Peace of Mind for Sternal Bleeding

TAKING BONE HEMOSTASIS TO ANOTHER LEVEL
CAAP (Calcium Apatite Bone Tamponade) used in Sternum closure procedures. (1), (2)

A Median Sternotomy is a common approach in patients undergoing cardiac surgery. Some of these patients exhibit excessive sternal bleeding and lack of bone stock resulting in significant morbidity such as pain, infection, or non-unions. CAAP provides an effective solution to control bleeding and address poor bone quality.

CAAP is indicated to control bleeding from cut or damaged bone by acting as a mechanical barrier or tamponade. The calcium apatite paste will harden to a composition similar to the mineral phase of bone (hydroxyapatite). A biocompatible scaffold is now created to allow bony ingrowth and return bone to its native architecture. Unlike bone wax and other soluble hemostatic agents, CAAP remodels through a natural cell-mediated process and will be replaced by host bone. CAAP is an ideal product to halt bleeding in even the most difficult to control sternotomy cases (3). There is recent evidence that CAAP may improve bone density in the sternal table, which may have added benefits (1).

These images were presented by Dr. Derek Muehrcke at the 89th Annual Meeting of the American Association for Thoracic Surgery, May 9-13, 2009.

Severely osteoporotic sternum with voids

Voids impacted with CAAP

Preoperative chest CT scan using bone windows measuring 26.7 Hounsfield Units

Same patient postoperative day 31 chest CT scan revealing a small amount of retained cement and improved Hounsfield Units of 275.1

Same patient post operative day 508 chest CT scan revealing complete remodeling of CAAP and increased sternal Hounsfield Units of 418.4
Mixing & Implantation Instructions

CAAP Tamponade Kit is to be stored at controlled room temperature between 15°C to 30°C (59°F to 86°F), mixed and implanted at 19°C to 21°C (66°F to 70°F). Do not mix and implant CAAP until the surgeon is ready to close the sternum at the end of the case. CAAP is designed to be used just prior to closing the sternum after open heart surgery.

**STEP 1**
Open ‘Step 1 Powder Vial’ and pour powder into the mixing bowl, gently tap the vial to ensure maximum transfer of powder.

**STEP 2**
Slowly pour the ‘Step 2 Liquid Vial’ into the mixing bowl. After the liquid has been poured, gently tap the vial to ensure that all of the liquid has been transferred.

**STEP 3 - Mix in 1 minute**
Use the pestle to vigorously mix in circular motion the powder and liquid for approximately 1 minute and make sure to reincorporate the material collecting on the pestle into the mixing process to achieve proper mix.

**STEP 4 - Transfer in 2 minutes**
Surgeon will have 2 minutes to scrape CAAP on to the spatula and implant into the sternum.

**STEP 5**
The material should be packed digitally by blunt instrument with moderate pressure until hemostasis is achieved. Wipe away excess material. CAAP will begin to harden in minutes following application to the warm bloody site and provide hemostasis.
CAAP REFERENCES:


BONE WAX REFERENCES:


Summary of CAAP:

- Stops bleeding immediately
- Remodels into bone
- Easy-to-use (mixes in 1 minute)
- No adhesive properties
- May improve bone density (1), (2)
- Isothermic
- Biocompatible