easy-graft™ CRYSTAL

Injectable, in-situ hardening
accelerated osteoconduction
long-term volume preservation
Dear Reader

Research findings on bone regeneration are progressing. So are the methods and optimal use of bone grafts and their substitutes. Whilst in the past scarcely anything other than autologous bone was used, nowadays more and more bone graft substitutes have found their way into the clinics. Granules from xenogenic, human or synthetic origin are used for treating bone defects using GBR technique. The broad availability and clinically proven effectiveness of these products has enabled the dentist to achieve better and reproducible results. With easy-graft™ and its stunningly easy handling, DS has significantly contributed to the suitability for daily use of bone graft substitutes and has been a door opener to new therapeutic possibilities.

For such uses, DS recommends biphasic, porous calcium phosphate-granules. This material has been successfully used in orthopaedics for years and consists of hydroxyapatit and ß-TCP. The ß-TCP resorbs, releases calcium ions and forms porous channels that function as a guiding structure for bone regeneration. The crystalline structure of the hydroxyapatit has an optimal surface for osteoconduction and remains in place for years. Therefore, it supports the long-term preservation of bone volume. The new biphasic granules are available with the award-winning easy-graft™ application technique.

The innovative concept

- High porosity due to bionic structure of granules
- Injectable putty due to fast resorbing polylactic acid coating
- Initial antibacterial properties
- Prevention of bacterial ingrowth due to coating
- No loss of granules due to solid body formation in situ
- High biocompatibility demonstrated in histological sections
- Direct bone contact promotes tissue ingrowth
- Blood uptake and tissue ingrowth due to porosity between granules
- Bone formation in parallel to partial degradation of bone graft substitute

Histological analysis

Two months after filling of an 8 mm drill defect in a sheep humerus with biphasic calcium phosphate granulate (BCP). After the toluidine blue staining, bone appears blue. Bone has grown through the entire supercritical defect confirming the good osteoconductivity of the material. The violet staining of the granulate suggests that bone penetrated into the granules. The osteo-integrated hydroxyapatite remains in the bone resulting in long-lasting volume preservation. The intimate contact between BCP and bone indicates an excellent biocompatibility of the material.

Faithfully yours, Kurt Ruffieux
Indications

The high osteoconduction and the long-term stability makes easy-graft™ CRYSTAL especially suitable for

- Large bone defects
- Regions that are prone to bone atrophy
- Patients with reduced bone regeneration potential

Possible uses are

- Cystectomy
- Socket preservation
- Sinus floor elevation
- Bone spreading
- Guided bone regeneration (GBR)
- Periodontal defects
- Periimplantitis

The advantages of easy-graft™ CRYSTAL are

- Time & cost savings due to simple handling and shortened surgical procedure:
  - injectable
  - easy modelling in the pocket
  - In-situ hardening
  - In most cases no membrane needed
- accelerated osteoconduction
- long-term volume preservation
- 100% synthetic (60% HA / 40% β-TCP)

Vertical alveolar ridge augmentation

easy-graft™ CRYSTAL was used to fill the void below the mobilized layer of cortical bone in a vertical augmentation procedure. The hardening of the material resulted in a good primary stability.

Horizontal spreading and implantation

Support for implant insertion and horizontal bone spreading, optimal stabilization of the mobilized lamellae.
**Easy to use: mix - apply**

**easy-graft™CRYSTAL** consists of a new unique biomaterial: bioceramic granules with a sticky surface. Apply directly into the defect, the bone graft will harden in situ within minutes...

**Step by step...**

Open the pouch with the syringe containing **easy-graft™CRYSTAL** granules, open the pouch with the Biolinker.

Fill the Biolinker into the syringe.

Mix both components and discard excess Biolinker.

The granules are now sticky and may be applied directly into the bone defect.

**Literature about biphasic calcium phosphate (BCP) and DS biomaterials**


High osteoconduction and long-term volume preservation

easy-graft™ CRYSTAL achieves an accelerated osteoconductivity thanks to its high micro- and macroporosity as well as its optimally balanced material formulation. The β-TCP (40%) resorbs slowly while the hydroxyapatite (60%) remains in the defect and functions as a highly porous scaffold ensuring long-term volume preservation.

Detail of an easy-graft™ CRYSTAL granule (electron-microscopic image)

Cross section through an easy-graft™ CRYSTAL granule (schematic representation)

Phase I
after application into the defect

A magnification of the enclosed region is shown for phases II to IV

Phase II
after degradation of the polylactide coating

Phase III
proceeding bone formation

Phase IV
the β-TCP part has been degraded, HA is embedded in bone

Hydroxyapatite (HA)
β-Tricalcium phosphate (β-TCP)
Polylactide coating (PLGA)
Bone
Blood
### easy-graft™ CRYSTAL

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### easy-graft™ CLASSIC

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### calc-i-oss™

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