



smartbone®

THE NEXT FRONTIER OF BONE REGENERATION



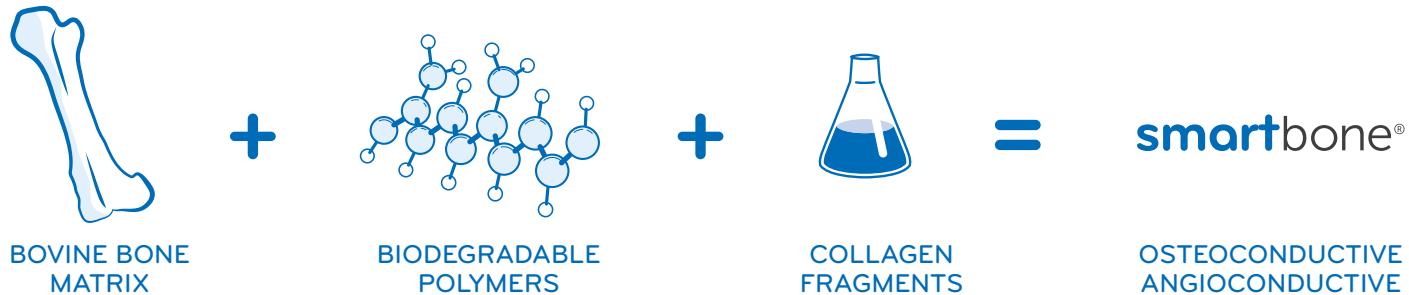
 swiss made



smartbone®

TECHNOLOGY

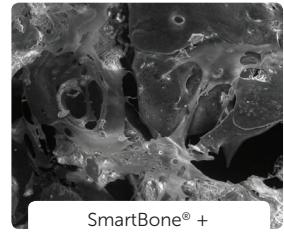
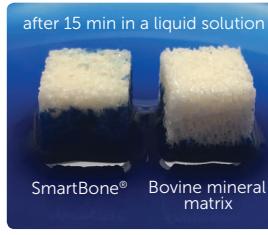
SmartBone® is a new hybrid bioactive bone substitute specifically developed for bone regeneration in reconstructive surgery. SmartBone® is produced by combining a bovine mineral bone matrix with bioactive resorbable polymers and collagen fragments. This new concept of composite biomaterial promotes a quick growth of the patient's cells into SmartBone® while its biopolymers degrade, providing perfect integration and osteogenesis.



BIODEGRADABLE POLYMERS



COLLAGEN FRAGMENTS

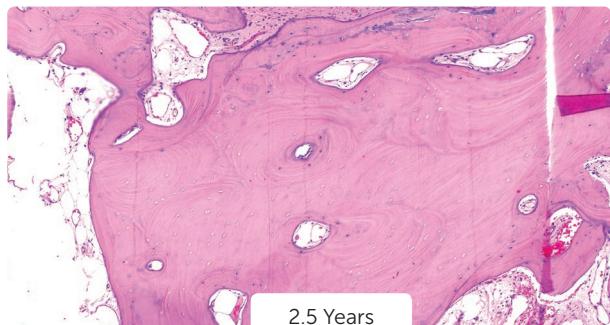


Give SmartBone®:

- high loading resistance
- high volumetric stability (>95%); the polymers protect the bone from early resorption
- high tenacity to screws fixation

Help SmartBone® to:

- promote blood cells adhesion and colonization
- guarantee a high hydrophilicity thus enhancing the chemical cascade of signals that promotes the osteogenic process



SmartBone® is progressively replaced by new young bone: osteoblasts are visible both in the active and in the quiescent state, when, after having formed mature lamellar bone, they become osteocytes, as evidenced inside the lacunae. After 2.5 years the graft has been completely replaced and the osteogenesis has formed a lamellar bone with cement lines; there is evidence of a great amount of osteocytes inside the lacunae and of a good angiogenesis. SmartBone®, combined with the native bone, forms an osteoinductive system.

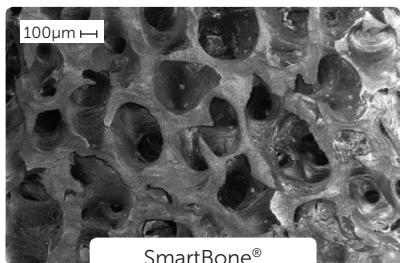


smartbone®

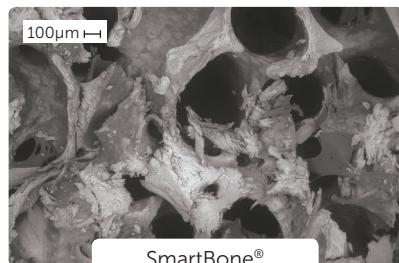
KEY FEATURES

OPEN AND INTERCONNECTED POROSITY

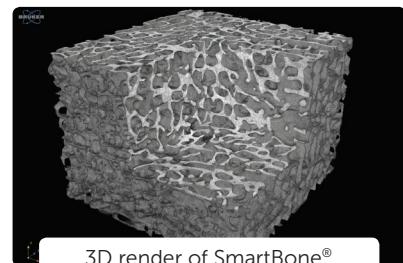
The microstructure of SmartBone®'s composite matrix strongly resembles the human bone in terms of open and mid-sized porosity.



SmartBone®



SmartBone®



3D render of SmartBone®

SmartBone® is completely resorbed and replaced by the patient's own bone within 1-2 years: this excellent outcome grants a vital, functional bone-implant integration.

SmartBone® is extremely biocompatible and is fully compliant with ISO 10993-1 requirements.

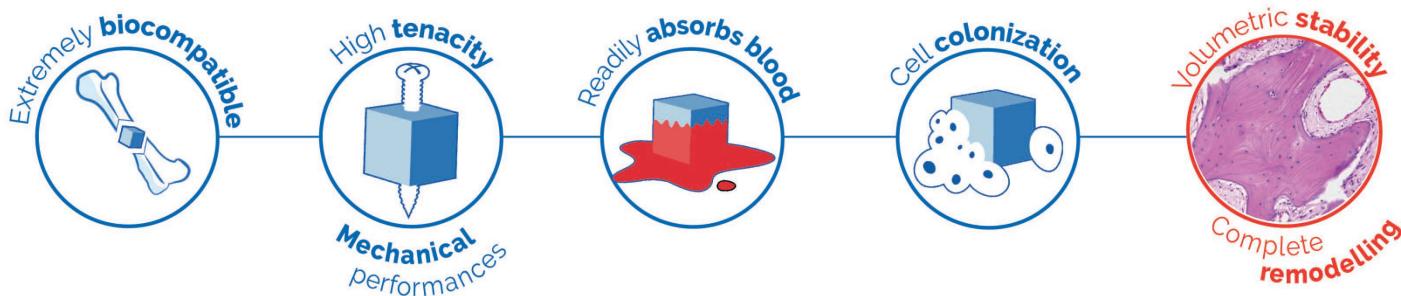
FROM CHIPS TO CUSTOM-MADE GRAFTS



3

ADVANTAGES OF SMARTBONE®

- Easy dust free shaping with any type of surgical tool (for example: bone cutter, drill)
- Resistant to extreme loads and to heavy surgical maneuvering
- Far better stability of the augmented bone graft vs the loose granules
- Bigger defects do not need autologous bone, thus reducing patient morbidity
- No resorption: the polymeric coating protects the graft during initial healing/osteointegration period
- Readily absorbs blood





CUSTOM MADE GRAFTS FOR RECONSTRUCTIVE SURGERY ARE ONLY FOUR STEPS AWAY

1

Diagnosis prescription

The doctor sends the patient's CT Scan in .dicom format with a brief clinical description

2

Digital planning

IBI designs the graft in accordance with the doctor's clinical prescriptions

3

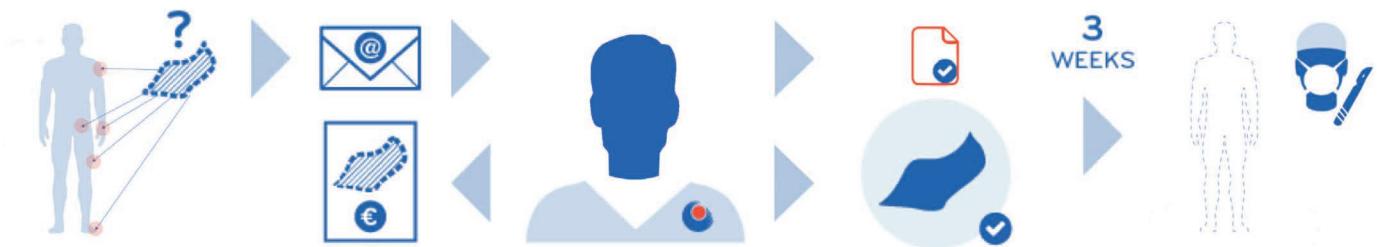
Custom made bone graft

IBI produces the custom made graft based on the .stl file

4

Surgery

3 weeks later you will receive your graft ready for the surgical operation. No sterilization or extra shaping required



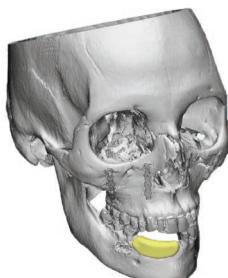
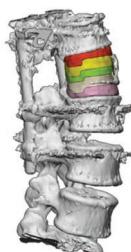
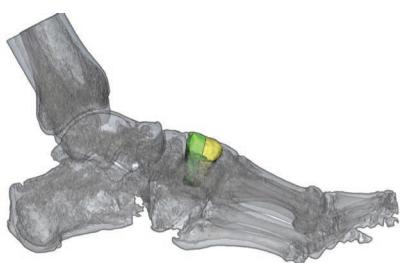
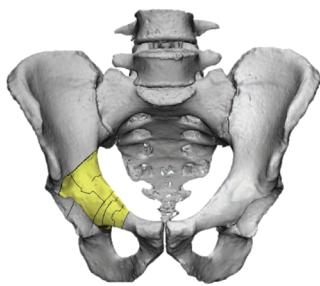
2.5 YEARS AFTER SURGERY

The graft has been completely replaced and a mature lamellar bone has formed.

SMARTBONE® ON DEMAND™

- is a custom-made bone graft specifically designed on the patient's defect
- ensures a perfect contact between the graft and the recipient site for improved integration
- ensures a precise creation of the desired shape

- helps you to resolve complex situations
- reduces surgery time
- reduces patient's risks
- helps you to reduce surgical costs
- guarantees you success





smartbone®

CATALOGUE

Our product is available in the following sizes:

smartbone® Microchips

SIZE	QUANTITY
------	----------

0.25 - 1 mm	0.25 g
0.25 - 1 mm	0.5 g
0.25 - 1 mm	1 g
0.25 - 1 mm	2 g
1 - 2 mm	0.5 g
1 - 2 mm	1 g
1 - 2 mm	2 g



smartbone® Granules

SIZE	QUANTITY
------	----------

2 - 4 mm	2 g
2 - 4 mm	3 g
2 - 4 mm	5.5 g
2 - 4 mm	8.5 g



smartbone® Block

SIZE

7 x 7 x 7 mm
10 x 10 x 10 mm
10 x 10 x 5mm
10 x 10 x 20 mm
10 x 20 x 20 mm
14 x 12 x 6 mm
14 x 12 x 8 mm
14 x 12 x 12 mm
14 x 12 x 20 mm
14 x 12 x 24 mm
15 x 30 x 20 mm
15 x 30 x 30 mm
15 x 30 x 40 mm
15 x 30 x 60 mm
16 x 14 x 6 mm
16 x 14 x 8 mm



smartbone® Cylinder

SIZE

Ø 11 x h 20 mm
Ø 12 x h 20 mm
Ø 14 x h 20 mm
Ø 16 x h 20 mm
Ø 11 x h 10 mm
Ø 14 x h 14 mm
Ø 08 x h 30 mm
Ø 08 x h 35 mm
Ø 10 x h 30 mm



5

smartbone® Rod

SIZE

35 x 4 x 3 mm



smartbone® Wedge

SIZE

35 x 22 x 5 mm
35 x 22 x 8 mm
35 x 25 x 10 mm
35 x 25 x 12 mm
40 x 25 x 12 mm
40 x 25 x 14 mm



DO

- Prepare the receiving site well
 - properly expand soft tissues
 - properly microdrill native bone
- Ensure a tight contact to host bone
 - appropriate graft shaping
 - firmly tight screws
- Smooth edges and corners
- Use membrane to cover SmartBone® (suggested collagene or pericardium membrane)

DON'T

- Avoid the use of saline solution, mix it with patient blood
- Do not overfill (avoid extra material, it does not shrink)
- Do not mix it with other biomaterials
- Do not reuse the product
- Do not re-sterilise

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AVOID THE USE OF SALINE SOLUTION



PREFER THE USE OF PATIENT BLOOD



DON'T REUSE



FOR SINGLE USE ONLY



FAQs

- **What is SmartBone® made of?**

It's a composite material, made of a bovine derived mineral matrix, reinforced with biopolymers and proteins (collagen fragments of porcine origin).

- **What's the biological mechanism of osteointegration of a bone graft?**

Bone generally has the ability to regenerate completely, but it requires a very small fracture space or some sort of scaffold to do so. Indeed, bone grafting is possible because bone tissue has the ability to regenerate completely if provided the space into which to grow.

As native bone grows, it will generally replace the graft material completely, resulting in a fully integrated region of new bone. The biologic mechanisms that provide a rationale for bone grafting with composite grafts and xenografts are osteoconduction (guiding the reparative growth of the natural bone) and osteoinduction (encouraging undifferentiated cells to become active osteoblasts). Only few bone grafts ensure a complete remodeling, SmartBone® is among these, together with autografts.

- **What are the top mechanical performances of SmartBone®?**

Braking Stress of about 26MPa (av.)

Elastic Modulus of about 1,2GPa (av.)

Breaking torque under screw fixation (screw tenacity) >55Ncm (av.)

- **Is SmartBone® an open-porous material?**

Yes! SmartBone® has an open interconnected porous structure.

- **How is SmartBone®'s microstructure?**

SmartBone® microstructure was specifically designed to mimic natural healthy human bone, in terms of composition and porosity.

- **Which is the expected (average) time of resorption of the biopolymers present within SmartBone®?**

They are degraded and resorbed in about 4-6 months: meanwhile they degrade and get resorbed, new born bone is formed.

- **Is SmartBone® hydrophilic?**

Yes! Due to its composition SmartBone® is extremely hydrophilic and can sustain a 38% w/w (av.) swelling in physiologic fluids. This features allow the graft to quickly and massively absorb blood once *in situ*, hence sparkling a better and faster integration with the host tissue.

- **Which biopolymers are used?**

We use biodegradable polymers, the same used in resorbable sutures.

- **Where does the bovine derived mineral matrix of SmartBone® come from?**

We supply our production with bovine derived tissues directly from fully certified companies in New Zealand, a "BSE negligible risk Country" (formerly known as "BSE free Country"). We control all our supply chain, according to the most strict norms and highest quality standards, according to the EU Regulation 722/2012 and ISO 22442.

- **How is SmartBone® produced?**

IBI applies a proprietary process to produce SmartBone®.

- **Can the biomaterial be mixed with a saline solution?**

The saline solution is not a fundamental component involved in the regeneration biological process, for this reason the patient's blood is absolutely recommended. The saline solution could extract the proteins adsorbed onto the trabecular surface of the graft.

- **Do I need to use a membrane?**

The use of the membrane is recommended in oral surgery, e.g. in cases of horizontal augmentations, in order to protect the graft from any dehiscence.

- **Once the vial or envelope has been opened, can I close it again, re-sterilise it and, if necessary, within what period of time should I use it?**

No, once the primary packaging has been opened (in sterile surgical environment), the material must be used immediately on a single patient. The surplus material must be disposed of according to IFU. SMARTBONE® IS SINGLE USE.

- **Why is SmartBone® single use?**

SmartBone® is provided, in its intact packaging, as a sterile medical device; once opened, it must be used immediately. Storage after opening does NOT ensure safety! SmartBone® is, hence, single use.

- **Can I keep the material in the fridge?**

The material must be stored according to the instructions on the labels, therefore away from light or heat sources, in a dry place and between +2 and +25 °C.

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THE NEXT FRONTIER OF BONE REGENERATION

IBI is an innovative hi-tech Swiss biomedical company focused on research, development and production of medical devices for tissue engineering and regenerative medicine: substitutes, grafts, 3D matrixes and 2D scaffolds. IBI believes that regenerative medicine and tissue engineering represent the future in healthcare. IBI has advanced competencies and core skills in processing materials for biomedical applications, which are used to develop proprietary technologies to build new and innovative products. IBI commits to safety and quality management: IBI Quality System is [ISO 13485:2016](#) certificated.



CAUTION: The law restricts the sales of these devices made by, or on the order of, a dentist or physician.

This catalogue is for healthcare professionals only, therefore the distribution to the general public is forbidden.