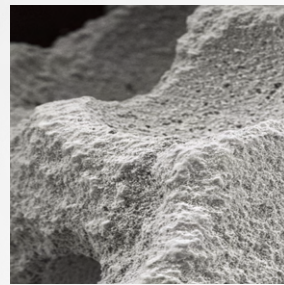


Challenging Spongy bone!

Bone Matrix I™

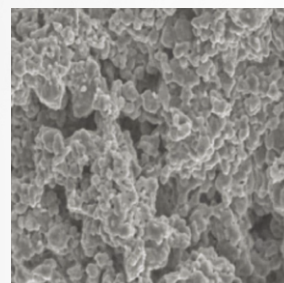
- **UNIQUE CELL-FRIENDLY** Celike® surface
- **BETTER WETTABILITY** than Spongy bone
- **MAINTAIN SPACE** during bone regeneration
- **OUTSTANDING RAPID** new bone formation

Can synthetic bone have the advantages of Spongy bone?



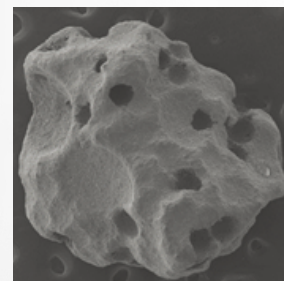
Superior cell attachment thanks to unique Cell-friendly Celike® surface

- **Distinct buffed surface** of Bone Matrix I™ called **Celike®** that differs from smooth surface of spongy bone
- **Comparable** network structure to spongy bone
- **Activates** tissue fluids & cell adhesion.



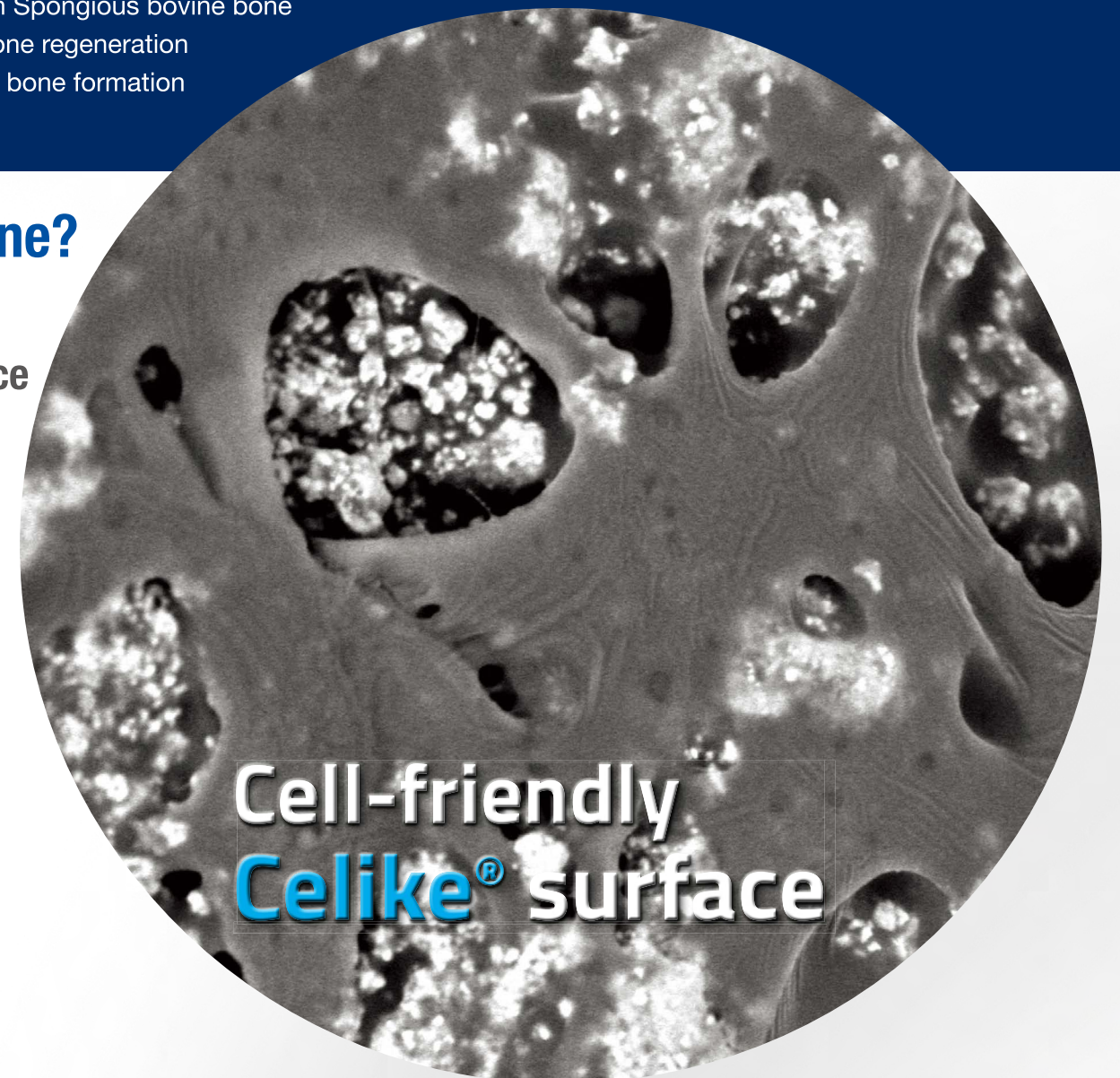
Porosity similar to spongy bone, but better Wettability

- **Ideal** surface area to increase bone regeneration
- **Perfect combination** of macropores(100~500um) for inflow of blood & stem cells + micropores(≤10um) for inflow of growth factor
- **Adequate space maintenance** due to fully interconnected structure of macropores and micropores.
- **Exceptional** blood wettability for **Outstanding** new bone formation



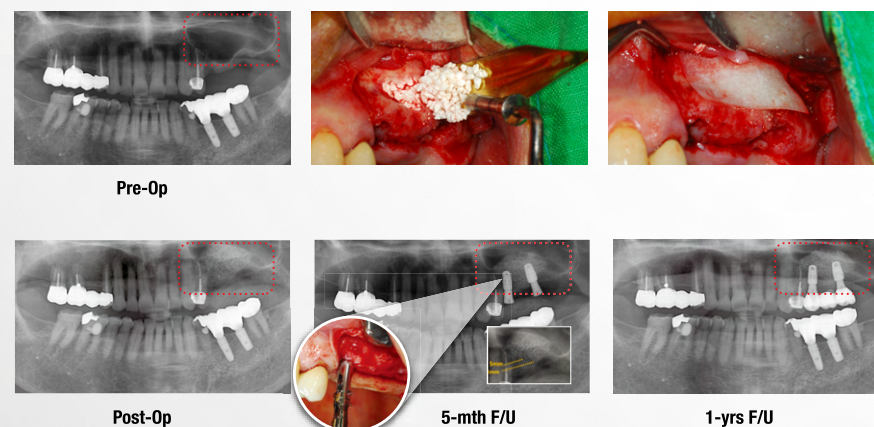
Faster new bone formation with ideal ratio of HA and β-TCP

- **Comparable** mineral content to Spongy bone
- **Ideal ratio** of β-TCP rapid absorption & HA space support ability (HA:β-TCP=60:40) even small particles maintain 60:40 combination ratio.
- **Accelerates** the growth of cells and blood vessels



Cell-friendly
Celike® surface

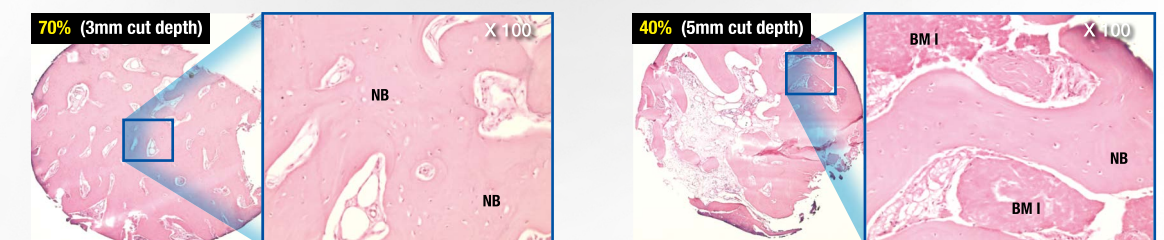
HIGH DENSITY of new bone formation



Reported by Dr. Dae-hee Lee,
Clinical Advisor for Bone Matrix I

About 5 months after a sinus graft procedure using 100% Bone Matrix I, two AnyOne implants were placed, followed by a temporary bridge after 3 months and the final restoration after a further 3 months. The ISQ values were 77 for #25 and 64 for #27 at the time of implant placement and increased to 82 for #25 and 74 for #27 at the time of final restoration, which is significant as #25 had about 3mm residual bone, while #27 had almost no residual bone. When comparing the radiographs, the synthetic bone also exhibited a slightly lower radiopacity at the time of final restoration, indicating BCP absorption and the formation of new bone. Meanwhile, the appearance of radiopaque new lamina dura in the uppermost area of the sinus cavity bone graft site indicated the establishment of osteogenesis without any evidence of inflammation. Thus, while long-term follow-up of at least five years is still required, the initial 1-year findings show fully effective results when using 100% Bone Matrix I for maxillary sinus bone grafting.

Bone formation after 5mths



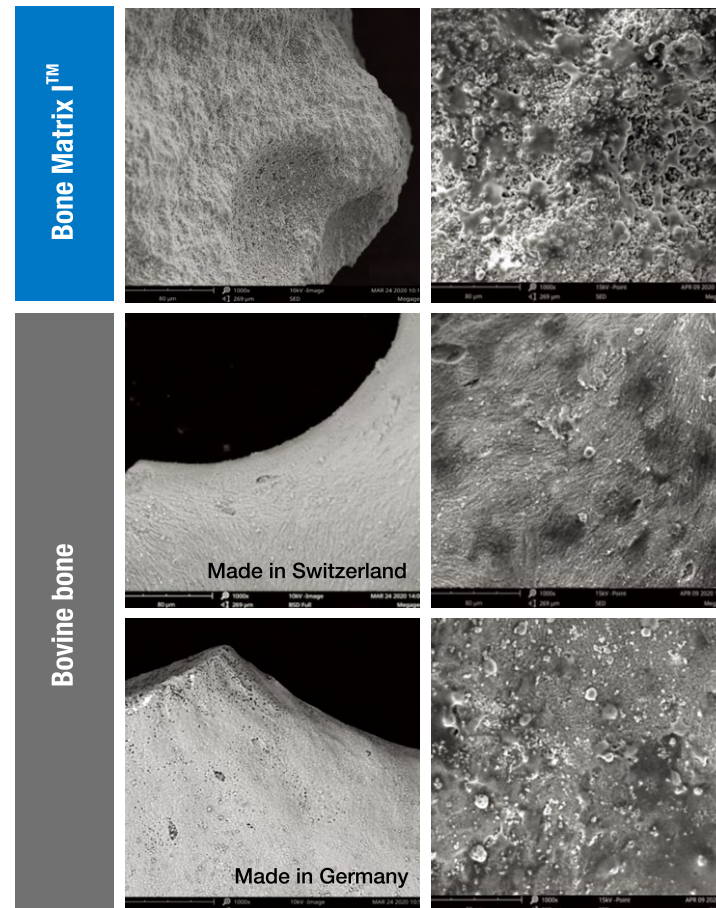
Test results using Bone Matrix I show significant new bone growth after 5 months at cut depths of 3mm and 5mm. In contrast to the bone bridging effect of xenograft materials, the alloplastic Bone Matrix I graft material is physicochemically dissolved and absorbed by the tissue fluids and macrophages via phagocytosis, creating a framework for vital bone formation where the new osteoid was shown to contain osteocytes in lacunae. No inflammatory cells, such as multinucleated giant cells, were observed around the connective tissues or blood vessels. A previous study* of xenograft reported a 12.5% density of new bone formation at 6 – 8 mths, representing a bridging effect rather than neoplasm. **IN SIGNIFICANT CONTRAST**, Bone Matrix I produced a 40% density of new bone formation at 5mths.

* Comparison of Mineralized Cancellous Bone Allograft (Puros) and Anorganic Bovine Bone Matrix (Bio-Oss) for Sinus Augmentation: Histomorphometry at 26 to 32 Weeks After Grafting. Stuart J. Froum, Stephen S. Wallace et al. The International Journal of Periodontics & Restorative Dentistry Volume 26, Number 6, 2006

Structure (Celike®)

Comparison of surface & cell attachment

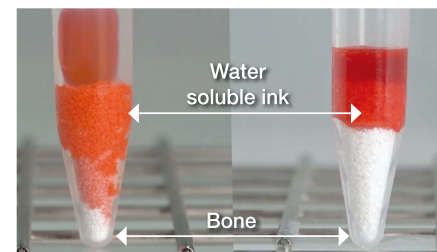
- Buffed surface of Bone Matrix I™ **attractive** for tissue fluids & cell adhesion
- Bone Matrix I shows **superior** initial cell attachment (*see below*)



* Cells: MC3T3-E1 (mouse osteoblasts) 1.6 x 10⁵ cell/ml

Wettability

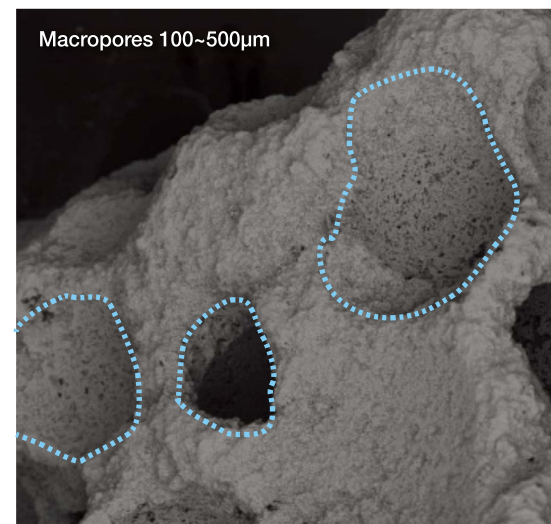
- Bone Matrix I™ has **high wettability** for unrestricted blood supply to promote cell attachment & growth
- These pores also maximize the surface area to increase bone regeneration
- Bone Matrix I™ provides **ideal combination** of macropores & micropores, ranging from 5 – 500µm, creating **maximim** cell adhesion



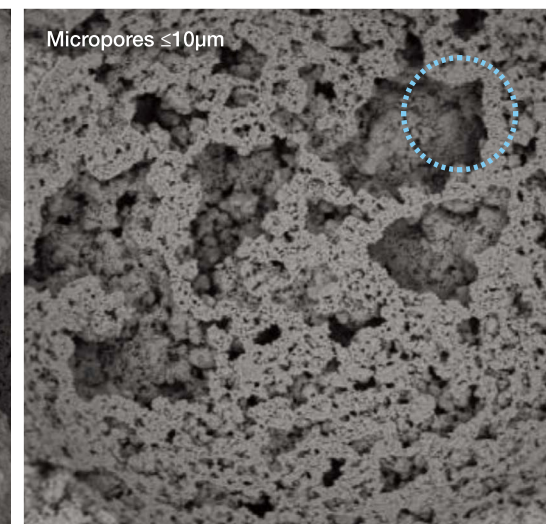
Bone Matrix I™ Spongy bovine bone

	Bone Matrix I™	Spongy bovine bone
Total porosity	84%	86%

Porosimeter analysis (Quantachrome, PM33GT)



Macropores 100~500µm



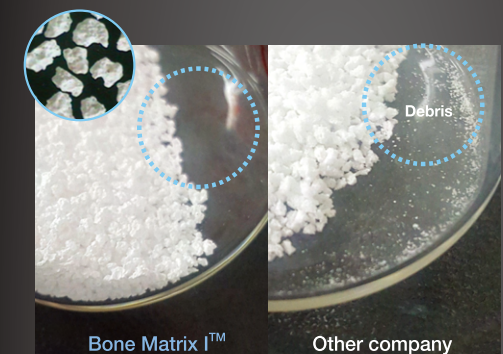
Micropores ≤10µm



0.6-1.0mm

0.8-1.2mm

Small size (0.6~1mm)	Large size (0.8~1.2mm)
0.15g	0.15g
0.25g	0.25g
0.50g	0.50g
1.00g	1.00g

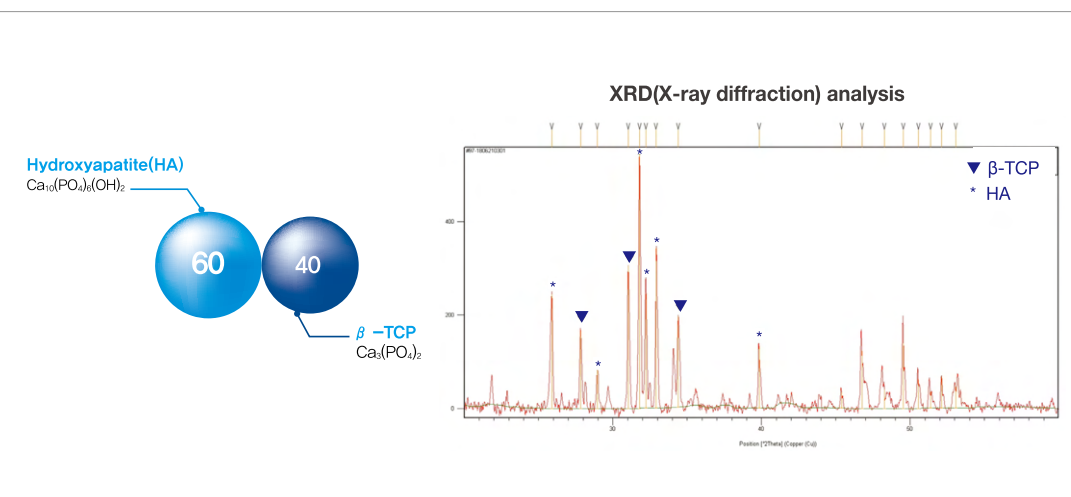
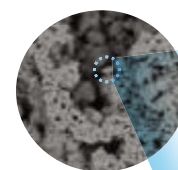


Bone Matrix I™ Other company

Minimize debris generation through additional production process
The rounded particle shape of Bone Matrix 1 minimizes any risk of perforating the maxillary sinus membrane during a crestal approach & reduces the chance of inflammation caused by debris generated during placement.

Minerals

- Thanks to Cross-molecular bonding using sol-gel method, a high-quality chemical manufacturing method that other companies do not use due to processing efficiency, even small particles maintain 60:40 combination ratio.
- HA is a component of Spongy bovine bone, and functions similarly. HA, which is not very absorbable, acts as a scaffold to maintain the volume stability.
- β-TCP is rapidly absorbed and promotes the growth of cells and blood vessels. However, β-TCP contracts quickly, causing slumping
- Thus, the combination of HA and β-TCP creates an ideal synergy.



Given the recent discussions on long latency periods related to coronaviruses in animals, perhaps it is important to **RE-THINK** the use of bovine bone in human patients...

The limited ability to screen prions within the animal genome, along with the long latency period to manifestation of bovine spongiform encephalopathy (BSE) (1 - over 50 yrs) in infected patients, provides a framework for discussing possible long-term risks of the xenografts that are used so extensively in dentistry. We suggest abolishing the use of bovine bone.

Clin Implant Dent Relat Res. 2016 Dec.

AN IMPORTANT CHOICE...