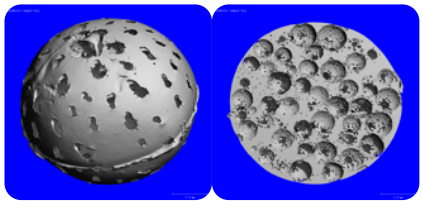


Fig. 4: Interconnectivity of Ceraballs®

The challenge of ceramic bone substitutes is considered the strength of the material combined with the maximum of porosity and interconnectivity (fig. 4). There is a trend transferred to combine the HA and ß-TCP raw materials yielding so-called biphasic implants. There is, however, no longer any predictable resorption in those implants and no advantage.

Ceraball® as a fully interconnected ceramic implant providing high capillary forces suctioning-in blood and bone marrow[2] provides:

- suctioning-in blood and bone marrow and **stops bleeding** (fig. 2,3).
- colonization by marrow stem cells **(MSCs).**
- **Primarily formed mature cancellous bone carrying the load from the early beginning**.
- Reconstructing even large tumor cavities in a physiological manner
- bone healing **in weeks instead of months**[3].

3. Primary Formation of a Cancellous Scaffold

The unique properties of **Ceraball®** yield early bone formation and reconstruction of a primary cancellous bone scaffold comprising mature lamellar bone[3,4].

The striking features are:

- **Early bone healing in weeks instead of months[2].**
- **Full reabsorption** of the ß-TCP beads.
- There is no need for morcellized bone.
- **Ceramic disease** will **not appear.**
- Fully synthetical ceramic.
- Stable fixed implant after coagulation.
- **Providing millions of adult stem cells for early bone healing** (fig. 5,6).

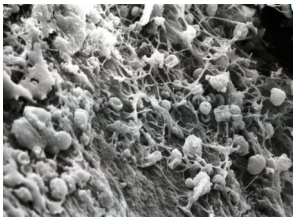


Fig. 5: Hematoma organization by a scaffold of fibrin

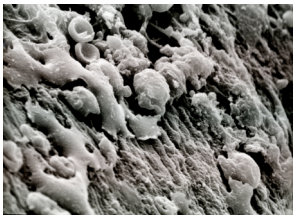


Fig. 6: Colonization by pluripotential mesenchymal cells of the bioactive surface

4. Unique Osseointegration

Whereas **bone substitutes of bovine origin** present an anisotropic architecture resulting in newly formed woven bone (fig.7), mainly presented in the form of beadlike formations, which have to be remodeled during the following six months, **Ceraball®** succeeds to reconstruct a cancellous bone scaffold **within the early stages** (fig. 8), thus forming loaded structures **in weeks instead of months,** compared to an HTO without load (fig. 11).

The striking features are:

- **no iliac crest** bone grafts any longer.
- the suctioned blood and bone marrow provide **own body defense** against infections.
- **healing in weeks** with early rehabilitation.
- **full reabsorption** depending upon the load acting on it, which defines the so-called turnover rate.

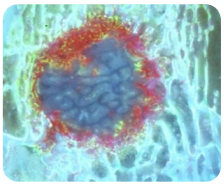


Fig. 7: Bovine implant

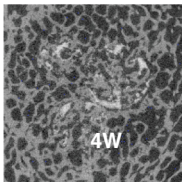


Fig. 8: Ceraball® after 4 weeks

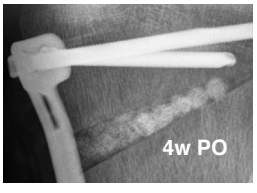


Fig. 9: HTO (High-Tibial-Osteotomy) with Ceraball® 4 weeks after implantation

Fig. 10: HTO without load after 1 year

Fig. 11: Ceraball® packaging

Ceraball®.
The new Gold Standard for reconstructing cancellous scaffolds.
Not in months, but in weeks.

More information about **Ceraball®** under **www.boneartis.com.**

1 Gluck (1891), Dreesman (1892), Tarsoly und Timory (1963), Draenert (2015),

2 Draenert et al. (2013): Osseointegration of Hydroxyapatite and Remodelling-Resorption of Tricalciumphosphate Ceramics. Microsc Res Tech 76:370-80.

3 Draenert et al. (2013): Primary cancellous bone formation with BMP and micro-chambered beads - Experimental study on sheep. Bone 52:465-73.

4 Draenert et al. (2014): Primary cancellous bone formation around micro-chambered beads. Rev Esp Cir Ortop Traumatol.58(3):131-7.

*Literature on request

Headquarter Switzerland
boneArtis AG Global
Gersauerstrasse 23
6440 Brunnen
Schweiz
phone. +41 41 820 38 82
fax. +41 41 820 38 85
@. info@boneartis.com
www. www.boneartis.com

Distribution EU
boneArtis AG
Gabriel-Max-Str.3
81545 München
Deutschland
phone. +49 89 642 30 89
fax. +49 89 693 79 076
@. info@boneartis.com
www. www.boneartis.com

This instruction is for Medical Doctors and authorized persons only trained in the operating theatre or a dental office.

The instruction for use of this brochure is intended to demonstrate the broad portfolio of products of boneArtis. Please, read the instruction for use carefully before using a product, the same is recommended for the labelling of the package and its intactness. Some of the products are not available in all global markets. This depends upon the regulations and indications for operations in the specific countries. Please, contact your boneArtis consultant in your country and ask, whether the boneArtis products are available or not.

bayern innovativ
NOMINIERT
INNOVATION LEBEN AWARD

www.boneartis.com