Product Information

MIS Warranty: MIS exercises great care and effort in maintaining the superior quality of its products. All MIS products are guaranteed to be free from defects in material and workmanship. However, should a customer find fault with any MIS product after using it according to the directions, the defective product will be replaced.
Technological advances over the past decade have led to a new era in bone repair and growth. Today, augmentation procedures are a part of routine dental surgical care. Current augmentation methods use materials from different sources such as autografts, allografts, xenografts, and alloplasts, which are in a granulated form. BondBone™ has been developed to facilitate handling and reduce time in dental augmentation procedures.
Overview.

BondBone™ is a novel synthetic bone graft material and is considered to be a breakthrough in the field of dental bone grafting. It is composed of biphasic calcium sulfate, which has well-established and documented biocompatible, osteoconductive, and bioresorbable properties. The biphasic calcium sulfate is fast setting, and its physical properties are not affected by the presence of blood or saliva.
BondBone™ can be mixed with other granular bone-filling agents to prevent particle migration in an osseous defect, creating an outstanding composite graft. It can be used alone in bone regenerative techniques. It can also be used as a resorbable barrier over other bone graft materials.
BondBone™ is available in a granulated powder form that is packaged in 1cc and 0.5cc drivers and marketed in units of three. With its unique driver and implantation method, BondBone™ provides a new approach to bone defect reconstruction. It has several advantages:
Excellent binder
The material is excellent for bonding other granular augmentation materials, allowing easy handling, and preventing particle migration thus obtaining predictable outcomes.

Versatile
In most cases BondBone™ does not require membrane coverage, when used as a composite graft for different kinds of defects or by itself. When used alone, it is ideal for obtaining a complete regeneration in defects that are less than 10mm with at least three-wall bony support. It also can be used as a membrane over other augmentation materials.

Easy handling
BondBone™ allows significant reduction in procedure time. The initial pliable paste hardens in two to five minutes, allowing excellent handling time.

Adaptivity
Its setting is not affected by the presence of blood or saliva.

Pure and safe
BondBone™ does not contain any components other than calcium sulfate.

Osteoconductive
Its unique porous structure allows infiltration of growth factors through its micropores and angiogenesis, as well as cell proliferation through its macropores.

Completely resorbs
It is completely resorbed, leaving behind natural bone.
**Properties** (During Setting)

The setting time allows the practitioner a reasonable working time of approximately three minutes. The heat released after mixing reaches an average reaction temperature of 30°C (85°F) after about three minutes, while the pH of the surrounding tissue remains neutral. The inherent dihydrate phase of BondBone™ reduces the exothermic reaction found in products that use accelerators during setting. This results in reduced patient discomfort.
Material Characteristics (Post-setting)

The morphology of the resulting structure is characterized by a porosity of about 46 percent. The microstructure contains macropores ranging from 300μm to 800μm - allowing angiogenesis formation and cell proliferation to induce bone tissue regeneration - and the micropores range from 1μm to 50μm - allowing infiltration of growth factors. The needlelike particles increase the strength of the cement.

The composition is characterized by an average bioresorption rate that corresponds to the established bone generation rate of approximately four to ten weeks.
**Mechanism of Action.**

Once BondBone™ encounters saline, the granulated powder goes through an efficient setting process. This setting allows the in situ formation of a rigid structure that is highly crystalline despite the intervening harsh environment of blood, proteins, and saliva. In order to shorten the setting time (cement reaction), the reaction is started in the manufacturing plant so that the preset and post-set components of calcium sulfate are combined within the material. The unique particle-size distribution controls the reaction rate and thus controls both the setting time and the microstructure being built. Finally, the resulting microstructure determines the strength and the resorption rate, which is comparable to that of bone growth.

In summary, the composition of BondBone™, characterized by a controlled, predetermined setting time, strength, and resorption rate, can be utilized beneficially in a variety of case types during repair of bone defects.

1. **Seed crystals**

2. **Rapid growth and crystallization**

3. **A crystal net being rapidly built in spite of the harsh environment**
The Concept of Biphasic Calcium Sulfate.

- Highly rigid
- Resorption rate equivalent to that of bone growth
- Not affected by blood and saliva

Hemihydrate

\[ \text{CaSO}_4 \cdot 0.5\text{H}_2\text{O} \]

Dihydrate

\[ \text{CaSO}_4 \cdot 2\text{H}_2\text{O} \]

- Moldable
- Cementable
Clinical Cases.

Case 1 shows BondBone™ being used as a composite graft, combined with granular bone graft material. Case 2 shows BondBone™ being used on its own.

1. Large defect in a narrow ridge following implant failure
2. Using BondBone™ as a composite graft
3. Same area after three months of healing

1. Bone defect before treatment
2. BondBone™ in place
3. Healing after three months
Histology.

Histological sections show a dense lamellar bone is formed without remnants of the bone graft.