ArrowBone-β

Fully Resorbable Beta-TCP
Bone Reconstruction Material

ArrowBone-β

May 10th, 2013
Acquisition of International Patent on bone substitution material and its manufacturing method
No.WO2009/148147 AI

特 許 証
(CERTIFICATE OF PATENT)

特許第5263992号
(PATENT NUMBER)

発明の名称 (TITLE OF THE INVENTION) 骨補填材及びその製造方法

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この発明は、特許するものと確定し、特許原簿に登録されたことを証する。
(THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE JAPAN PATENT OFFICE.)

平成25年 5月10日(May 10, 2013)

特許庁長官 (COMMISSIONER, JAPAN PATENT OFFICE) 深野弘行

2006: USA FDA Marketing Clearance
2014: Japan Marketing Approval
2016: ISO 13485

Bone Filler / Bone Substitution Materials

Category	Typical Materials
Autogenous	Bones taken out from own intra-oral sites Bones taken out from outside of own intra-oral sites
Allogeneic	FDBA・DFDBA
Xenograft	Bio-Oss・Osteograf/N・PepGen-15 BioCoral
Alloplast	**Plaster of Paris（calcium sulfate）** **Bioactive Ceramics（Resorbable β-TCP / Non-resorbable HA）** **Bioactive Glasses（PerioGlas・BioGran）**

ArrowBone-β

Alloplast

Property of ArrowBone-β

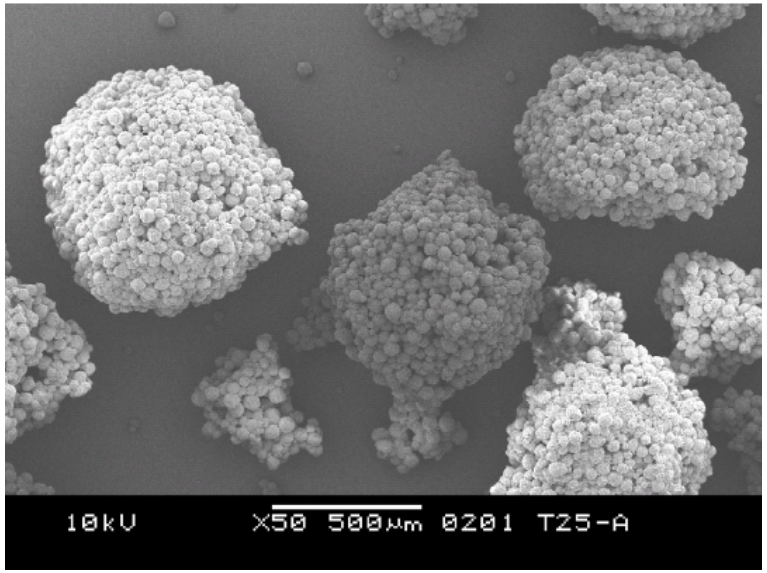
Form：Open porous granule structure

Granule size ： 250-1000μm / 1000-2000μm

Porosity：75%

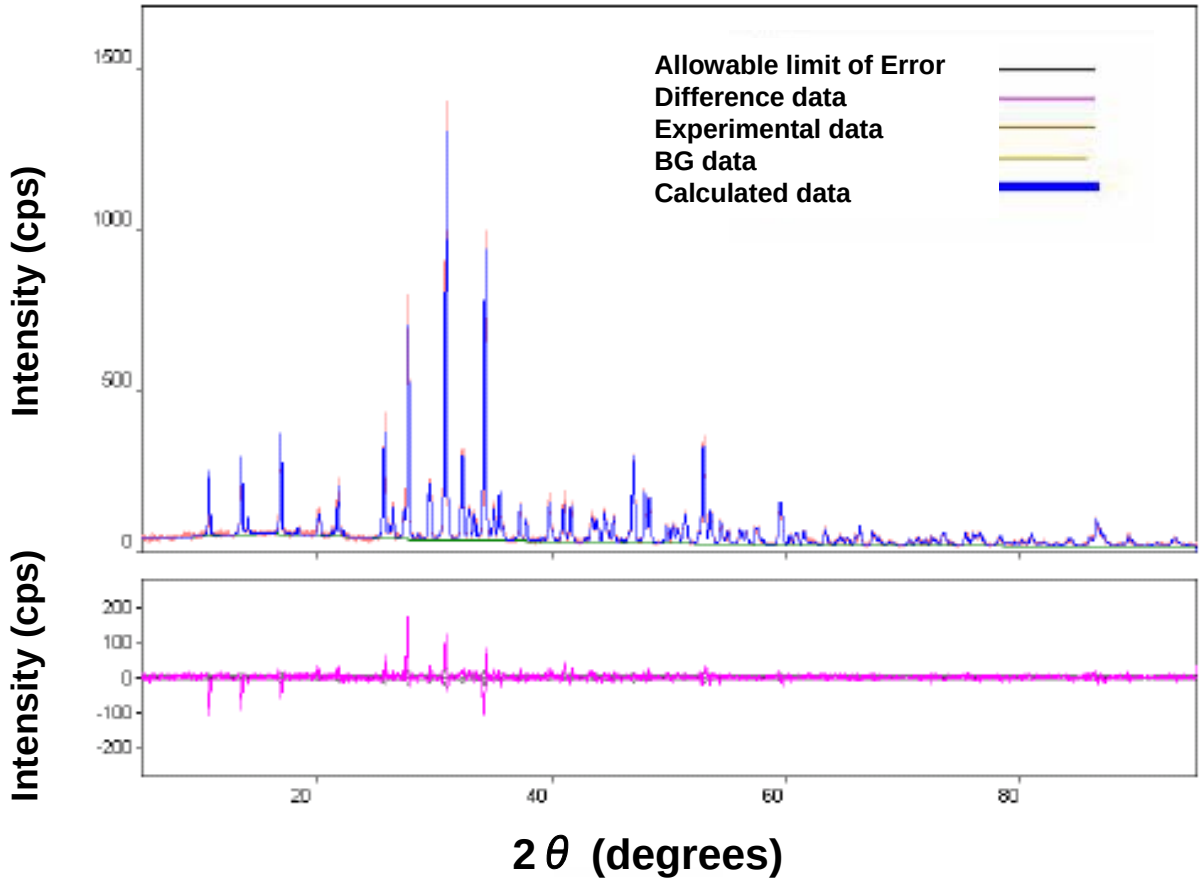
Hydrophilicity：Excellent

Biocompatibility： Excellent



ArrowBone-β

X-Ray Diffraction Analysis of *ArrowBone-β*



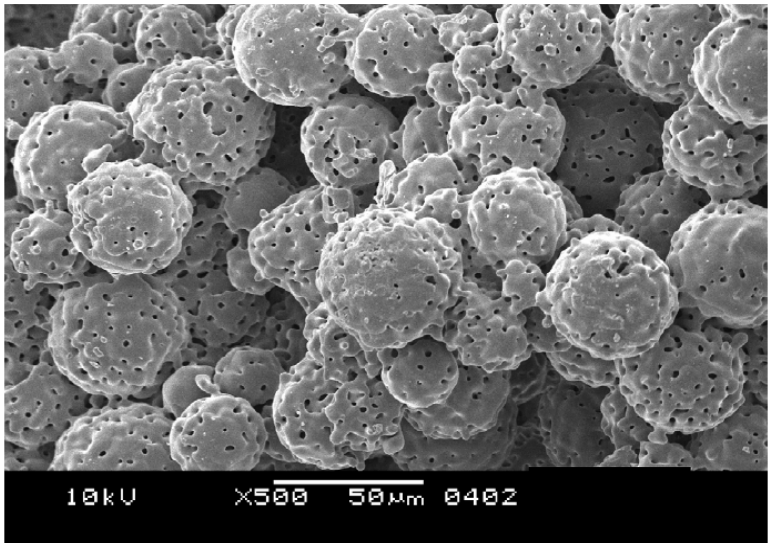
It was proved that *ArrowBone-β* is a single-phase β-tricalcium phosphate with almost 100% purity.

ArrowBone-β

What is the bone reconstruction material, *ArrowBone-β, Synthesis*?

- **ArrowBone-β is the β-TCP (Ca3PO4) -based bone regeneration material that has the highest bone reconstruction capability.**
- **ArrowBone-β dissolves concurrently with the bone regeneration process and are rapidly and completely resorbed within the body.**
- **As it consists of high-purity β-TCP material, potential infection risks associated with bone substitutes of biological origin are avoided.**

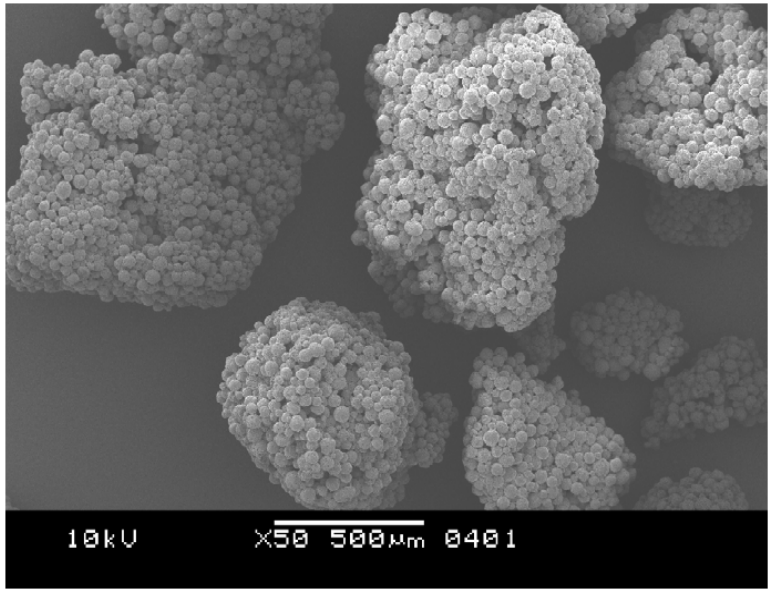
What is the bone reconstruction material, *ArrowBone-β, Synthesis ?*



An innovative **multi-porous structure** created by agglomerating **micro-particles (50 µm)** to produce **macro-granules (800 µm)**.

Its **high porosity** and **interconnected pores** running through the granules assure adequate surface area and blood flow for dissolution and provide **an excellent scaffold for bone regeneration**.

What is the bone reconstruction material, *ArrowBone-β, Synthesis ?*



Excellent resorbability

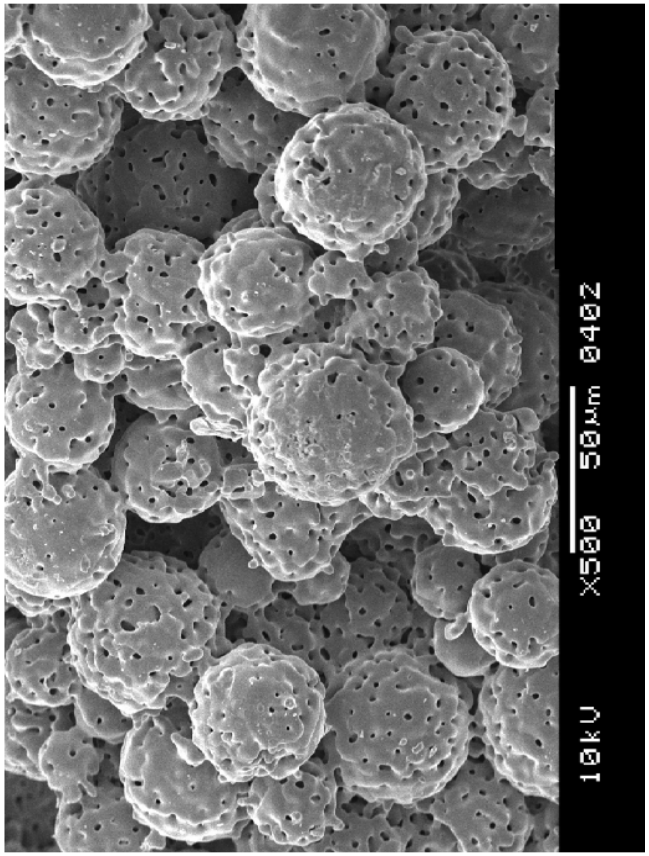
Excellent substitution capability

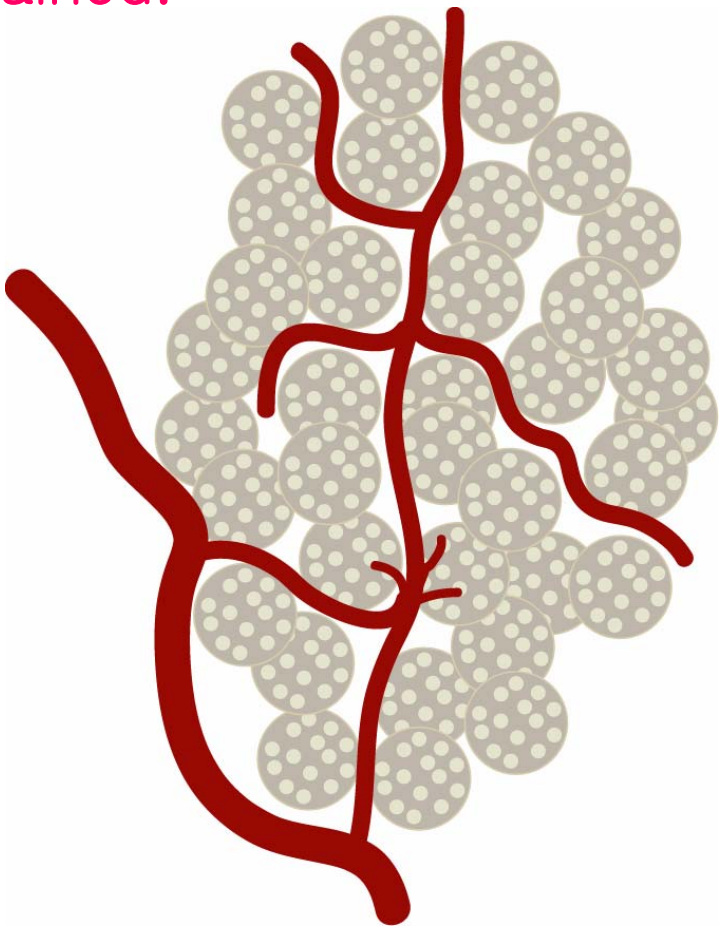
Excellent shaping capability

BrainBase Corporation

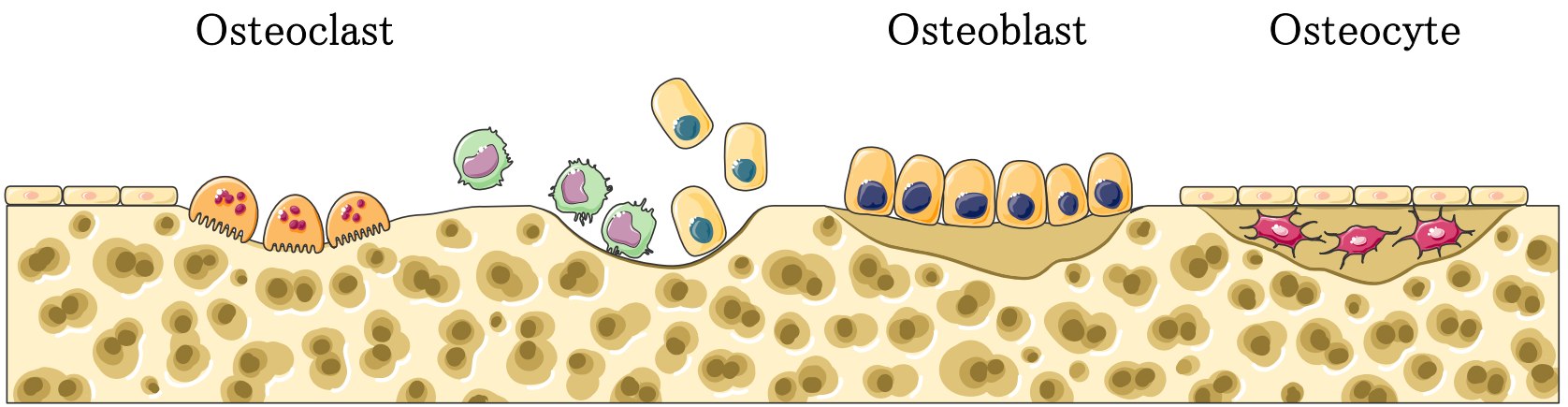
Image of ArrowBone-β

Capillary infiltration into the inside of the granule and the inter-granular spaces can be gained.





Bone Resorption and Bone Formation



After bone resorption is done by osteoclast, osteoblast emerges.
Subsequently, bone formation is done.

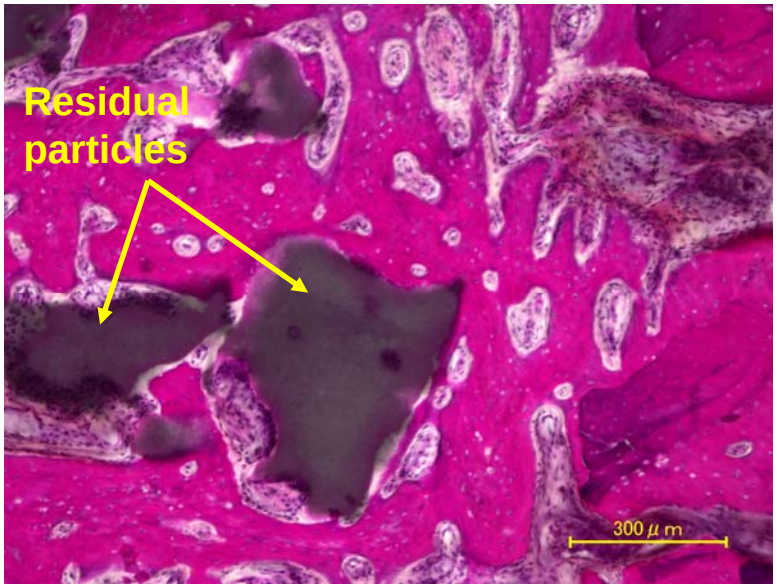
H-E stained tissue specimens eight weeks after filling

Bone defect side Existing bone

ArrowBone-β

ArrowBone-β granules were degraded, and the defects were filled with newly formed bone within which only a few granules remained to be observed.

Bone defect side Existing bone

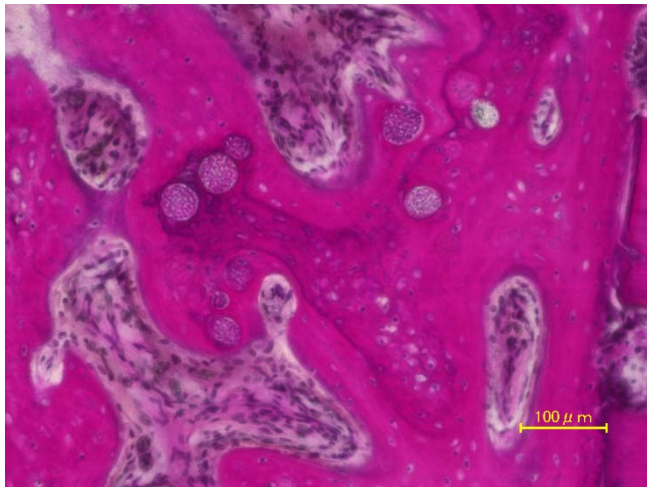


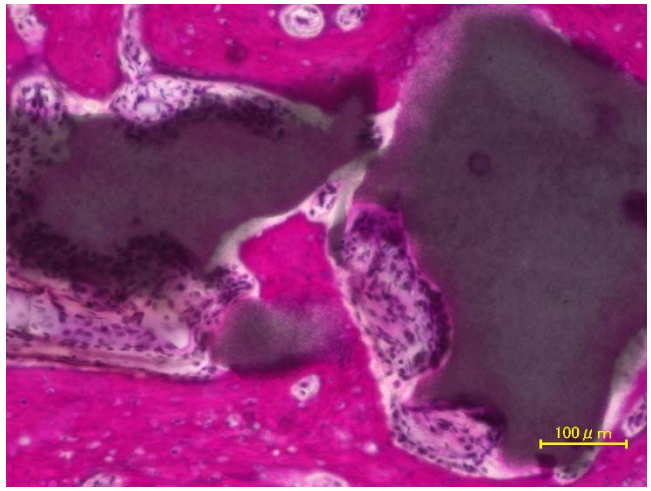
Compared product

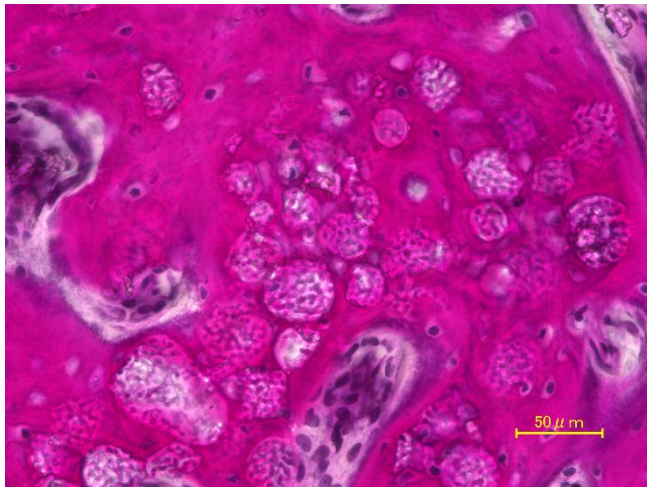
Most of the granules of the compared products remained, although their diameter decreased to some degree. They were surrounded by granulation tissue only a part of which was replaced by newly formed bone.

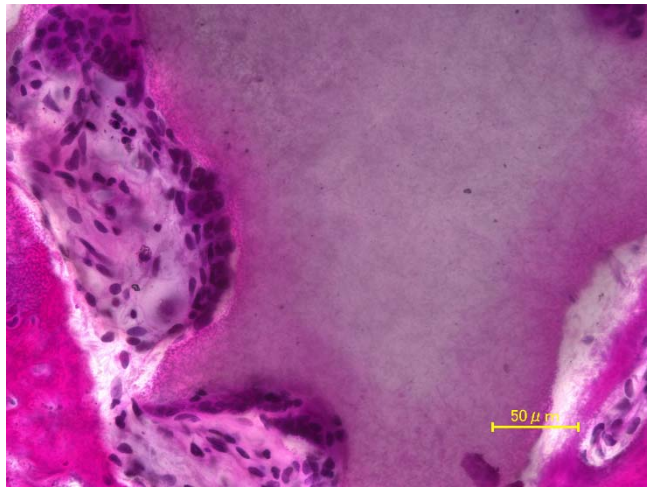
ArrowBone-β

H-E stained tissue specimens eight weeks after filling







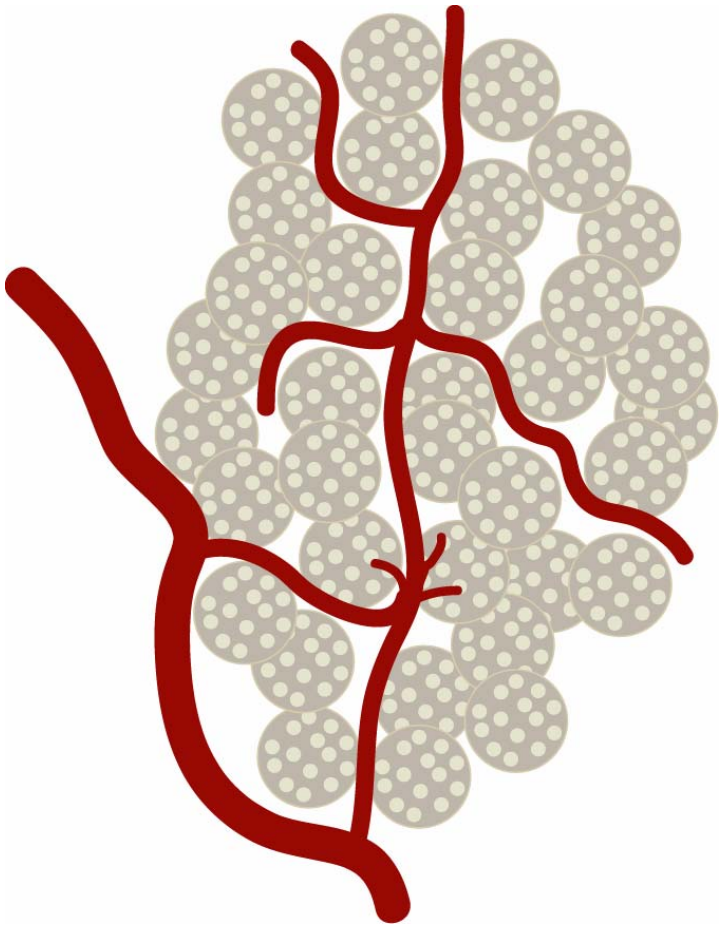


ArrowBone-β

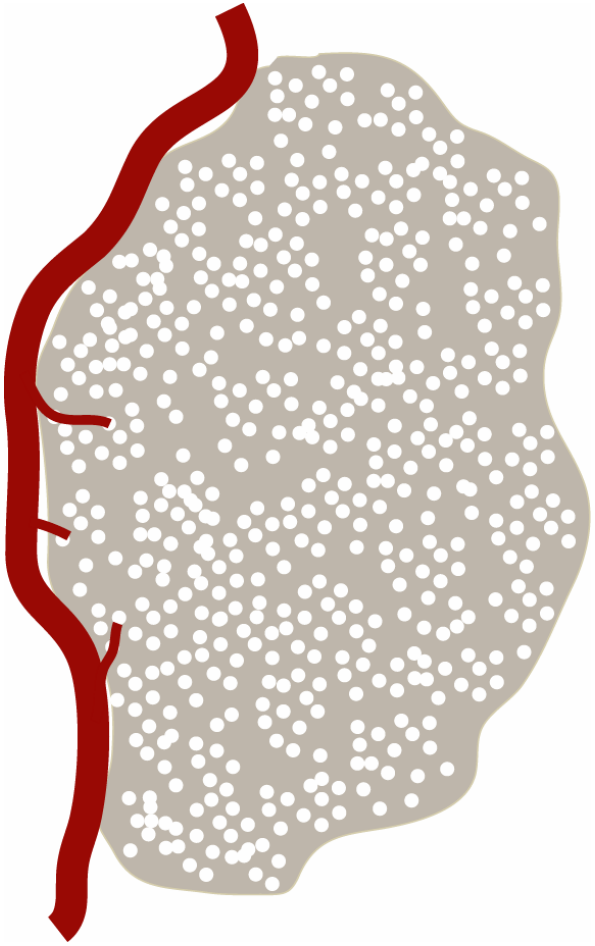
Compared product

ArrowBone-β

Image of *ArrowBone-β*



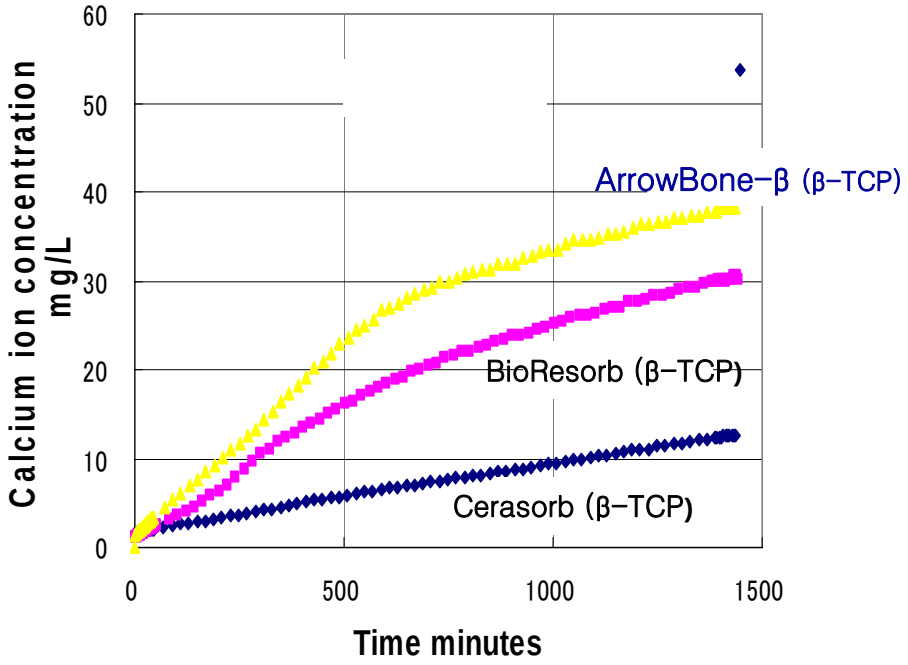
ArrowBone-β



Compared product

ArrowBone-β

Comparison of dissolution rate

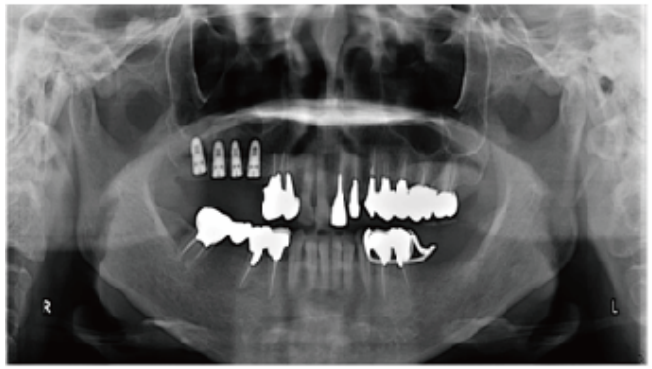


※ The data were obtained at Chemsultants International Inc. (an ISO/IEC-accredited testing laboratory) in the United States.

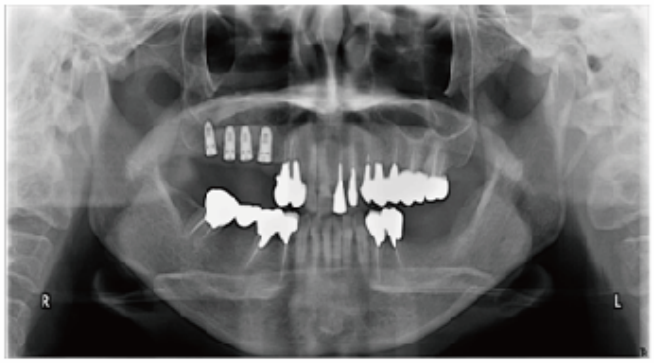
ArrowBone-β showed higher dissolution rates, which can result in rapid replacement by bone.

Clinical Applications

Elevation of the maxillary sinus floor

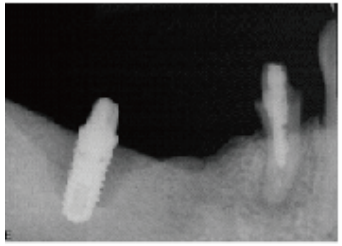


Before



After

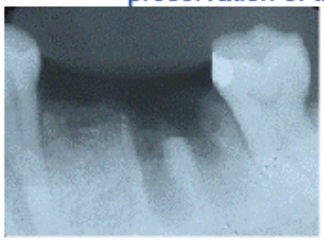
Recovery of peri-implant defects



Before

After

Extraction sockets to enhance preservation of the alveolar ridge



Before

After